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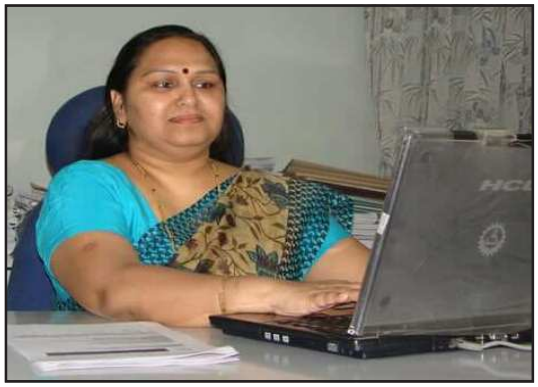
Preface



It is with deep satisfaction that I write this preface to the Special Edition of the Journal of the **International Conference on "Transforming Education through Excellence in Management and Adaptive Technologies"**, organized on **17th & 18th January 2026 at B.V.M. College of Management Education, Yamuna Nagar, Thatipur, Gwalior (M.P.), India**.

In the rapidly evolving global environment, education systems are undergoing significant transformation driven by technological advancements, innovative management practices and the increasing demand for adaptive learning frameworks. Institutions across the world are continuously striving to develop educational models that promote excellence, flexibility and inclusivity. The integration of management strategies with emerging technologies has become essential for enhancing the quality of education and preparing learners for the dynamic challenges of the modern era. Transforming education requires a collaborative approach that brings together academicians, researchers, industry professionals and policymakers to exchange ideas and experiences. Adaptive technologies, digital learning platforms, artificial intelligence, and innovative management techniques are playing a vital role in reshaping the educational landscape. These advancements not only improve accessibility and efficiency but also contribute to the development of skills required for sustainable growth and global competitiveness.

Keeping these perspectives in view, this **two-day International Conference** has been organized to provide a platform for scholars and experts from diverse disciplines to discuss contemporary trends, research findings and innovative practices in the fields of education, management and technology. The conference aims to foster meaningful dialogue and promote collaborative research that can contribute to transforming education systems and enhancing institutional excellence.

The conference has brought together eminent academicians, researchers, industry experts, and scholars who have shared their valuable insights, experiences, and research contributions on various emerging aspects of management and adaptive technologies in education. The research papers presented in this conference reflect diverse perspectives and offer valuable knowledge for future academic and professional developments.

I would like to express my sincere gratitude to all the **reviewers and editors** for their valuable time and efforts in reviewing the research papers. I also extend my heartfelt appreciation to the **authors, organizing committee members and participants** whose contributions have made this conference successful. Special thanks are due to the **College Executive Director – Mr. Abhishek Jain, Dr. Deepika Bhatnagar (Principal – Education), Dr. Saurabh Goyal (Principal – Management) and all the faculty and staff members of B.V.M. Group of Institutions** for their dedicated support in organizing this International Conference.

Savita Singh
(Chairperson)

Executive Director's Message

It is a privilege to present the proceedings of the International Conference on "Transforming Education through Excellence in Management and Adaptive Technologies," hosted by B.V.M. College of Management Education, Gwalior, on 17–18 January 2026.

The conference was established with the vision of fostering meaningful scholarly dialogue among academicians, industry professionals, and researchers. In today's knowledge-driven society, higher education is undergoing a significant transformation driven by rapid technological advancements, including the integration of artificial intelligence, data analytics, and digital ecosystems. At the same time, globalization has increased interconnectedness and emphasized the need for globally aligned educational standards, while innovative management practices are redefining paradigms in teaching, learning, and knowledge dissemination.

The event witnessed enthusiastic participation from eminent experts across the globe, whose insightful deliberations enriched the academic discourse and provided fresh perspectives on the challenges and opportunities presented by adaptive technologies in modern education.

I would like to express my sincere gratitude to all contributors and reviewers for their rigorous scholarly input and commitment to excellence. I also extend my appreciation to the organizing committee, including the dedicated faculty, staff, and students of B.V.M. College, whose collective efforts ensured the successful conduct of the conference. Special thanks are due to Naveen Shodh Sansar, particularly Mr. Ashish Narayan Sharma, for facilitating the online publication of these proceedings.

I am confident that the research compiled in this volume will serve as a valuable resource, inspiring further innovation and encouraging continued dialogue in the fields of management and technology. It will also contribute significantly to bridging the gap between academic research and practical implementation in the evolving educational landscape. I hope that this compilation motivates future researchers to explore new dimensions and develop sustainable solutions for the advancement of education.

Abhishek Jain
Executive Director

Principal's Message

It is a matter of great pride and privilege to present the proceedings of the International Conference on *"Transforming Education through Excellence in Management and Adaptive Technologies,"* organized by B.V.M. College of Management Education, Gwalior, on 17–18 January 2026 at Yamuna Nagar, Thatipur, Gwalior (M.P.), India. This conference was envisioned as a vibrant intellectual platform to foster meaningful dialogue, knowledge exchange, and collaborative engagement among academicians, researchers, industry professionals, and scholars from diverse disciplines.

In an era marked by rapid technological advancement and global interconnectedness, higher education is witnessing a profound transformation. The emergence of adaptive technologies, artificial intelligence, and data-driven decision-making is reshaping the landscape of teaching, learning, and knowledge dissemination. These developments call for continuous innovation, critical inquiry, and interdisciplinary collaboration—making academic forums such as this conference increasingly relevant and essential.

The conference received an overwhelming response, with the participation of distinguished academicians, researchers, and industry experts from across the nation and abroad. Their insightful contributions and scholarly deliberations have significantly enriched the discourse, offering valuable perspectives on contemporary challenges and emerging opportunities in the fields of management, education, and technology.

I extend my heartfelt appreciation to all contributors, reviewers, and participants for their invaluable support and intellectual contributions. I also express my sincere gratitude to the organizing committee, faculty members, staff, and students whose dedication, teamwork, and commitment ensured the resounding success of this event. I would like to place on record my special thanks to Mr. Ashish Narayan Sharma of Naveen ShodhSansar Research Journal for facilitating the online publication of the conference proceedings.

I firmly believe that the research compiled in this volume will make a significant contribution to academic scholarship and will serve as a catalyst for further research and innovation in the domains of management, education, and adaptive technologies.

Dr. Deepika Bhatnagar
(Principal - Education)

Principal's Message

BVM College of Management Education has always upheld the mantle of academic excellence and has remained committed to providing students with an environment where they could learn, grow, and broaden their horizons of knowledge. The institution continuously strived to enhance the quality of education by embracing innovative teaching methods, research-oriented learning and meaningful academic discourse. In its endeavor to meet the evolving needs of society and the global academic community, the institution remained dedicated to promoting knowledge, creativity and professional competence.

In this spirit, **B.V.M. College of Management Education organized the International Conference on "Transforming Education through Excellence in Management and Adaptive Technologies" on 17th & 18th January 2026 at Yamuna Nagar, Thatipur, Gwalior (M.P.), India**. The conference provided an academic platform for scholars, academicians, industry professionals and researchers to deliberate upon emerging trends, innovations, and challenges in the fields of management, education, and technology.

In the present era, rapid technological advancements, globalization, and digital transformation have significantly influenced the education sector. Adaptive technologies, artificial intelligence, data-driven decision-making, and innovative management practices have reshaped the way education is delivered and experienced. Such developments have presented both opportunities and challenges for institutions, educators and learners. Through this conference, meaningful discussions were encouraged that contributed to improving educational systems and fostering academic excellence. Eminent academicians, researchers and industry experts from different parts of the country and abroad participated in the conference and shared their valuable insights and experiences. Their participation helped in understanding the evolving landscape of education and management practices and inspired new research ideas and collaborative opportunities.

I extended my heartfelt welcome to all the academicians, industry experts, research scholars and students who participated in this conference. I also expressed my sincere gratitude to the organizing committee, faculty members, staff and students whose dedication and efforts made the organization of this conference possible. I want to thank Mr. Ashish Narayan Sharma of Naveen ShodhSansar Research Journal for providing us with the platform for online publication.

I am confident that this International Conference served as a meaningful platform for intellectual exchange and contributed significantly to the advancement of knowledge in the fields of management, education and adaptive technologies.

Dr. Saurabh Goyal
(Principal-Management)

Naveen Shodh Sansar (An International Refereed / Peer Review Multidisciplinary Research Journal)
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Digital Transformation, Innovation and Future- Ready Learning Ecosystems

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Abstract- The digital transformation of higher education institutions (HEIs) has accelerated due to rapid technological advancements, globalization, and evolving learner expectations. Smart management systems have emerged as a strategic response to enhance governance, teaching-learning processes, institutional performance, and sustainability. This article examines the role of smart management systems in higher education, emphasizing governance and policy frameworks, data-driven decision-making, digital leadership, innovative pedagogy, and emerging technologies such as artificial intelligence, learning analytics, and immersive environments. The study also addresses quality assurance, inclusivity, ethics, cyber security, and lifelong learning. The article concludes that smart management systems are essential for building resilient, inclusive and competitive higher education ecosystems in the digital age.
Keywords- Smart Management Systems, Higher Education, Digital Transformation, Digital Pedagogy, Learning Analytics, Artificial Intelligence.

Introduction - Higher education institutions are experiencing unprecedented transformation driven by technological innovation, knowledge-based economies, and changing societal demands. Traditional administrative and pedagogical models are increasingly insufficient to address challenges related to scalability, quality assurance, and learner engagement. Digital transformation has therefore become a strategic priority for HEIs worldwide (Selwyn, 2016).

Smart management systems integrate digital technologies, data analytics, and intelligent decision-making tools to support governance, academic delivery, and administrative efficiency. These systems enable institutions to respond proactively to emerging challenges while ensuring quality, inclusivity, and sustainability (Al-Haddad & Kotnour, 2015).

Governance and Policy Frameworks for Digital Transformation- Effective governance is fundamental to the successful implementation of smart management systems. Governance and policy frameworks provide strategic direction, ensure regulatory compliance, and promote accountability in digitally transformed institutions (OECD, 2020). National and international education policies increasingly emphasize outcome-based education, accreditation standards, and technology integration to enhance global competitiveness.

Institutional policies related to digital ethics, data protection, accessibility, and cybersecurity are critical for maintaining stakeholder trust and ensuring responsible digital transformation (UNESCO, 2021).

Data-Driven Management for Performance Monitoring and Institutional Growth- Data-driven management has become central to institutional effectiveness in higher education. Big data and learning analytics enable HEIs to monitor academic performance, student engagement, retention, and operational efficiency (Siemens & Long, 2011). Predictive analytics supports early identification of at-risk students and enables timely interventions.

By leveraging evidence-based decision-making, institutions can align strategic planning with measurable outcomes, thereby supporting continuous improvement and sustainable growth (Daniel, 2015).

Digital Leadership in Academic Ecosystems - Digital leadership plays a critical role in driving innovation and managing organizational change in higher education. Leaders must possess not only technological competence but also the ability to foster a digital culture that encourages collaboration, experimentation, and continuous learning (Sheninger, 2019).

Strategic -making through disruptive technologies such as artificial intelligence, cloud computing, and automation enhances institutional agility and responsiveness in competitive academic environments (Westerman et al., 2014).

Innovation, Entrepreneurship, and Lifelong Learning - Smart management systems support innovation and entrepreneurship by enabling flexible, technology-rich learning environments. Universities increasingly act as

innovation hubs that foster entrepreneurial mindsets, interdisciplinary learning, and industry collaboration (Etzkowitz & Leydesdorff, 2000).

Lifelong learning, reskilling, and up skilling are essential in the digital society. Online platforms, micro-credentials, and open educational resources provide learners with continuous opportunities for professional development and career advancement (European Commission, 2020).

Technology-Enabled Inclusive Education and Universal Access- Digital technologies have the potential to significantly enhance inclusivity and access to higher education. Technology-enabled inclusive education ensures that learners from diverse backgrounds can access learning resources irrespective of physical, geographical, or socio-economic constraints (UNESCO, 2020).

Assistive technologies, adaptive learning systems, and cloud-based platforms support equity and learner well-being. Ethical considerations must guide technology adoption to prevent digital divides and ensure fairness (Williamson & Hogan, 2020).

Innovative Teaching Methods and Digital Pedagogy - Digital pedagogy emphasizes learner-centered approaches and the development of 21st-century skills such as critical thinking, creativity, collaboration, and digital literacy (Redecker, 2017). Innovative teaching methods include blended and hybrid learning, flipped classrooms, problem-based learning, and gasification.

Smart classrooms equipped with interactive digital boards and immersive technologies enhance engagement and support outcome-based education aligned with accreditation standards (Garrison & Vaughan, 2008).

Teacher Training and Professional Development- Faculty readiness is a key determinant of successful digital transformation. Continuous professional development programs enhance educators' digital competence, instructional design capabilities, and assessment practices (Koehler & Mishra, 2009). Virtual learning communities and professional networks support collaborative learning and pedagogical innovation.

Emerging Technologies in Higher Education

1. **Artificial Intelligence and Machine Learning-** AI and machine learning enable personalized learning, intelligent tutoring systems, automated assessment, and academic advising. These technologies improve efficiency while supporting student-centered learning experiences (Holmes et al., 2019).
2. **Big Data and Learning Analytics-** Learning analytics enhance personalization by analyzing learner behavior, engagement patterns, and performance data to optimize instructional strategies (Ferguson, 2012).
3. **Internet of Things for Smart Campuses-** IoT technologies improve campus management through smart classrooms, energy optimization, security systems, and administrative automation (Min-Allah &Alrashed, 2020).
4. **Blockchain Technologies-** Blockchain ensures secure, transparent, and tamper-proof academic records, certifications, and credential verification, enhancing trust and mobility (Sharples & Domingue, 2016).
5. **Virtual Reality, Augmented Reality, and the Metaverse-** VR and AR support immersive learning through simulations and virtual laboratories, enhancing experiential and skills-based learning (Radianti et al., 2020).

Student Engagement through Gamification and Immersive Technologies - Student engagement is a critical determinant of learning success and institutional effectiveness in higher education. In digitally enabled environments, gamification and immersive technologies have emerged as powerful tools to enhance learner motivation, participation, and persistence. Gamification refers to the integration of game design elements—such as points, badges, leaderboards, challenges, and rewards—into non-game educational contexts to influence learner behavior and engagement.

Research indicates that gamified learning environments foster active participation, improve knowledge retention, and encourage collaborative learning. When combined with learning management systems (LMS), gamification enables continuous feedback, formative assessment, and self-regulated learning. Immersive technologies such as virtual reality (VR), augmented reality (AR), and mixed reality further enhance engagement by providing experiential and simulation-based learning opportunities. These technologies are particularly effective in disciplines requiring practical skills, such as engineering, medicine, management simulations, and teacher education.

From a smart management perspective, engagement analytics derived from gamified and immersive platforms provide valuable insights into learner behavior, participation patterns, and learning outcomes. These insights support evidence-based instructional design, curriculum improvement, and student support strategies

Quality Assurance, Accreditation, and Compliance - Quality assurance (QA) remains a fundamental pillar of higher education, particularly in digitally transformed institutions. Technology-enabled education requires revised QA frameworks that address online delivery, digital assessment, academic integrity, and learner authentication. Accreditation bodies increasingly emphasize outcome-based education, alignment of learning outcomes with assessment methods, and continuous quality improvement. Smart management systems support QA and accreditation through automated reporting, performance dashboards, and digital documentation of learning outcomes and assessment evidence. Learning analytics and institutional research systems enable continuous monitoring of academic quality, student achievement, and program effectiveness. Compliance with national and international accreditation standards enhances institutional credibility, global recognition, and stakeholder confidence.

Furthermore, technology facilitates transparency and

accountability by enabling real-time data access, audit trails, and standardized reporting mechanisms. As a result, smart QA systems contribute to sustainable academic excellence and institutional resilience.

Cyber security, Data Privacy, and Ethical Considerations- The increasing reliance on digital platforms and data-intensive systems exposes higher education institutions to cyber security threats and data privacy risks. Cyberattacks, data breaches, and unauthorized access can compromise sensitive academic and personal information. Therefore, cyber security has become a strategic priority within smart management systems.

Institutions must implement robust information security frameworks, including secure authentication mechanisms, encryption, access control, and regular security audits. Compliance with data protection regulations and ethical data governance practices ensures the responsible collection, storage, and use of student and institutional data.

Ethical considerations extend beyond security to include issues such as algorithmic bias, transparency of artificial intelligence systems, and the impact of digital surveillance on learner autonomy and well-being. A balanced approach that integrates technological innovation with ethical responsibility is essential for sustainable digital transformation in higher education.

Cloud-Based Solutions and Digital Infrastructure - Cloud-based solutions form the backbone of smart management systems by providing scalable, flexible, and cost-effective digital infrastructure. Cloud computing enables institutions to deploy learning management systems, virtual classrooms, research platforms, and administrative applications without significant upfront investment in physical infrastructure.

Smart campuses leverage cloud-based platforms integrated with Internet of Things (IoT) technologies to enhance operational efficiency, resource management, and sustainability. Applications include smart classrooms, energy management systems, digital libraries, e-governance portals, and remote access to academic resources.From a strategic perspective, cloud-based infrastructure supports institutional agility, collaboration, and innovation. It enables seamless integration of emerging technologies and supports data-driven governance, thereby enhancing the overall effectiveness of higher education institutions

Conclusion- The adoption of smart management systems represents a transformative shift in the governance, administration, and academic delivery of higher education institutions. By integrating digital governance frameworks, data-driven decision-making, innovative pedagogy, and emerging technologies, HEIs can enhance institutional performance, student engagement, and educational quality. Expanded use of gamification, immersive technologies, robust quality assurance mechanisms, secure digital infrastructure, and ethical data practices strengthens institutional resilience in an increasingly complex educational landscape. Smart management systems also play a critical role in promoting inclusivity, lifelong learning, and global competitiveness.

Future research should focus on empirical validation of smart management models, cross-institutional case studies, and policy-driven frameworks that support sustainable and equitable digital transformation in higher education.

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A Study of Emotional Intelligence and Its Effect on Academic Achievement of High School Students

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Abstract- Education is illumination. It plays extremely significant role in the lives of individuals by empowering them with various abilities, skills, competencies, and thus paving way for enhancing the quality of life. The students come from various backgrounds such as rural and urban regions. The students undergo a lot of pressure to with stand today's competition, mainly at the moment of their establishment stage in career. In order to cope up with the stress and pressure of today's competitive world, the students should have a balance in their emotional stability. Emotional Intelligence is a type of intelligence that has been heavily studied in social sciences, psychology and business sector, but not in educational arena. The present study helps us to know about the emotional intelligence levels of students in the post graduation specifically the students coming from rural and urban regions. It is a comparative study of emotional intelligence levels of students belonging to rural and urban backgrounds, so that it is helpful to assess the student's emotionality, well-being, sociability and self control. By this which back ground students can easily cope up with the today's competition in the market can be identified which will help the faculties to have much concentration on the students depending on their backgrounds. Along with this the impact of EI on their academic performance is also studied so that it will be helpful for the faculties to develop the EI along with their academic performance.
Keywords - Emotional Intelligence, Academic Achievement,Well-being, Sociability,Competitive.

Introduction - In present system of education in India as well in globe, is putting the future of pupils in a raise where everyone would be searching for a path of success with low efforts. The students play no active role in the attainment of knowledge. His entire education is becoming passive and mechanical. Things are loaded on his mind which he cannot digest without strong emotional intelligence, he only crams and therefore they never become his own, which at the end puts him in the struggle for his academic achievement.

Emotional intelligence refers to an ability to recognize the meanings of emotion and their relationships and to reason and problem-solve on the basis of them. Emotional intelligence is involved in the capacity to perceive emotions, assimilate emotion-related feelings, understand the information of those emotions, and manage them. Researchers investigated dimensions of emotional intelligence by measuring related concepts, such as social skills, interpersonal competence, psychological maturity and emotional awareness, long before the term 'emotional intelligence' came into use. Emotional intelligence represents an ability to validly reason with emotions and to use emotions to enhance thought. Emotional Intelligence encompasses the following five characteristics and abilities: **Self-awareness, Mood management**, **Self-motivation, Empathy, Managing relationships**

Emotional Intelligence- "Emotional intelligence refers to emotional awareness and emotional management skills which provide the ability to balance emotion and reason so as to maximize long-term happiness."

Definitions - Cooper and **Sawaf** say Emotional Intelligence is "The ability to sense, understand and effectively apply the power and acumen of emotions as a source of human energy information, connection and influence.

According to Goleman, emotional intelligence consists of five components: Knowing our emotions (self-awareness), managing them, motivating ourselves, recognizing emotions in others (empathy), and handling relationships

Academic Achievement - Academic achievement is related to the acquisition of principles and generalizations and the capacity to perform efficiently certain manipulations, objectives, symbols and ideas.

Definitions- Academic achievement is defined by **Crow and Crow** as the extent to which a learner is profiting from instructions in a given area of learning i.e., achievement is reflected by the extent to which skill and knowledge has been imparted to him.

Good defines academic achievement as the knowledge attained or skill developed in the school subjects usually designated by test scores or marks assigned by the teacher.

Objectives:

1. To study the emotional intelligence of Govt. High school Boys and Girls.
2. To study the emotional intelligence of Private High school Boys and Girls.
3. To study significant difference in Emotional Intelligence of Boys Govt. and Private Schools.
4. To study significant difference in Emotional Intelligence of Girls.Govt. and Private Schools.

Hypotheses:

1. There is no significant difference in Emotional Intelligence of Govt. High School Boys and Girls.
2. There is no significant difference in the Emotional Intelligence of Private High School Boys and Girls.
3. There exists no significant difference in Emotional Intelligence of Boys Govt. School and Private Schools.
4. There exists no significant difference in Emotional Intelligence of Girls Govt. and Private Schools.

Review of Literature:

Reviews of Emotional Intelligence

Kaur (2001) conducted a study on a sample of 356 adolescents and found significant relationship between emotional maturity and intelligence. However, no significant relation was observed between emotional maturity and academic achievement. Further the study revealed that no significant difference in the emotional maturity of boys and girls, adolescents of urban and rural areas but significant difference in the emotional maturity of arts and science students.

Kaufman, Alan S. and Kaufman, James (2002) conducted a study on "Emotional intelligence as an aspect of general intelligence, what would David Wechsler say: "The purpose of the study was explored to David Wechsler's attempts to integrate El into his test. Neuro-psychological research is better criteria than the Armed services and vocational aptitude Battery should be used in future El studies. Then investigators look forward to more research helm, conducted on performance based assessment."

Reviews of Academic Achievement

Pope (2012) examined "The Relationship of Selected Intrapersonal, Interpersonal, and Life Management Skills to Academic Achievement among secondary school students". The test was administered to 205 ninth and tenth graders. Academic Achievement was measured using a cumulative grade point average. The study reveals that a statistically significant positive correlation exists between academic achievement and the personal skills of growth motivation, commitment to ethic, drive strength, empathy, self esteem, time management, assertion, interpersonal awareness, decision making, stress management and leadership.

Jasraj Kaur, (2013), A Study of Academic Achievement of College Students having High and Low Achievement Motivation Objectives: Major Findings: The study revealed that students having high achievement motivation are better in academic achievement than the college students having low achievement motivation. Hence it was interpreted that there prevailed a significant difference in academic achievement of college students showing high and low achievement motivation.

Method of Investigation-

In the present study the survey method is used

Types of Tools-

S. K. Mangal And Shubhra Mangal. Emotional Intelligence Inventory (EII–MM).

Sampling - The students will be selected randomly from the High schools of greater Gwalior. This number of students will be about 500.

The Data has been given below:

S.	Govt. School Students		Private School Students	
1.	Boys	Girls	Boys	Girls
2.	125	125	125	125

Limitations Of The Study:

(a) **Area:** The study will be limited to such students from greaterGwalior city.

(b) **Students:** The study shall be limited to 500 students of High Schools of Gwalior.

(c) **School:** This research is limited to the students of high school leveli.e classes IX and X

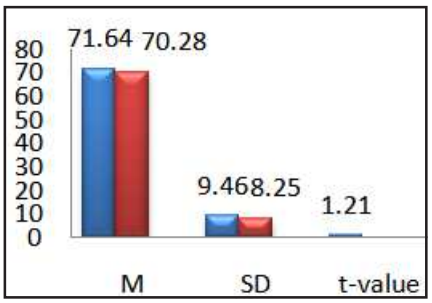
Findings:

Hypothesis One: "There is no significant difference in Emotional Intelligence of Govt. High School Boys and Girls.

Students	M	Σ	df	Levelof Significance		t-value
Boys	71.64	9.46	248	0.05	1.97	1.21
Girls	70.28	8.25		0.01	2.59	

Now at df =248 the value of CR at 0.05 level of signification is 1.97 and at 0.01 The value is 2.59. But the calculated value 1.21 is less than these standard values hence it is insignificant. So There is no significant difference in Emotional Intelligence of Govt. High School Boys and Girls and the hypothesis is accepted.

Graph 1: Graph showing Mean, SD and t-value



Hypothesis Two :

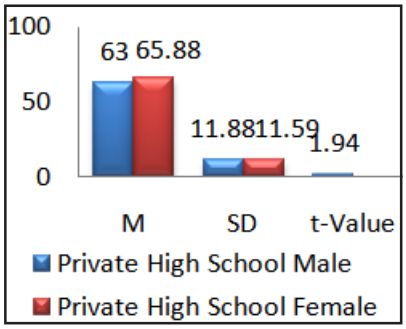
There is no significant difference in Emotional Intelligence of Private High School Boys and Girls.

Students	M	Σ	df	Levelof Significance		t-value
Boys	63.00	11.88	248	0.05	1.97	1.94
Girls	65.88	11.59		0.01	2.59	

Now 248 df the value of CR at 0.05 level of signification is

1.97 and at 0.01 the value is 2.59. The Calculated value of C.R. is 1.94 which is less than these two standard values and hence is insignificant. Hence the Hypothesis is accepted. "There is no significant difference in Emotional Intelligence of Private High School Boys and Girls.

Graph 2: Graph showing Mean, SD and t-value

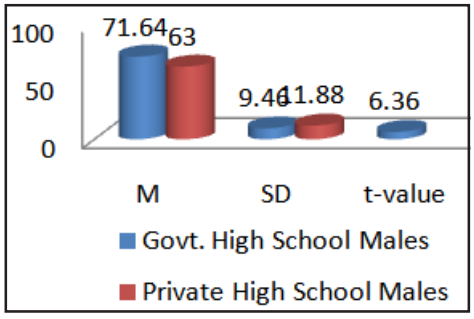


Hypothesis Three: "There Exist No Significant Difference in Emotional Intelligence of Boys Govt. School and Private Schools".

Students	M	Σ	df	Levelof Significance		t-value
Govt. School Boys	71.64	9.46	248	0.05	1.97	6.36
Private School Boys	63.00	11.88		0.01	2.59	

The standard Value of CR at df =248 at 0.05 level of significant is 1.97 and at 0.01 level it is 2.59. The calculated value of CR is 6.36, which is greater than those two levels and hence it is significant. That is there is a significant difference in Emotional intelligence of Boys govt. and private high school. Hence the hypothesis rejected.

Graph 3: Graph showing Mean, SD and t-value

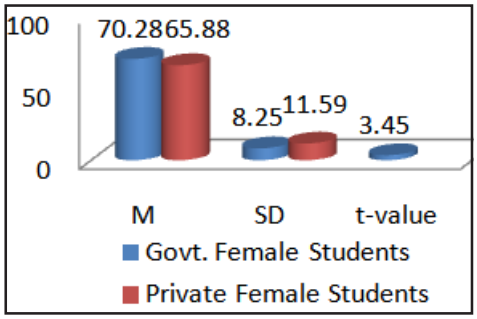


Hypothesis Four : "There exist no significant difference in Emotional Intelligence of GirlsGovt. and Private Schools."

Students	M	Σ	df	Levelof Significance		t-value
Govt. School Girls	70.28	8.25	248	0.05	1.97	3.45
Private Schools Girls	65.88	11.59		0.01	2.59	

The standard Value of CR at df =248 at 0.05 level of significant is 1.97 and at 0.01 level it is 2.59. The calculated value is 3.45 which is greater than these two standard values and hence is significant. That is there is a significant difference in emotional intelligence of Girlsstudents from govt. schools and from private schools. Thus the hypothesis is rejected **There exist a significant difference in Emotional Intelligence of Girls Govt. and Private Schools**

Graph 4: Graph showing Mean, SD and t-value



Conclusion:

1. There is no significant difference is Emotional Intelligence of Boys and GirlsGovt. high schools and the hypotheses accepted.
2. There is no significant difference in the Emotional Intelligence of Boys and Girls from Private High Schools. Hence the Hypotheses accepted.
3. There is a significant difference in Emotional intelligence of Boys govt. and private high school. Hence the hypotheses rejected.
4. There exist a significant difference in Emotional Intelligence of Girls Govt. and Private Schools. Hence the hypotheses rejected.

Suggestions For Further Research:

1. A comparative study can be undertaken to study to stress among educators and students of government aided colleges of education and self financed colleges.
2. It can be carried out in relation to emotional intelligence and a higher age group can be taken.
3. A study may be taken to explore the comparison between emotional maturity of teachers and college students.

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A Comparative Study of Multidimensional Personality of Boys and Girls Studying in Government Higher Secondary Schools

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Abstract- Personality development is an important objective of modern education as it influences the behaviour, attitudes, and social adjustment of students. Adolescence is considered a crucial stage for personality formation because individuals undergo significant physical, emotional, and psychological changes during this period. Schools play a vital role in shaping students' personality traits through academic experiences, peer interaction, and teacher guidance. The present study aims to examine the multidimensional personality traits of boys and girls studying in government higher secondary schools with particular reference to the extroversion–introversion dimension. The study also investigates other personality dimensions such as self-concept, independence–dependence, temperament, adjustment, and anxiety. The descriptive survey method was used for conducting the study. A sample of 400 students (200 boys and 200 girls) from government higher secondary schools of Gwalior district was selected through random sampling. The Multidimensional Personality Inventory developed by Dr. Manju Agarwal was used as the tool for collecting data. Statistical techniques such as Mean, Standard Deviation, and t-test were applied to analyze the data. The results reveal significant differences between boys and girls in various personality dimensions. Boys were found to score higher in extroversion, independence, and self-concept, whereas girls showed relatively different patterns in emotional traits such as adjustment and anxiety. The study highlights the importance of understanding gender differences in personality development in order to create supportive educational environments that foster balanced psychological growth among students.

Keywords- Personality Traits, Multidimensional Personality, Extroversion–Introversion, Gender Differences, Higher Secondary Students.

Introduction - Education plays a crucial role in the overall development of human personality. It not only imparts knowledge but also helps individuals develop social values, emotional maturity, and behavioural patterns necessary for successful living in society. The development of personality is therefore one of the major goals of education.

Personality can be understood as the organized pattern of thoughts, emotions, attitudes, and behaviours that characterize an individual. Each individual possesses unique personality traits that influence the way they perceive the world and respond to various situations. These personality traits are shaped through the interaction between biological factors and environmental influences.

Adolescence is an important stage in the process of personality development. Students at the higher secondary level experience rapid psychological and emotional changes that influence their behaviour, attitudes, and interpersonal relationships. During this stage, the school environment plays a significant role in shaping students' personality traits through classroom interaction, peer relationships, and participation in various activities.

Among the various dimensions of personality, extroversion and introversion are particularly important. Extroverted individuals are generally outgoing, socially active, and expressive, whereas introverted individuals tend to be reflective, reserved, and inward-oriented. These personality traits influence academic participation, communication patterns, and social adjustment among students.

Gender differences also play a significant role in personality development. Social expectations, cultural norms, and family influences often shape the behaviour and personality characteristics of boys and girls differently. Therefore, studying the personality traits of boys and girls helps in understanding these differences and designing educational strategies that promote balanced personality development.

Keeping these considerations in mind, the present study attempts to analyze the multidimensional personality traits of boys and girls studying in government higher

secondary schools.

Objectives of the Study:

1. To study the extroversion–introversion dimension of personality among boys and girls studying in government higher secondary schools.
2. To compare the self-concept of boys and girls studying in government higher secondary schools.
3. To examine the independence–dependence personality dimension among boys and girls.
4. To study the temperament of boys and girls studying in government higher secondary schools.
5. To analyze the adjustment levels of boys and girls.
6. To examine the anxiety levels among boys and girls studying in government higher secondary schools.

Hypotheses of the Study:

1. There is no significant relationship between the Multidimensional Personality -Extroversion- Introversion of Boys and Girls Studying in Government Higher Secondary.
2. There is no significant relationship between the Multidimensional Personality - Self-Concept of Boys and Girls Studying in Government Higher Secondary School
3. There is no significant relationship between the Multidimensional Personality - Independence- Dependence of Boys and Girls Studying in Government Higher Secondary School.
4. There is no significant relationship between the Multidimensional Personality - Temperament of Boys and Girls Studying in Government Higher Secondary School.
5. There is no significant relationship between the Multidimensional Personality - Adjustment of Boys and Girls Studying in Government Higher Secondary School.
6. There is no significant relationship between the Multidimensional Personality - Anxiety of Boys and Girls Studying in Government Higher Secondary School.

Research Methodology- The present study was conducted using the descriptive survey method, which is commonly used in educational research for studying existing conditions and relationships.

Population- Students studying in government higher secondary schools of Gwalior district constituted the population of the study.

Sample- A sample of 400 students was selected using random sampling technique.

Boys = 200

Girls = 200

Tool Used-Multidimensional Personality Inventory developed by Dr. Manju Agarwal.

Statistical Techniques: Mean, Standard Deviation, and t-test.

Data Analysis and Interpretation-

H-1 There is no significant relationship between the Multidimensional Personality -Extroversion-Introversion of Boys and Girls Studying in Government Higher Secondary School.

Table No. - 01 (see in last page)

On finding the value of t-test, it is 4.96 whereas the value of t at 0.01 and 0.05 significance level is 2.60 and 1.97 respectively, which is more than both these values. Hence, on the basis of the data obtained, we can say that there is a significant difference in the personality of boys and girls studying in government higher secondary schools. Hence, the Multidimensional Personality - Extroversion- Introversion of boys and girls studying in government higher secondary schools was found to be higher than that of girl's students. That is, the hypothesis is proved false at both these levels of significance. **That is a significant relationship between the Multidimensional Personality -Extroversion-Introversion of Boys and Girls Studying in Government Higher Secondary School.**

H-2 There is no significant relationship between the Multidimensional Personality - Self-Conceptof Boys and Girls Studying in Government Higher Secondary School

Table No. – 02 (see in last page)

On finding the value of t-test, it is 5.05 whereas the value of t at 0.01 and 0.05 significance level is 2.60 and 1.97 respectively, which is more than both these values. Hence, on the basis of the data obtained, we can say that there is a significant difference in the personality of boys and girls studying in government higher secondary schools. Hence, the Multidimensional Personality - Self-Conceptof boys and girls studying in government higher secondary schools was found to be higher than that of girl's students. That is, the hypothesis is proved false at both these levels of significance. **That is, a significant relationship between the Multidimensional Personality - Self-Conceptof Boys and Girls Studying in Government Higher Secondary School.**

H-3 There is no significant relationship between the Multidimensional Personality -Independence-Dependence of Boys and Girls Studying in Government Higher Secondary School.

Table No. - 03 (see in last page)

On finding the value of t-test, it is 5.04 whereas the value of t at 0.01 and 0.05 significance level is 2.60 and 1.97 respectively, which is more than both these values. Hence, on the basis of the data obtained, we can say that there is a significant difference in the personality of boys and girls studying in government higher secondary schools. Hence, the Multidimensional Personality - Independence-Dependenceof boys and girls studying in government higher secondary schools was found to be higher than that of girl's students. That is, the hypothesis is proved false at both these levels of significance. **That is, a significant relationship between the Multidimensional Personality - Independence- Dependence of Boys and Girls Studying in Government Higher Secondary School.**

H-4 There is no significant relationship between the

Multidimensional Personality - Temperament of Boys and Girls Studying in Government Higher Secondary School.

Table No. - 04 (see in last page)

On finding the value of t-test, it is 4.96 whereas the value of t at 0.01 and 0.05 significance level is 2.60 and 1.97 respectively, which is more than both these values. Hence, on the basis of the data obtained, we can say that there is a significant difference in the personality of boys and girls studying in government higher secondary schools. Hence, the Multidimensional Personality - Temperamentof boys and girls studying in government higher secondary schools was found to be higher than that of girl's students. That is, the hypothesis is proved false at both these levels of significance. **That is, a significant relationship between the Multidimensional Personality - Temperamentof Boys and Girls Studying in Government Higher Secondary School.**

H-5 There is no significant relationship between the Multidimensional Personality -Adjustment of Boys and Girls Studying in Government Higher Secondary School.

Table No. - 05 (see in last page)

On finding the value of t-test, it is 4.93 whereas the value of t at 0.01 and 0.05 significance level is 2.60 and 1.97 respectively, which is more than both these values. Hence, on the basis of the data obtained, we can say that there is a significant difference in the personality of boys and girls studying in government higher secondary schools. Hence, the Multidimensional Personality - Adjustmentof boys and girls studying in government higher secondary schools was found to be higher than that of girl's students. That is, the hypothesis is proved false at both these levels of significance. **That is, a significant relationship between the Multidimensional Personality - Adjustment of Boys and Girls Studying in Government Higher Secondary School.**

H-1.6 There is no significant relationship between the Multidimensional Personality - Anxiety of Boys and Girls Studying in Government Higher Secondary School.

Table No. - 06 (see in last page)

On finding the value of t-test, it is 4.89 whereas the value of t at 0.01 and 0.05 significance of the data obtained, we can say that there is a significant difference in the personality of boys and girls studying in government higher secondary schools. Hence, the Multidimensional Personality - Anxiety of boys and girls studying in government higher secondary schools was found to be higher than that of girl's students. That is, the hypothesis is proved false at both these levels of significance. **That is, a significant relationship between the Multidimensional Personality - Anxiety of Boys and Girls Studying in Government Higher Secondary School**level is 2.60 and 1.97 respectively, which is more than both these values. Hence, on the basis**.**

Findings of the Study:

1. Significant differences were found between boys and girls in extroversion–introversion.
2. Boys showed higher mean scores in self-concept.
3. Independence–dependence dimension showed significant gender differences.
4. Temperament differed significantly between boys and girls.
5. Adjustment levels varied between the two groups.
6. Anxiety levels were also significantly different between boys and girls.

Conclusion- The study highlights that significant gender differences exist in multidimensional personality traits among higher secondary school students. Boys tend to exhibit higher levels of extroversion, independence, and self-concept, while girls demonstrate different emotional patterns in traits such as adjustment and anxiety. These differences may be influenced by cultural expectations, socialization processes, and environmental factors.

Educational institutions should recognize these differences and create supportive learning environments that encourage balanced personality development. Teachers and counselors can play a crucial role in guiding students during adolescence by promoting self-confidence, emotional stability, and social interaction.

Understanding personality differences among students can help educators develop effective educational strategies that support the holistic development of adolescents.

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Table No. - 01: Mean, standard deviation and t-value on Multidimensional Personality -Extroversion- Introversion of Boys and Girlsstudying in government higher secondary schools

Government Boys		Government Girls		df	Level of Significance		t-value
Mean	Standard Deviation	Mean	Standard Deviation				
(M)	(S.D.)	(M)	(S.D.)	399	0.05	1.97	(t)
39.39	11.79	36.29	11.78		0.01	2.60	4.96

Table No. – 02: Mean, Standard Deviation and T-Value on Multidimensional Personality -Self-Concept of Boys and GirlsStudying in Government Higher Secondary Schools.

Government Boys		Government Girls		df	Level of Significance		t-value
Mean	Standard Deviation	Mean	Standard Deviation				
(M)	(S.D.)	(M)	(S.D.)	399	0.05	1.97	(t)
39.05	11.61	35.93	11.49		0.01	2.60	5.05

Table No. - 03
Mean, Standard Deviation and T-Value on Multidimensional Personality -Independence- Dependence of Boys and Girls.Studying in Government Higher Secondary Schools.

Government Boys		Government Girls		df	Level of Significance		t-value
Mean	Standard Deviation	Mean	Standard Deviation				
(M)	(S.D.)	(M)	(S.D.)	399	0.05	1.97	(t)
39.21	11.64	36.09	11.56		0.01	2.60	5.04

Table No. - 04
Mean, standard deviation and t-value on Multidimensional Personality -Temperament of Boys and Girlsstudying in government higher secondary schools.

Government Boys		Government Girls		df	Level of Significance		t-value
Mean	Standard Deviation	Mean	Standard Deviation				
(M)	(S.D.)	(M)	(S.D.)	399	0.05	1.97	(t)
39.41	11.40	36.39	11.31		0.01	2.60	4.96

Table No. - 05: Mean, standard deviation and t-value on Multidimensional Personality -Adjustment of Boys and Girlsstudying in government higher secondary schools

Government Boys		Government Girls		df	Level of Significance		t-value
Mean	Standard Deviation	Mean	Standard Deviation				
(M)	(S.D.)	(M)	(S.D.)	399	0.05	1.97	(t)
39.59	11.47	36.57	11.43		0.01	2.60	4.93

Table No. - 06: Mean, standard deviation and t-value on Multidimensional Personality -Anxiety of Boys and Girlsstudying in government higher secondary schools.

Government Boys		Government Girls		df	Level of Significance		t-value
Mean	Standard Deviation	Mean	Standard Deviation				
(M)	(S.D.)	(M)	(S.D.)	399	0.05	1.97	(t)
39.77	11.58	36.75	11.59		0.01	2.60	4.89

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Pay Equity and Staff Performance in Uganda's Public Education Sector

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Abstract - This study examines how pay equity, resource availability, and unionization influence job satisfaction and performance among Uganda's public educators. Guided by Equity, Two-Factor, and Job Demands-Resources theories, a moderated mediation model was tested using Structural Equation Modeling (SEM) on data from 400 teachers. Pay equity directly and indirectly (via satisfaction) predicted performance, while resource availability strengthened this mediation. Unionization showed no significant moderating effect, underscoring its limited influence. By integrating psychological and contextual factors, the study extends HRM theory within the Global South public sectors and offers policy insights for enhancing motivation, fairness, and workforce effectiveness.
Keywords- Pay Equity, Job Satisfaction, Unionization, Resource Availability, Public Education, Uganda.

Introduction - Pay equity, fair compensation for work of equal value, remains central to employee motivation and performance (World Economic Forum, 2023[1]; OECD, 2023[2]). Research highlights unionization as a key driver of equitable compensation and job satisfaction (Ott, 2024)[3]. Grounded in the Job Demands-Resources Framework (Bakker & Demerouti, 2007)[4], studies show that satisfaction mediates the HR-performance link (Herzberg, 1959[5]; Salifu, 2016[6]). In Sub-Saharan Africa, especially Uganda, inequities persist amid weak union influence and poor resourcing (Oh et al., 2025[7]; Olum et al., 2024[8]). This study examines how pay equity, job satisfaction, unionization, and resources shape staff performance in Uganda's public education sector.

Literature Survey-

Theoretical grounding- This study draws on three complementary theories: Equity Theory (Adams, 1963)[9], Motivator-Hygiene Theory (Herzberg, 1959)[5], and the Job Demands-Resources (JD-R) Model (Bakker & Demerouti, 2007[4]). Equity Theory links fair compensation to satisfaction and performance, highlighting the role of unionization in restoring perceived fairness (Oh et al., 2025[7]; Olum et al., 2024[8]). Herzberg's framework distinguishes hygiene factors, such as pay, from intrinsic motivators like recognition (Ssegawa, 2019). The JD-R Model explains how sufficient resources enable satisfied teachers to perform effectively. Together, these theories underpin the study's moderated mediation model within Uganda's public education sector.

Empirical appraisal

I. Pay equity and staff performance- Global evidence links pay equity to employee performance, especially in public sectors where motivation depends on perceived fairness (OECD, 2023)[2]. Equitable compensation enhances retention and innovation, while inequities diminish morale (Herzberg, 1959[5]; Adams, 1963[9]; Pham et al., 2020[10]). In Africa's underfunded education systems, opaque pay structures foster perceptions of injustice. Studies in Ghana and Kenya show that salary fairness improves satisfaction and collaboration (Oh et al., 2025)[7]. Across East Africa, unfair pay and weak welfare reduce education quality (Rwigema, 2022)[11]. In Uganda, stagnant salaries, favoritism, and inequitable promotions lower morale and performance (Ssegawa, 2019[12]; Olum et al., 2024[8]). Collectively, research confirms compensation equity as a critical predictor of staff motivation and performance.

This empirical evidence compels the researcher to posit that:

H1*:Pay equity is positively associated with staff performance.*

II. Job satisfaction, pay equity, and staff performance- Job satisfaction mediates the link between pay equity and staff performance across sectors. Fair compensation enhances satisfaction, fostering commitment and productivity (Wang et al., 2022[13]; Kim & Fernandez, 2017[14]; Katebi et al., 2021[15]). In public service contexts with limited extrinsic rewards, perceived fairness is vital for engagement (OECD, 2023[2]; UNESCO, 2024[16]). African-based studies affirm this relationship: equitable pay drives satisfaction but must be paired with recognition and career growth (Salifu, 2016[6]; Herzberg, 1959[5]). In Uganda, persistent pay disparities and inconsistent promotions weaken morale,

while satisfaction strengthens performance only under supportive conditions (Olum et al., 2024[8]; Ssegawa, 2019[12]). Thus, satisfaction is pivotal in translating equity into performance.**Based on this, the researcher proposes:**

H2*: Job satisfaction mediates the association between pay equity and staff performance.*

III. Unionization, pay equity, and job satisfaction- Unionization enhances job satisfaction by promoting transparency, procedural justice, and grievance resolution (Freeman & Medoff, 1985[17]). Cross-national evidence shows unionized workers report greater fairness and satisfaction, even without higher pay (Jung et al., 2024[18]). In Africa, unions improve perceived equity and job security through collective advocacy (Salifu, 2016[6]). In Uganda, the Uganda National Teachers' Union (UNATU) advances welfare and fairness despite resource constraints (Olum et al., 2024). Studies confirm union presence buffers dissatisfaction and strengthens morale, particularly in under-resourced contexts (Ssegawa, 2019[12]), highlighting its moderating role between pay equity andsatisfaction.**The researcher, therefore,hypothesizes:**

H3*:Unionization moderates the association between pay equity and job satisfaction.***.**

IV. Pay equity, resource availability, and job satisfaction- Resource availability moderates thesatisfaction-performance link by enabling employees to translate morale into productivity (Bakker & Demerouti, 2007[4]). Studies show teachers in well-resourced environments achieve stronger satisfaction-performance connections (OECD, 2023[2]; Panakaje et al., 2024[19]). Conversely, even satisfied workers underperform amid shortages (Kim & Fernandez, 2017[14]). Across Sub-Saharan Africa, inadequate tools, overcrowded classrooms, and poor infrastructure hinder outcomes despite high commitment (Matla & Xaba, 2019[20]; Salifu, 2016[6]). In Uganda, resource gaps limit the impact of pay equity and satisfaction on teaching effectiveness (Olum et al., 2024[8]; Ssegawa, 2019[12]). Thus, sufficient resources are indispensable for converting satisfaction into tangible performance gains.**This consistent theoretical and empirical support affirms that:**

H4*:Resource availability supports the connection between job satisfaction and staff performance.*

The research framework (Figure 1) illustrates the proposed relationships.

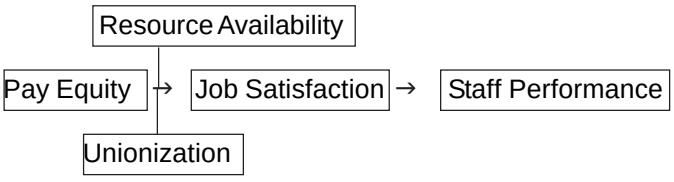

Figure 1: *Research model*
Source: *Researcher's conceptualization*

Research strategy-

A quantitative cross-sectional survey using SEM tested the moderated mediation framework. The study targeted teachers in Uganda's public primary, secondary, and tertiary institutions, using stratified random sampling across four regions. Of 700 questionnaires distributed, 400 valid responses (57%) were analyzed, meeting SEM adequacy criteria (Krejcie& Morgan, 1970[21]; Hair et al., 2019[22]). Data were collected via validated scales: pay equity (Colquitt, 2001[23]), job satisfaction (Spector, 2022[24]), unionization (Freeman & Medoff, 1985[17]), resources (Bakker & Demerouti, 2007[4]), and performance (Koopmans, 2015[25]), rated on a 5-point Likert scale (Likert, 1932[26]). Reliability, validity, and model fit (CFI, RMSEA, RMR) were confirmed. Ethical protocols ensured informed consent, anonymity, and voluntary participation.

Results-

Table 1: Model diagnostics

Indicator	Estimate	Threshold	Interpretation
X^2	182.418	-	-
DF	160	-	-
X^2/DF	1.14	≤3.00	Excellent
GFI	0.96	≥ 0.90	Excellent
CFI	0.996	≥ 0.95	Excellent
RMR	0.03	< 0.08	Excellent
RMSEA	0.02	< 0.06	Excellent
Probability	0.11	> 0.05	Excellent

Origin: *Primary data*

Cutoff criteria according to Hu & Bentler, 1999

Table 2 (see in last page)

Discussion of findings- The findings reveal that pay equity significantly enhances staff performance, mediated by job satisfaction and strengthened by resource availability. Fair compensation, more than absolute pay levels, fosters commitment and motivation in Uganda's public education sector (Olum et al., 2024; Kim & Fernandez, 2017). Job satisfaction proved a strong mediator, affirming Herzberg's and Equity Theory propositions that fairness drives intrinsic motivation and output. However, unionization showed no significant moderating effect, reflecting weak advocacy structures and limited bargaining power (Ssegawa, 2019). Resource availability, consistent with the JD-R Model (Bakker & Demerouti, 2007), amplified satisfaction, confirming that material support is essential for translating morale into performance.

The study extends classical HR and organizational behavior theories by integrating pay equity, satisfaction, and contextual moderators into a single framework. Practically, equitable pay must be coupled with improved infrastructure, manageable workloads, and supportive management. Policy reforms should align remuneration reviews with resource investment tomaximize productivity and satisfaction. Weak union effects signal a need for more visible, evidence-based advocacy. Broadly, enhancing teacher welfare through equity and resourcing supports Sustainable Development Goal 4 (Quality Education) and

strengthens public trust in Uganda's education system through a more motivated and empowered workforce.

Conclusions, limitations, and future directions- This study confirmed that pay equity enhances performance directly and through job satisfaction, with resource availability amplifying this effect, while unionization showed no significant influence. It offers a contextual model for Uganda's public education sector. Limitations include its cross-sectional design and self-reported data. Future studies should employ longitudinal or mixed methods, expand to other sectors, and qualitatively explore union dynamics and leadership factors affecting satisfaction and performance.

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Table 2: Direct, mediated, and moderated outputs

Relationship	Standard Beta (β)	t-value/ Critical Ratio (CR)	R^2 Estimate	p-value	Implication
Standardized Regression Weights					
PEQ→PERF	0.25	5.30		0.001	H1 - Supported
PEQ*RES→JSAT	0.24	4.92		0.001	H2 - Supported
PEQ*UNION→JSAT	0.08	1.90		0.060	Not significant
PEQ*UNION→JSAT→PERF	0.03	-		0.200	H3 - Rejected
PEQ*RES→JSAT→PERF	0.10	-		0.001	H4 - Validated
JSAT			0.32	0.001	Significant
PERF			0.29	0.001	Significant

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Lifelong Learning and Protean Career Orientation among MBA Tourism and Hospitality Graduates: An Exploratory Perspective

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Abstract - The changing nature of work, rapid technological advancements, and evolving organizational structures have significantly altered career across many sectors, including tourism and hospitality. Traditional linear career paths are increasingly being replaced by self-directed, value-driven career orientations, commonly referred to as protean careers. In this context, lifelong learning has emerged as a critical capability enabling graduates to remain adaptable, employable, and resilient in dynamic labour markets.

This paper explores the relevance of lifelong learning and protean career orientation among MBA graduates in tourism and hospitality management, with reference to emerging patterns of job mobility, skill adaptability, and career self-management. Drawing upon secondary data sources such as global workforce reports, employability studies, and sector-specific human resource development literature, the study examines how contemporary graduates increasingly prioritise continuous learning, flexibility, and personal career values over organizational loyalty and long-term tenure.

The tourism and hospitality sector, characterised by high workforce mobility and evolving skill requirements, provides a relevant context to understand these changing career attitudes. National and international reports indicate a growing trend of job switching, upskilling, and cross-functional career movement among management graduates, reflecting the practical manifestation of protean career principles. The paper highlights the implications of these trends for management education institutions, curriculum design, and policy frameworks, emphasizing the need to integrate lifelong learning competencies and career self-management skills into tourism and hospitality education.

In the context of emerging trends in business and management education, understanding career adaptability and lifelong learning has become increasingly relevant for policy and institutional planning

Keywords- Lifelong Learning; Protean Career Orientation; Job Mobility; Tourism and Hospitality Education; MBA Graduates; Career Self-Management.

Introduction - The tourism and hospitality industry is one of the most dynamic sectors of the global economy. Rapid technological advancements, changing consumer expectations, and evolving service delivery models have transformed employment structures within the industry. As a result, traditional organizational career paths characterized by long-term job security and hierarchical progression is gradually diminishing.

In recent years, management graduates, particularly those from tourism and hospitality backgrounds, have shown a growing inclination towards flexible career choices, frequent job mobility, and self-driven professional development. This shift has led to increased interest in the concept of protean career orientation, which views careers as individually managed rather than organization controlled.

Lifelong learning has emerged as a critical factor enabling individuals to remain relevant in such dynamic environments. Continuous skill development, reskilling, and upskilling have become essential for career sustainability. This study explores how protean career orientation influences lifelong learning behaviour among MBA graduates in tourism and hospitality education, with a focus on employability and career adaptability.

Concept of Protean Career Orientation- The concept of protean career orientation was introduced to describe a career path that is self-directed and guided by personal values rather than organizational structures. Individuals with a protean orientation take responsibility for their career growth and are proactive in acquiring skills and knowledge.

Key characteristics of protean career orientation include:

1. Self-directed career management
2. Value-driven career decisions
3. Career adaptability and flexibility
4. Continuous learning orientation

In the context of tourism and hospitality, where job roles frequently evolve due to market demands and technological changes, protean career orientation becomes highly relevant. Graduates are required to continuously update their

competencies to remain competitive in the job market.

Lifelong Learning in Tourism and Hospitality Education- Lifelong learning refers to the continuous pursuit of knowledge and skills throughout an individual's career. In service-intensive industries like tourism and hospitality, lifelong learning plays a vital role in maintaining service quality, innovation, and customer satisfaction.

MBA programs in tourism and hospitality are expected to prepare students not only with technical knowledge but also with adaptive skills such as problem-solving, communication, leadership, and digital literacy. Graduates who actively engage in lifelong learning are better equipped to manage career transitions and respond to industry disruptions.

This study considers lifelong learning as a strategic response to career uncertainty and examines its association with protean career orientation.

Review of Literature- Previous studies have highlighted that individuals with a strong protean career orientation exhibit higher levels of career satisfaction and adaptability. Research also suggests a positive relationship between protean orientation and continuous learning behaviour.

Studies in management education indicate that graduates increasingly value employability skills and personal growth over traditional organizational loyalty. In tourism and hospitality education, limited research has examined the combined influence of protean career orientation and lifelong learning on career outcomes.This study attempts to bridge this gap by focusing on MBA graduates from a specialized tourism management institution.

Objectives of the Study: The main objectives of the study are:

1. To examine the level of protean career orientation among MBA tourism and hospitality graduates.
2. To analyse the relationship between protean career orientation and lifelong learning attitudes.
3. To assess the role of lifelong learning in enhancing employability and career adaptability.
4. To provide suggestions for academic institutions and policymakers.

Research Methodology- The present study adopts a **conceptual and exploratory research design** based on secondary data sources. The analysis draws upon published reports, policy documents, workforce surveys, and academic literature related to lifelong learning, protean career orientation, and job mobility among management graduates.

Key sources include global workforce and employability reports, tourism education and skills development publications, and policy documents issued by national and international agencies. The study synthesizes existing literature to identify emerging career patterns and implications for tourism and hospitality management education.This approach provides a conceptual foundation for understanding contemporary career orientations and offers directions for future empirical research.

Findings of the Study- The major findings of the study are as follows:

1. Most MBA graduates exhibit moderate to high levels of protean career orientation.
2. Graduates with strong protean orientation actively pursue additional certifications, skill-based training, and professional development programs.
3. Lifelong learning attitude shows a positive relationship with career adaptability and employability.
4. Job switching intentions are higher among graduates who prioritize personal growth and skill enhancement over organizational stability.
5. Institutional support for experiential learning and industry exposure enhances graduates' readiness for protean careers.

Suggestions- Based on the findings, the following suggestions are offered:

1. Academic institutions should integrate lifelong learning frameworks into MBA tourism curricula.
2. Greater emphasis should be placed on experiential learning, internships, and industry projects.
3. Career counselling services should focus on self-directed career planning and adaptability.
4. Policymakers should support continuous professional development initiatives in tourism education.

Conclusion- The study highlights the growing relevance of protean career orientation and lifelong learning among MBA tourism and hospitality graduates. In a rapidly changing industry environment, self-directed career management and continuous skill development are essential for sustainable employability. Educational institutions play a crucial role in shaping graduates' career orientations by fostering adaptive learning environments. Aligning management education with the realities of protean careers can enhance graduate outcomes and contribute to the long-term development of the tourism and hospitality sector.In the context of emerging trends in business and management education, understanding career adaptability and lifelong learning has become increasingly relevant for policy and institutional planning.

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A Review Article on Knowledge and Attitude Toward Substance Use Among Nursing Students

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Abstract-Substance use among adolescents and young adults is a growing public health concern worldwide and in India. Nursing students, as future healthcare professionals, play a crucial role in health promotion, prevention, and counselling related to substance use. Understanding their knowledge and attitudes is essential for strengthening nursing education and practice.This review aims to examine existing literature on the knowledge and attitude of nursing students toward substance use and to identify gaps that may influence nursing education and professional practice.A narrative review of literature was conducted using published studies related to knowledge and attitudes toward substance use among nursing students. Articles were identified from peer-reviewed journals, focusing on national and international studies. Relevant findings were analysed and synthesised thematically. The reviewed literature indicates that nursing students generally possess moderate knowledge regarding substance use, particularly about physical health effects. However, gaps persist in understanding psychological dependence, social determinants, prevention strategies, and rehabilitation. Attitudes toward substance use and individuals with substance use disorders ranged from neutral to negative, with stigma and lack of counselling confidence commonly reported. Studies consistently demonstrate a positive association between higher knowledge levels and favourable attitudes.The review highlights the need for comprehensive, skill-based substance use education within nursing curricula. Enhancing knowledge and addressing attitudinal barriers can better prepare nursing students to function as effective health educators and advocates for substance abuse prevention and rehabilitation.

Keywords: Nursing students, Substance use, Knowledge, Attitude, Review, Health education.

Introduction - Substance use is a major public health issue affecting individuals, families, and societies worldwide. Psychoactive substances such as alcohol, tobacco, and illicit drugs contribute significantly to morbidity, mortality, and social problems. According to the United Nations Office on Drugs and Crime, approximately 292 million people worldwide used drugs in 2022, reflecting a steady increase over the past decade. In India, substance use is increasingly reported among adolescents and young adults, leading to adverse physical, psychological, academic, and social consequences.

Nursing students represent a unique population, as they are at a transitional stage between adolescence and professional adulthood. They are exposed to academic stress, clinical responsibilities, peer influence, and social pressures, all of which may increase vulnerability to substance use. At the same time, nursing students are expected to function as role models, educators, and counselors for patients and communities. Adequate knowledge and positive attitudes toward substance use prevention are therefore essential.

Several studies conducted among nursing and medical students in India have reported moderate knowledge levels but unfavorable or ambivalent attitudes toward substance users. Stigmatization, lack of confidence in counseling, and limited exposure to de-addiction services have been identified as major challenges. Understanding the existing level of knowledge and attitude among nursing students is crucial for planning effective educational interventions.Therefore, reviewing existing literature on this topic is essential to identify common trends, gaps, and implications for nursing education.

Review of Literature-

Knowledge Regarding Substance Use among Nursing Students- Multiple studies conducted among nursing students have reported moderate levels of knowledge regarding substance use. Sharma and Singh (2023) found that most nursing students were aware of the physical ill effects of substance abuse but had limited understanding of psychological dependence, withdrawal symptoms, and relapse prevention. Similar findings were reported by Ariyalakshmi (2025), who observed that while students

demonstrated awareness of common substances and health risks, preventive strategies and rehabilitation measures were poorly understood.

International studies reflect comparable trends. Petrus and Kadhila (2023) reported that nursing students in Namibia had adequate theoretical knowledge; however, this knowledge did not consistently translate into preventive attitudes or behaviours. Systematic reviews further suggest that nursing students often lack comprehensive understanding of substance use disorders as chronic, relapsing conditions, which may affect patient care.

Attitude Toward Substance Use and Substance Users- Attitude plays a crucial role in shaping nursing practice related to substance use. Several studies have identified neutral to negative attitudes among nursing students toward substance use and individuals with substance use disorders. Fernandes et al. (2022) reported that although students recognised substance abuse as a health problem, many held stigmatizing views and expressed discomfort in dealing with affected individuals.

Nandan et al. (2025) observed mixed attitudes among college students, with moral judgement and social stigma influencing perceptions of substance users. Such attitudes may act as barriers to effective counselling and compassionate care. Reviews of nursing literature also indicate that stigma and fear of relapse contribute to avoidance behaviours among healthcare providers.

Relationship Between Knowledge and Attitude- A consistent finding across the literature is the positive association between knowledge and attitude. Studies have shown that nursing students with higher levels of knowledge tend to exhibit more positive, preventive, and empathetic attitudes toward substance use and rehabilitation. Fernandes et al. (2022) and Sharma and Singh (2023) both reported statistically significant relationships between knowledge scores and favourable attitudes, highlighting the importance of educational interventions.

Implications for Nursing Education- The reviewed literature strongly emphasises the need to strengthen substance use education in nursing programmes. Traditional teaching methods that focus primarily on factual knowledge may be insufficient to address attitudinal barriers. Authors recommend integrating counselling skills training, role play, case-based learning, and exposure to de-addiction and rehabilitation settings to enhance students' confidence and competence.

Research Gaps Identified- A critical analysis of the reviewed literature reveals several important research gaps that need to be addressed to strengthen evidence in this area. Although numerous studies have assessed knowledge and attitudes toward substance use among nursing students, the majority are descriptive and cross-sectional in nature, limiting causal interpretation and long-term understanding.

1) First of all, predominantly most studies focus on assessing knowledge related to physical health effects of substance use, while comparatively limited attention is given to psychological dependence, behavioural aspects, relapse prevention, and social determinants such as peer pressure, family influence, and socio-cultural factors. This creates an incomplete understanding of nursing students' preparedness to address substance use holistically.

2) The attitudinal assessment are superficialin many studies , often failing to explore stigma, moral judgement, empathy, and confidence in counselling substance users. Few studies have examined how negative or neutral attitudes among nursing students may directly impact patient care, therapeutic communication, and health education outcomes.

3) There is a notable scarcity of intervention-based studies evaluating the effectiveness of structured educational programmes, counselling skill training, or experiential learning methods on improving knowledge and attitudes toward substance use among nursing students. Longitudinal studies assessing retention of knowledge and sustained attitude change are particularly limited.

4) Regional disparities exist in the available literature. Many studies are concentrated in urban settings, with limited research focusing on rural, tribal, and underserved populations, especially in the Indian context. This limits the generalisability of findings and highlights the need for context-specific research.

Finally, few studies integrate qualitative approaches to explore nursing students' lived experiences, perceptions, and emotional responses related to substance use and substance users. Such approaches could provide deeper insights into attitudinal formation and barriers to effective practice.

Addressing these gaps through methodologically rigorous, multi-centre, and mixed-methods research is essential to inform evidence-based curriculum development and policy formulation.

Discussion- The findings of this review suggest that nursing students generally possess moderate knowledge regarding substance use but demonstrate gaps in critical areas such as psychological dependence, prevention, and rehabilitation. Attitudes toward substance use and affected individuals are often influenced by stigma, cultural beliefs, and lack of practical exposure. These findings are consistent across national and international studies.

The positive relationship between knowledge and attitude underscores the importance of comprehensive education. Improving knowledge alone may not be sufficient; educational strategies must also focus on attitude transformation and skill development. Nursing educators play a vital role in shaping students' perceptions and preparing them for real-world clinical challenges.

Implications for Nursing Practice and Education:

1. Incorporation of comprehensive substance use modules in undergraduate nursing curricula.

2. Emphasis on counselling and communication skills related to substance use.
3. Clinical exposure to de-addiction centres and community-based prevention programmes.
4. Regular continuing education and sensitisation programmes for nursing students.

Conclusion- This review of literature concludes that while nursing students demonstrate basic awareness of substance use and its health consequences, significant gaps remain in knowledge depth and attitudinal orientation. Strengthening nursing education through evidence-based, skill-oriented, and attitude-focused interventions is essential to prepare nursing students as effective health educators and advocates for substance abuse prevention and rehabilitation.

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Innovative Teaching Methods for Digital Learning Environment with Special Reference to Madhya Pradesh Government

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Abstract - This paper examines the integration of innovative teaching methods within the digital learning ecosystem developed by the Government of Madhya Pradesh. During the COVID-19 pandemic, digital learning platforms became a necessity for students, while teachers simultaneously adapted & developed new pedagogical approaches through these platforms. In the post-pandemic period, MP state worked for strengthening its Digital Education Framework, particularly following implementation of the National Education Policy (NEP) 2020.

Several initiatives like Digital Learning Enhancement Platform (DigiLEP), Project Based Learning (PBL), Establishment of CM Rise Schools, Artificial Intelligence, Coding courses have emerged as significant developments.

These initiatives aim to foster 21st-century skills, promote digital literacy, provide an updated, learner-friendly curriculum through the effective use of digital learning tools. The study adopts a mixed-methods approach, drawing upon secondary data, policy documents & case studies from CM RISE Vinoba School of Ratlam, Government Sandipani Schools, Central, Private, Public & CM Rise Schools.

The research highlights the outcomes of innovative teaching practices for teachers, students and society at large.
Keywords- Digital Learning, CM Rise Schools, Project Based Learning (PBL), National Education Policy (NEP) 2020, AI-Driven and Diksha.

Introduction - The primary objective of these initiatives is to foster 21st-Century Skills, Promote Digital Literacy by offering an updated, easily comprehensible curriculum supported by Digital Learning Tools. Innovative Teaching Methods have become central to enhancing learning outcomes & ensuring equitable access to quality education.

This study explores Innovative Teaching Methods adopted across various educational institutions, including Central, Private, Public and CM Rise Schools in Madhya Pradesh. A Mixed-Methods Research Approach has been employed, utilizing existing data & government policy documents. The analysis focuses on understanding the key features of digital pedagogy for both Teachers & Students, Evaluating its broader social outcomes. The paper highlights innovative pedagogical shifts from necessity (pandemic) to strategic development, emphasizing blended learning & digital tools to create engaging, accessible education across MP.

Effect of Covid-19: The Covid-19 pandemic was a challenge for teachers as well as students, for spreading knowledge in society. This time challenge initiate for innovation, digital wellbeing, usage of online applications & related technologies. In many research it shows that the COVID-19 pandemic leads a greater knowledge of innovative e-learning programs with various methods. It creates high communication between Teaching & learning. After research it has been stated that the COVID-19 pandemic has marked a turning point in the development of and the use of innovative e-learning technology. It leads to positive impact on possibilities, quality of using e-learning in higher education in the future.

Through NEP 2020 major paradigms shift from access based or input based education (seat availability, attendance, lecture hours) to outcomes based or competency based education (skills, application, behavioral evidence) in both school and higher education.

So, after sudden closure of colleges at the time of COVID-19 it was a forced or massive adoption, experimentation with various types of new online, blended, tech-enabled pedagogies, online materials &e-lecture delivery.

Objectives of Study:

1. To Analyze Innovative Teaching Methods Adopted in Madhya Pradesh Government.
2. To Examine Major Government Initiatives for Digital Education.
3. To Evaluate Impact on Students, Teachers and Society.
4. To Identify Challenges and Future Opportunities.
5. Study CM Rise, PBL, AI Initiatives

Key Focus Areas:

Digital Platforms: Utilizing the Digital Learning Enabled Platform (DigiLEP) for online instruction & resource sharing.
Infrastructure: Developing State-of-the-art CM Rise Schools with advanced Digital Integration.
Future Skills: Introducing AI & coding to equip students with essential Digital Competencies.
Curriculum Modernization: Creating learner-friendly, updated content for better comprehension.
Teacher Adaptation: Documenting the teacher's use of new digital pedagogies.

Research Methodology

1. Mixed-Methods Approach.
2. Secondary Data Analysis.
3. Government Policy Documents, Analysis, Reports.
4. Case Studies of Central, Private, Public & CM Rise Schools of MP.
5. Secondary Data & Policy Documents Analysis.
6. Comparative & Outcome-Based Analysis.

Research Approach

Mixed-Methods: Combining qualitative and quantitative data.
Data Sources: Policy Documents, Secondary Data, and Case Studies, Central, Private, Public and CM Rise Schools.
Innovative Teaching Methodologies: It is a collection of various strategies that uses creative practices for improving the overall learning experience & performance of students. It uses modern tools, techniques & different approaches to make teaching & education more engaging, effective. Using Innovative Teaching Methods in classroom can make day to day learning more engaging, easy & effective. It will assist teachers in promoting learning, encouraging student understanding & growth. For better development and implementation of this technique it is very essential to give proper training to teachers, because if the teachers are highly trained and skilled they build an excellent teaching & learning environment for students.
Various Types of Innovative Teaching Methodologies are: These are the few suggestive ways to use innovation into teaching:
Interactive Lessons in Teaching.
Usage of Virtual Reality Technology.
Project Based Learning Method.
Personalized Learning Environment:
Blended Learning Environment and
Adaptive Learning Environment.
Flipped Classroom and other Activities.
Usage of Artificial Intelligence in Teaching and Learning.
Design Thinking Process and Crosswords, Quiz and MCQ.
Inquiry Based Learning Environment.
Cloud Computing Techniques.
Peer Teaching and Feedback System.
Crossover Teaching.
3D Printing and Animation.
Usage of Audio /Video Technology.
Smart Classroom.
Uses of Virtual Reality.
Activity and Simulation Based Learning.

Major Digital Initiatives and Transformation in Education by Madhya Pradesh Government

Project-Based Learning (PBL): Real-World Problem-Solving and Teamwork. In Madhya Pradesh during recent studies it is found that for a landmark shift towards learner-centric education, this project based learning (PBL) is being used or embedded across approx 274 CM Rise Schools.
CM Rise Schools: Selected Government School with better Facilities, Teaching, Training and Infrastructure. The aim are to reform the wider government-led teacher training ecosystem, to build teacher's resilience & capability, to respond to the crisis, in the process of making the culture of lifelong learning for teachers as a function of the education system. It also builds the digital teacher training ecosystem in the state which was aim for focusing on improving school education by upgrading infrastructure, promoting digital learning, enhancing teacher training, usage of audio/ visual & smart classroom etc.
Digital Platforms Supporting Teachers are:
DIKSHA Technology Platform – National Teacher Training Platform, DIKSHA, Shiksha Setu platform, M-Shiksha Mitra.
NIC, SCERT Content Collaboration.
Toll-Free Academic Helpline Numbers.
Digital Learning Enhancement Platform (DigiLEP).
AI & Coding Curriculum.
Shift from Emergency Remote Teaching to Strategic Digital Learning.
Blended Learning and Smart Classrooms.
TV, Radio, What's-App-Based Learning Support.
Integration of AI, PBL & Digital Platforms.
Madhya Pradesh Government Initiative: The paper emphasizes on various initiative by MP government in the development of innovative teaching methods and designing a better digital learning infrastructure in their various education institution development in teaching methods Innovative teaching methods like Paradigm shift, smart classroom project based learning (PBL), blended learning specially this will plans to build in government scheme of Madhya Pradesh.
Inductive Teaching and Learning: Students are first presented with challenges inductive methods are used like inquiry- based, case-based, problem-based, project-based, discovery learning & just- in-time teaching.
Active Learning Strategies: Dynamic learning techniques become possibly the most important factor, it utilise for enabling & animate a classroom by putting understudies at the focal point of the learning procedure.
Peer Teaching Activities: Reading buddies, Cross-age peer tutoring and Role Play.
Game-Based Learning Platforms: It increases / boosts engagement, knowledge retention in students by integrating gaming mechanics with education with the use of various

gaming techniques, quizzes, open forum, brainstorming etc. it results in high engagement of students their skill development & tracking learning growth.

Digital Learning & Technology Integration: Smart boards, projectors & internet-enabled classrooms, online quizzes, videos & learning apps, Digital assessments & instant feedback, Enhanced digital literacy among rural students as well as continuous professional development. Teacher's capacity building, training for effective use of digital content. online platforms, making classroom sessions more engaging, interactive, libraries, labs, online tests has provided students with hands-on learning experiences

PM Shree Scheme: About 730 schools has been identified by the state for infrastructural & education quality improvement.

Findings-

The study reveals several positive impacts of innovative teaching methods in digital learning environments, including:

Improved student learning outcomes.
Improved digital proficiency & skill development
Fast comprehension & grasping of academic concepts.
Enhanced knowledge development & better pedagogical practices for Teachers.
Improved lecture delivery & capacity building among teachers.
Increased student engagement & interest in learning.
Broader societal benefits through improved education.

The effective use of digital tools & platforms has significantly enhanced overall teaching-learning process. With successful models like CM Rise Scheme in Madhya Pradesh and the PM Shree Scheme, it is proved that well-planned educational reforms can create long-lasting impact, it creates the atmosphere for digital learning and better understanding by students.

Case study- The Vinoba School at Ratlam established in 1991, serves tribal community of the area & experiencing with low awareness, leads to poor enrollment and attendance of students, also facing weak leadership, infrastructural issues and de-motivated teachers. Then in 2024, "CM RISE Vinoba School of Ratlam", turned for its remarkable turnaround, best practices and receive award "The World's Best School Prize", a global education honor bestowed by the London-based T4 Education group.

Government Kamla Nehru Sandipani Schools at various place in Madhya Pradesh like Mhow, Dewas and Narsingpur are well equipped with infrastructure and education setup. As per Chief Minister Dr. Mohan Yadav that 369 Sandipani Schools are currently operating in the state, where education is not limited to books but it focused on holistic student development as well as recently announced Rs. 5 lakh award each to schools in Mhow, Dewas and Narsinghpur for achieving 100% examination results & excellent academic management.

Challenges- Despite the positive outcomes, several challenges persist like: Need of a techno-savvy environment for the successful implementation of Digital Teaching Methods. Teachers may face difficulties in understanding and adopting new technologies, training and guidance to teacher's are must necessary. Challenges related to rural infrastructure, irregular electricity, limited access to smart phones or computers, limited internet connectivity in remote region, inadequate digital resources and environmental constraints.

Conclusion- The essence of paper analyzes Madhya Pradesh Government (MP) proactive steps in digital education, moving beyond pandemic Covid-19 and a robust framework for future-ready learning.

This research highlights targeted and innovative digital pedagogy introduced by the Madhya Pradesh Government in transforming the educational landscape. Through strategic initiatives and technology integration, the state is progressing toward a more inclusive, skill-oriented and future-ready education system, not only in urban section of the society but in rural areas also. After solving many problems of rural areas the education system here increasing day by day. CM Rise School is a boom for rural areas school education development. As per the report of new model launch by government of Madhya Pradesh in 2021 is that it aims to create approx 9000 plus such model schools for providing quality education in rural and semi-urban areas and This schools program is closely aligned with the objectives of the National Education Policy 2020.

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Time Poverty in the Digital Age: How Technology-Enabled Education Impacts Women's Time Use, Work Status, and Well-Being

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Abstract- Digital education-through online classes, learning apps, and hybrid programmes—has expanded rapidly after COVID 19. For many women, it promises flexibility, reduced travel, and new pathways to skills, qualifications, and income. However, women's learning often happens inside a crowded daily schedule shaped by unpaid care work, household management, and paid employment. This paper examines the relationship between technology-enabled education and women's time poverty, work status, and well-being using a conceptual and secondary-data approach. Drawing on the time use and gender literature, it argues that digital education can both relieve and intensify time poverty: it may reduce commuting time and enable asynchronous learning, but it can also extend study hours into late nights, blur boundaries between home and learning, and increase cognitive load—especially where domestic work remains gendered and support systems are weak. The paper proposes a framework linking digital education access, time-use constraints, and well-being outcomes, and it outlines policy and institutional strategies such as flexible scheduling, learner support services, childcare linkages, and well being oriented digital pedagogy. The core conclusion is that digital education becomes empowering when it is designed with time poverty in mind.

Keywords-Time poverty, Digital education, Women's time use, Work status, Well-being, Work–life balance, Gender and Education.

Introduction - The diffusion of smartphones, affordable data, and online learning platforms has transformed access to education and training. In India and many developing economies, technology-enabled education has expanded through MOOCs, LMS-based college teaching, skill development portals, and coaching ecosystems. For women—particularly those balancing domestic responsibilities—digital education is often presented as an equalizer because it can be pursued from home. Yet, the home is also the primary site of unpaid care work, and women's time is frequently fragmented across multiple roles. In this context, time poverty becomes a critical lens for evaluating whether digital education truly expands women's capabilities or merely adds another task to an already overloaded day.

Time poverty refers to a shortage of discretionary time after meeting necessary activities such as paid work, household production, care work, and basic personal care. It is not only about "being busy"; it reflects unequal bargaining power, social norms, and the invisible labour that sustains households and economies. The consequences are wide-ranging: constrained labour-force participation, lower quality of leisure, stress, fatigue, and reduced well-being. This paper links these ideas to the fast-growing domain of digital education, asking how technology-enabled learning interacts with women's time use, work status, and well-being

.**Problem Statement and Rationale-** Digital education is frequently promoted as flexible, cost-effective, and inclusive. However, flexibility is not automatically freedom. When learning is moved into the home, it can be interrupted by domestic tasks, childcare, eldercare, and social expectations. Women may study late at night or early morning, sacrificing sleep or recovery time. Moreover, the same technology that enables learning also increases digital connectivity and expectations of constant availability (messages, assignments, notifications), potentially intensifying time pressure. Therefore, a gender-sensitive assessment is needed to understand the conditions under which digital education reduces time poverty versus when it deepens it.

Objectives:

1. To examine the concept of time poverty and its relevance in understanding women's time-use patterns in the context of technology-enabled education.
2. To analyse the impact of digital education on women's

time use, with reference to unpaid domestic work, care responsibilities, and learning time.

3. To develop a conceptual framework linking digital education, women's time poverty, work status, and well-being using evidence from time-use surveys and existing literature.

Brief Review of Literature- Research on time poverty highlights that women's total work burden (paid plus unpaid) is often higher than men's, even when labour-market participation is lower. Time use studies document persistent gender gaps in unpaid care work, which restrict women's opportunities for skill acquisition, career advancement, and rest. Feminist economics connects these patterns to social norms and undervaluation of care labour, while household bargaining models emphasize constraints within the family. In parallel, digital education literature finds that online learning can reduce geographic barriers, enable flexible pacing, and support lifelong learning. Yet digital divides (device access, bandwidth, digital literacy) and home learning environments (quiet space, family support) strongly shape outcomes. Studies also note that online learning may increase self regulation demands, screen fatigue, and mental load. Bringing these strands together suggests that the net effect of digital education on women depends on time availability, autonomy, and support systems.

Conceptual Framework- Figure 1 presents a simple framework. Access to technology-enabled education (devices, connectivity, platforms,and course design) influences women's learning participation through immediate time and resource constraints. Women's baseline time use is shaped by paid work status, unpaid care responsibilities, and household composition. Digital education can reduce time costs (travel, rigid schedules) and expand options (asynchronous modules, recorded lectures). At the same time, it can increase time costs (extended study hours, interruptions, platform overload), and it can shift the burden of managing learning (planning, troubleshooting, coordination) onto the learner. These time-use changes affect work outcomes (labour-force participation, job search, productivity) and well-being (stress, sleep, self-efficacy, perceived control). Institutional and policy supports—such as flexible assessments, mentoring, childcare linkages, and digital well-being design—moderate these effects.

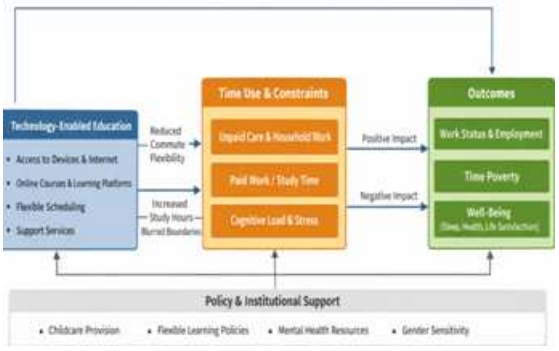

Figure 1: Conceptual framework of digital education and women's time poverty

Research Methodology- The study is conceptual and descriptive, based on secondary data and existing research. It synthesizes evidence from time use surveys, gender and labour studies, and digital education reports to identify mechanisms connecting digital learning with women's time poverty and well-being. The approach follows three steps: (i) defining time poverty and mapping women's time constraints; (ii) identifying how digital education changes the time cost and organization of learning; and (iii) discussing likely implications for work status and well-being, highlighting moderating factors such as household support, course design, digital access, and institutional flexibility. The paper aims to offer a practical framework and policy directions rather than estimating causal impacts.

Discussion: Pathways And Likely Outcomes- Time saving pathways. Digital education can reduce travel time and the fixed costs of attendance, which is particularly relevant where women face mobility constraints or safety concerns. Recorded lectures and asynchronous modules allow women to learn during small time windows. Digital content can also shorten search costs by providing structured materials and immediate feedback. When combined with supportive households and predictable schedules, these features can increase learning continuity and support transitions into employment or better jobs.

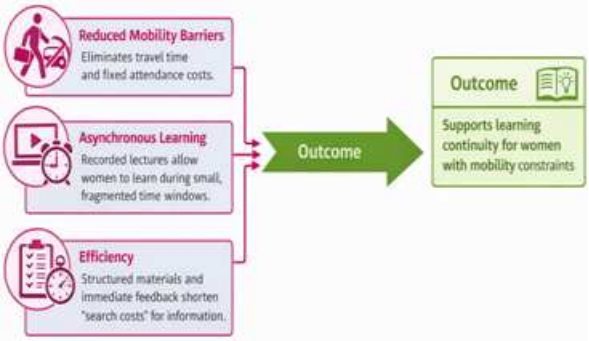

Figure 2. Time-Saving Benefits of Digital Education for Women's Learning Participation

· Time intensifying pathways. Flexibility can lead to boundaryless learning, where study is pushed into late-night hours after domestic work. Interruptions at home reduce learning efficiency, requiring longer time to complete the same tasks. Platform overload (multiple apps, frequent notifications, continuous assessments) increases mental load. In low resource settings, device sharing, connectivity issues, and lack of quiet space further raise time costs. Thus, digital education may unintentionally increase time poverty by adding study time without reducing unpaid work.

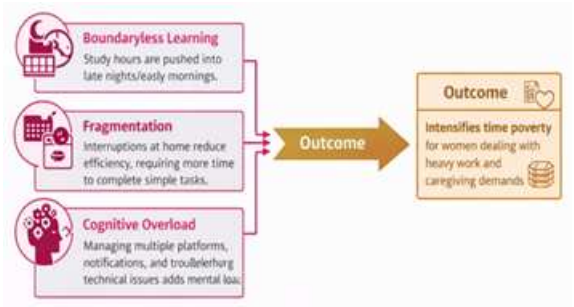

Figure 3. Conceptual Framework Showing How Digital Education Contributes to Women's Time Poverty

Work status implications. Skill acquisition through online learning can raise employability, especially for women re entering the labour market or seeking flexible work. However, when time poverty is severe, women may drop out of courses, under utilize learning opportunities, or experience slower progress, limiting labour-market benefits. Additionally, if digital education is used to justify shifting responsibility from institutions to individuals (e.g., 'learn at home' without support), it can reproduce gender inequality.

· Well being implications. Digital education can strengthen agency, self confidence, and social connectivity (peer forums, mentoring). Yet, if it is pursued under high time pressure, it may increase stress, sleep deprivation, and guilt—particularly when women are expected to excel in domestic roles simultaneously. Well being outcomes therefore depend on perceived control over time, adequacy of support, and humane learning design.

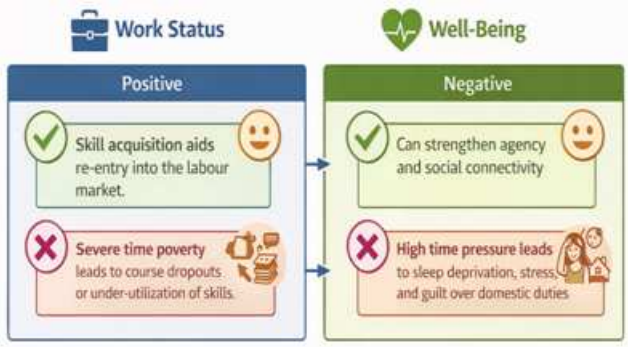

Figure 4: Dual Impact of Digital Education on Women's Work Status and Well-Being

Policy and Institutional Implications: To ensure that technology-enabled education reduces time poverty and improves well-being, interventions should target both learning design and the wider care economy. First, institutions should adopt time poverty sensitive pedagogy: recorded content, low bandwidth options, predictable weekly workload, flexible deadlines, and fewer but meaningful assessments. Second, learner support must include counselling, peer mentoring, and digital skills helpdesks. Third, community and workplace linkages (local learning hubs, childcare support, safe study spaces, employer-supported learning time) can protect women's study time. Fourth, policy should invest in public digital infrastructure and affordable devices, while also strengthening childcare and care services. Finally, platforms should integrate digital well-being features—reasonable notification defaults, screen-time breaks, and accessibility options—to reduce cognitive overload.

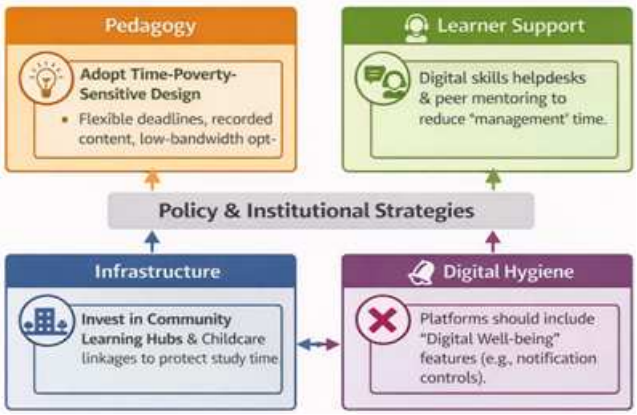

Figure 5: Policy and Institutional Strategies to Mitigate Women's Time Poverty in Digital Education

Conclusion- Technology-enabled education has the potential to expand women's capabilities by reducing mobility barriers and offering flexible learning pathways. However, flexibility does not automatically translate into time freedom. When unpaid care work remains unequal and home learning environments are constrained, digital education can intensify time poverty and strain well-being. This paper's framework highlights that the impact of digital education depends on the interaction between course design, household time constraints, and institutional support. A time poverty aware approach—combining humane digital pedagogy with care supportive policies—can make digital education a genuine tool for women's empowerment and inclusive growth.

Key Findings and Suggestions:

1. Digital education may reduce time poverty mainly by saving travel time and enabling asynchronous learning, but it may increase time poverty through interruptions, extended study hours, and digital overload.
2. Women's work outcomes depend on whether learning time is protected and whether skills gained translate into accessible, decent employment opportunities.
3. Well being is mediated by perceived control over time, sleep adequacy, and supportive learning environments.
4. Institutions should redesign workload and assessment patterns to match the realities of women's fragmented time.
5. Policy should pair digital education expansion with investments in care services, safe community learning spaces, and affordable digital infrastructure.

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Digital Pedagogy in India: Innovation Amidst Challenges in the Post-NEP 2020 Era

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Abstract - The education system in India is going through a massive change, moving away from traditional memorization toward a modern, technology-driven approach. This shift is largely supported by the National Education Policy (NEP) 2020 and the government's "Digital India" mission. This research paper explores how these changes are happening in real classrooms, from high-tech universities in cities to small government schools in villages.

Specifically, this paper analyses three innovative teaching methods: Gamification, The Flipped Classroom and Microlearning. It examines how these methods are helping Indian students who are preparing for competitive exams or studying with limited internet data. The study uses recent data from the *Annual Status of Education Report (ASER) 2024* to highlight the ground reality of digital access.

While these new teaching methods show great promise in increasing student engagement and attendance, the paper also uncovers a serious "digital divide." The findings show that while smartphone ownership is high in rural India, actual access for students especially girls remain low. The abstract concludes that for digital learning to be truly successful in India, we cannot rely on technology alone; we need a "Phygital" model (Physical + Digital) that combines digital tools with strong human support to ensure no student is left behind.

Keywords- Digital Pedagogy, NEP 2020, Gamification, Flipped Classroom, Microlearning, Digital Divide, ASER 2024, Blended Learning.

Introduction - India is home to one of the largest student populations in the world, with hundreds of millions of learners spanning from primary schools to massive universities. For decades, the Indian education system was defined by the traditional "Guru-Shishya" model. In this setup, the teacher was the sole source of knowledge and students were expected to listen passively and memorize facts (rote learning). While this method served its purpose in the past, it is struggling to keep up with the needs of the 21st century.

The landscape of Indian education changed dramatically following the COVID-19 pandemic. What started as a temporary emergency measure,shifting classes to Zoom or WhatsApp has now evolved into a permanent transformation. Schools and colleges realized that digital education offers flexibility that physical classrooms cannot always provide. However, simply moving a boring lecture from a blackboard to a laptop screen does not work. Students today, often called "digital natives," have shorter attention spans and are used to the fast-paced, interactive world of social media.

The **National Education Policy (NEP) 2020** addresses this by explicitly discouraging rote memorization and advocating for "blended learning." It envisions technology not as an add-on, but as a core tool for developing critical thinking and problem-solving skills

Furthermore, the "Digital India" initiative has improved internet connectivity across the country. With the cost of mobile data in India being among the lowest in the world, access to educational content has exploded. From a student in a metro city using a laptop to a village student using a parent's smartphone, the potential for digital learning is vast. This paper aims to move beyond general discussions of online classes and focuses on specific, innovative teaching methods like **Gamification**, **Flipped Classrooms** and **Microlearning**. It explores how these strategies are being adapted to fit the Indian context and analyses their effectiveness in turning passive listeners into active learners. Finally, it addresses the critical question: In a country as diverse as India, can these digital innovations truly reach everyone?

The Indian Context: Policy and Infrastructure- To understand why innovative teaching methods are becoming popular now, we must look at the massive changes in India's policies and infrastructure. The National Education Policy (NEP) 2020 is the blueprint for modern education in India. Unlike previous policies that focused mainly on building more schools, NEP 2020 focuses on how students learn.

1. **Emphasis on Digital Skills:** The policy mandates that technology be integrated into education at all levels. It encourages schools to teach coding and computational thinking from a young age.
2. **Blended Learning:** NEP 2020 officially recognizes "blended learning," where students learn partly through online digital media and partly through traditional face-to-face methods. This gives legitimacy to online degrees and digital certifications, which were previously seen as less valuable.

The Government of India has launched massive digital platforms to ensure that quality education is not just for rich students in big cities.

1. **SWAYAM (Study Webs of Active-Learning for Young Aspiring Minds):** This is often called the "Indian Coursera." It provides free online courses created by professors from top institutes like IITs and IIMs. Students from any village can take these courses and, upon passing an exam, earn credits that count toward their college degree.
2. **DIKSHA (Digital Infrastructure for Knowledge Sharing):** This is a national platform for school education. It hosts QR-coded textbooks. When a student scans a code in their physical textbook using a phone, they are immediately shown a video or explanation of that specific topic. This bridges the gap between the physical book and the digital world.
3. Policies are useless without the internet. The success of digital learning in India is powered by the "Digital India" initiative, which has drastically lowered the cost of the internet.
4. **Affordable Data:** India has some of the cheapest mobile data rates in the world. This allows students in Tier-2 and Tier-3 cities to watch educational videos without worrying about high costs.
5. **Smartphone Penetration:** As noted in the ASER reports, smartphone ownership has skyrocketed in rural households. While access issues remain (as discussed later in this paper), the sheer presence of devices in millions of homes has created the potential for a digital classroom in every pocket.

Innovative Teaching Methods in India

Gamification: In India, gamification has seen massive success, particularly in the coaching industry for competitive exams like JEE (Joint Entrance Examination) and NEET (National Eligibility cum Entrance Test).

How it works in India: Instead of boring lectures, apps use "leaderboards" and "daily streaks" to motivate students.For example, a student preparing for UPSC might get "badges" for completing a History module or compete in a live "quiz battle" with thousands of peers across the country.

Evidence from Indian Research: A 2024 study in the *Indian Journal of Educational Technology* found that gamification significantly improved student interest and attendance in foundational programs. The study highlighted that the inherent competitiveness of Indian students makes them highly responsive to elements like points and rankings.

The Flipped Classroom: In the Indian Flipped Classroom model, students watch recorded lectures (often available on NPTEL or YouTube) at home and use class time to solve problems with professors.

CaseStudy -A systematic literature review of Flipped Learning in India (2020–2024) reveals this method is gaining popularity in engineering and medical colleges. Professors at institutions like IITs are increasingly using class time for project discussions rather than concept delivery.

Benefit- This helps to address the high student-teacher ratio in Indian colleges. Since the basic lecture is recorded, the teacher can spend the physical class time helping students who are struggling, rather than repeating the same speech.

Microlearning: With India being a mobile-first nation, "Microlearning" has exploded. This method involves delivering content in small capsules (3-5 minutes), often via WhatsApp, Instagram, YouTube or other mobile apps.

Why it suits India:Short videos require less data, which is crucial for students in Tier-2 and Tier-3 cities. In recent times Indian youth is heavily accustomed to Instagram Reels and YouTube Shorts, and these bite-sized educational content becomes easier to consume.

While the methods above are promising, they face a unique hurdle in India, the digital divide. The Annual Status of Education Report (ASER) 2024 provides a reality check for rural India.

Smartphone Ownership vs. Access: While nearly 90% of rural households have a smartphone, only about 31% of rural adolescents have their own device. The phone is often with the father, who takes it to work, leaving the student without access during the day.

Gender Gap: Girls are significantly less likely to own a smartphone or know how to use digital services compared to boys.

Rural India	Boys	Girls
Can use a smartphone	80% approx.	Lower than boys
Owns a smartphone	Higher	Significantly Lower

Infrastructural Issues-Beyond the availability of phones,deeper infrastructural problems still persist in rural areas. Although most villages are officially "electrified," inconsistent power supply and a lack of backup systems (like UPS) often render digital classrooms useless during frequent power cuts.While 4G coverage has expanded, slow internet speeds often cause buffering during live classes. Additionally, daily data limits are quickly exhausted when multiple siblings share a device for study. In government schools, the ratio of students to computers is often critically high, leaving students with as little as 20 minutes of hands-on practice per week. A major hurdle is the lack of on-site IT support. Teachers, often lacking digital literacy themselves, are unable to fix minor technical glitches, leading to expensive smartboards and computers remaining unused.

Conclusion- The transition of the Indian education system from blackboards to digital screens is not just a trend but a revolution driven by the vision of the National Education Policy (NEP) 2020. This research paper has highlighted that digital learning is no longer about simply watching a video lecture. It is about using psychology and technology together to make learning faster and better. As shown in this study, innovative methods like Gamification work exceptionally well in India because they tap into the competitive nature of students preparing for exams like JEE and NEET. Similarly, Microlearning solves a major infrastructure problem by allowing students with limited data plans and cheap smartphones to learn in small, manageable chunks without buffering issues, while Flipped Classrooms are helping higher education institutions address teacher shortages by using class time for discussion rather than lecturing.

However, the most critical finding of this paper, supported by the ASER 2024 report, is that access to technology is not equal. While India has achieved high smartphone penetration, there is a distinct gap between having a phone in the house and a student actually owning a phone. The data reveals a significant gender gap where girls in rural India are left behind in digital ownership, and there is also a notable gap in digital literacy among rural teachers. If the system switches completely to online learning without addressing these disparities, it risks excluding millions of students from the education system.

To achieve the goal of a Viksit Bharat, the solution lies in a "Phygital" model that intelligently combines physical and digital learning. This future requires designing educational tools that work on basic phones and over SMS, rather than just relying on expensive tablets. Furthermore, the role of the teacher must shift from delivering content to guiding students through digital resources, ensuring that machines do not replace human connection. Ultimately, government schemes must target providing devices and training specifically to female students to close the gender gap. Innovative teaching methods can transform Indian education only if they are inclusive, ensuring that learning is accessible to the student in a remote village just as much as it is to the student in a metropolitan city.

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Governance and Policy framework For Digital Transformation in Education

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Abstract - Digital transformation has become a strategic priority for education systems worldwide, driven by rapid technological advancements and evolving learning needs. However, the effectiveness of digital education initiatives largely depends on the strength of governance and policy frameworks that guide their design and implementation. This study examines the role of governance mechanisms and policy coherence in enabling sustainable and inclusive digital transformation in education, with particular reference to the Indian context. Drawing on governance theory, the study develops a conceptual model linking governance structures and policy frameworks with institutional capacity, digital transformation processes, and educational outcomes. A mixed-methods research design is employed, combining quantitative analysis of institutional and stakeholder perceptions with qualitative policy analysis of key digital education initiatives, including the National Education Policy (NEP) 2020. The findings reveal that effective governance, policy alignment, and institutional capacity significantly influence the success of digital education reforms, while data governance and cybersecurity play a critical moderating role by shaping trust and adoption. Despite progressive policy intent, the study identifies persistent implementation gaps related to infrastructure, digital divides, and monitoring mechanisms. The study contributes to the literature by adopting a governance-centric perspective on digital transformation and offers policy-relevant recommendations for strengthening digital education governance in developing economies.

Keywords-Digital Transformation in Education, Education Governance, Policy Frameworks, NEP 2020, Digital Education Policy, Institutional Capacity, Data Governance, India.

Introduction - Digital transformation in education has emerged as a critical driver of systemic change in teaching–learning processes, institutional management, and educational governance. Rapid advancements in information and communication technologies (ICT), artificial intelligence, data analytics, cloud computing, and digital platforms have fundamentally reshaped how knowledge is created, delivered, accessed, and assessed. The COVID-19 pandemic further accelerated this transition, exposing both the immense potential of digital education and the structural gaps in policy preparedness, institutional capacity, and regulatory mechanisms. In this context, a robust governance and policy framework becomes essential to ensure that digital transformation in education is inclusive, effective, secure, and sustainable.

Governance in digital education refers to the structures, processes, rules, and institutional arrangements through which digital initiatives are designed, implemented, monitored, and evaluated. It involves multiple stakeholders, including governments, regulatory bodies, educational institutions, teachers, students, technology providers, and civil society. Effective governance ensures strategic alignment between national education goals and digital initiatives, clarifies roles and responsibilities, promotes accountability, and facilitates coordination across different levels of the education system. Without a coherent governance framework, digital transformation risks becoming fragmented, inequitable, and technology-driven rather than learner-centric. Policy frameworks play a complementary role by providing normative direction and regulatory clarity for digital transformation in education. Education policies related to digitalization typically address areas such as digital infrastructure, access and affordability, curriculum integration, teacher capacity building, assessment reforms, data governance, cybersecurity, and ethical use of technology. A well-designed policy framework ensures that digital tools are not merely adopted for efficiency gains but are meaningfully integrated to enhance learning outcomes, critical thinking, creativity, and employability skills. Moreover, policy coherence across education, ICT, data protection, and innovation domains is crucial for long-term impact. Teacher preparedness and

institutional capacity are equally important elements of digital transformation. Policies must support continuous professional development of educators, enabling them to effectively use digital tools, adopt learner-centric pedagogies, and engage students in virtual and hybrid environments. Governance structures should facilitate institutional autonomy combined with accountability, allowing educational institutions to innovate while aligning with national priorities. Leadership in digital transformation requires not only technological competence but also strategic vision, change management skills, and ethical responsibility. Data governance and cybersecurity have emerged as vital policy concerns in the digital education ecosystem. The increased use of learning management systems, student analytics, and AI-based tools generates large volumes of sensitive data. Effective governance frameworks must ensure data privacy, transparency, and ethical use, protecting learners' rights while enabling evidence-based decision-making. Policies related to data protection, consent, interoperability, and cybersecurity are essential to safeguard trust and system integrity.

Research Objectives- Based on the identified gaps, the present study proposes the following objectives:

General Objective-To examine the role of governance and policy frameworks in enabling effective, inclusive, and sustainable digital transformation in education.

Specific Objectives:

1. To analyze existing governance structures and policy frameworks supporting digital transformation in education.
2. To examine the relationship between governance mechanisms and the effectiveness of digital education initiatives.
3. To assess the extent to which policy coherence influences institutional capacity and digital adoption in education.
4. To identify governance challenges related to equity, quality assurance, and data governance in digital education.
5. To develop a policy recommendation framework for strengthening digital education governance, with special reference to India.

Hypotheses / Propositions Based on Governance Theory-

Hypothesis 1 (H1)

Effective governance structures have a significant positive impact on the successful implementation of digital transformation initiatives in education.

Rationale: Multi-level governance theory suggests that coordination across national, institutional, and local levels enhances policy effectiveness.

Hypothesis 2 (H2)

Policy coherence between education, ICT, and data governance policies significantly improves institutional readiness for digital transformation.

Rationale: Network governance emphasizes inter-policy and inter-agency coordination for complex reforms.

Hypothesis 3 (H3)

Institutions with decentralized and participatory governance models demonstrate higher levels of digital innovation and adaptability.

Rationale: Adaptive governance theory highlights flexibility, stakeholder participation, and learning-based governance as key enablers of innovation.

Hypothesis 4 (H4)

Strong regulatory and quality assurance frameworks positively influence learner trust and acceptance of digital education.

Rationale: Governance theory recognizes regulation as essential for legitimacy and accountability in public systems.

Hypothesis 5 (H5)

Robust data governance and cybersecurity policies moderate the relationship between digital technology use and educational outcomes.

Rationale: Ethical governance frameworks stress data protection as a prerequisite for sustainable digital systems.

Research Gap- The review of existing literature and policy documents reveals several critical gaps in the domain of governance and policy frameworks for digital transformation in education.

First, most studies emphasize technological tools, platforms, and digital pedagogy, while governance mechanisms and policy structures are under-theorized and empirically underexplored. Digital transformation is often treated as a technological phenomenon rather than a governance-led systemic reform, leading to fragmented interpretations and limited policy applicability.

Second, there is a significant gap between policy formulation and implementation. Although national and international policy frameworks, including NEP 2020 in India, articulate ambitious digital education goals, there is limited empirical evidence assessing how governance capacity, institutional autonomy, and regulatory clarity affect actual implementation outcomes.

Third, existing research lacks integrated analytical models that link governance, policy coherence, institutional capacity, and educational outcomes. Most studies focus on isolated variables, thereby failing to capture the complex, multi-level nature of digital education governance.

Fourth, data governance, ethics, and cybersecurity remain insufficiently addressed within education governance literature. While concerns related to privacy and algorithmic decision-making are acknowledged, few studies operationalize these issues as measurable governance variables.

Finally, in the Indian context, research remains largely descriptive and platform-centric, focusing on individual initiatives such as SWAYAM or DIKSHA rather than evaluating the overall governance architecture underpinning digital transformation. This highlights the need for a

comprehensive governance-based empirical inquiry.

Key Findings- The study finds that governance and policy frameworks play a decisive role in shaping the effectiveness of digital transformation in education. Institutions operating under clear governance structures with well-defined accountability, leadership support, and regulatory oversight demonstrate significantly higher levels of digital adoption and pedagogical integration. Policy coherence emerges as a critical success factor, as alignment between education policy, ICT policy, and regulatory guidelines enhances institutional readiness and reduces implementation gaps. The findings further reveal that institutional capacity—particularly in terms of digital infrastructure, faculty competence, and organizational readiness—acts as a key mediating factor between policy intent and actual outcomes. Institutions with decentralized and participatory governance models show greater adaptability, innovation, and resilience in implementing digital learning solutions. Additionally, the study highlights the growing importance of data governance and cybersecurity, noting that robust privacy and ethical frameworks increase stakeholder trust and sustained engagement with digital platforms. Despite progressive policy initiatives such as NEP 2020 in India, the findings indicate persistent disparities in implementation across regions and institutions, largely due to uneven infrastructure, digital divides, and limited monitoring and evaluation mechanisms.

Suggestions- Based on the findings, the study suggests that digital transformation in education should be pursued through a governance-led and policy-driven approach rather than isolated technological interventions. Governments and regulatory bodies should strengthen institutional coordination mechanisms and establish dedicated digital education governance units to ensure accountability and effective policy implementation. Greater emphasis should be placed on achieving policy coherence across education, ICT, and data protection domains, supported by clear regulatory standards for online and blended learning. At the institutional level, sustained investment in digital infrastructure and continuous professional development of educators is essential to translate policy goals into effective practice. Institutions should be encouraged to adopt decentralized and participatory governance models that empower faculty and learners while maintaining accountability. Furthermore, comprehensive data governance and cybersecurity frameworks must be implemented to protect learner privacy and build trust in digital education systems. To address equity concerns, targeted public investment and public–private partnerships should be promoted to bridge the digital divide and ensure inclusive access. Collectively, these measures can support a sustainable, inclusive, and quality-driven digital transformation of education systems.

Conclusion- Digital transformation in education is no longer an optional reform but a strategic necessity in the knowledge-driven global economy. This study underscores that technology alone cannot transform education systems; rather, effective governance and coherent policy frameworks are the foundational drivers of sustainable digital change. The findings highlight that governance structures, policy alignment, institutional capacity, and data ethics collectively shape the effectiveness, inclusiveness, and credibility of digital education initiatives.

In the Indian context, policies such as NEP 2020 provide a strong visionary framework for digital education. However, the realization of this vision depends on strengthening governance mechanisms, enhancing institutional capacity, and ensuring equitable implementation. Bridging the gap between policy intent and practice requires adaptive governance models, robust regulatory oversight, and a commitment to inclusivity and ethical digitalization.

The study contributes to the existing literature by offering a governance-centric conceptual model, empirically grounded insights, and a policy-oriented framework that can guide future research and policymaking. By situating digital transformation within a governance and policy lens, the study provides a roadmap for building resilient, equitable, and future-ready education systems.

Limitations and Future Research Directions- Despite its theoretical and policy contributions, the study has certain limitations that provide avenues for future research. First, the empirical analysis relies primarily on cross-sectional data, which limits the ability to capture dynamic changes in governance and digital transformation outcomes over time. Longitudinal studies could offer deeper insights into the evolving impact of governance reforms on digital education systems. Second, while the study adopts a mixed-methods approach, the scope of qualitative interviews is limited, which may restrict the diversity of stakeholder perspectives, particularly from students and grassroots-level educators. Future studies could expand qualitative inquiry to include learner experiences and regional administrators.

Third, the study focuses largely on higher education and formal institutional settings. Further research may explore governance and policy frameworks in school education, vocational training, and informal learning environments to provide a more comprehensive understanding of digital transformation across education levels. Fourth, although the Indian context offers valuable insights, comparative cross-country studies could enhance the generalizability of findings and identify best practices in digital education governance across different institutional and socio-economic contexts. Finally, future research may empirically test advanced governance models by incorporating emerging variables such as artificial intelligence governance, learning analytics regulation, and digital public infrastructure to better capture the next phase of digital transformation in education.

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Artificial Intelligence and Machine Learning in Education: Transforming Higher Education Ecosystems

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Abstract-Artificial Intelligence (AI) and Machine Learning (ML) have emerged as transformative technologies reshaping higher education globally. This research paper provides an in-depth academic analysis of the role of AI and ML in transforming teaching-learning processes, governance, assessment systems, research practices, and institutional ecosystems in higher education. Drawing upon international practices and policy frameworks, including the Indian National Education Policy (NEP) 2020, the paper examines opportunities, challenges, ethical dimensions, and future prospects. The study argues that strategic, ethical, and inclusive integration of AI and ML can significantly enhance educational quality, equity, efficiency, and sustainability in higher education institutions.
Keywords- Artificial Intelligence, Machine Learning, Higher Education, Educational Technology, Digital Transformation, NEP.

Introduction- The rapid advancement of digital technologies in the twenty-first century has profoundly influenced all sectors of society, with education being one of the most impacted domains.

Artificial Intelligence (AI) and Machine Learning (ML) are at the forefront of this transformation, offering innovative solutions to long-standing challenges in higher education. Universities worldwide face increasing demands for quality education, learner diversity, accountability, and global competitiveness. AI and ML provide new paradigms for personalized learning, data-driven decision-making, and institutional efficiency.

This paper critically examines the transformative potential of AI and ML in higher education ecosystems from a global and Indian perspective.

Conceptual Understanding of AI and ML- Artificial Intelligence refers to the ability of machines to perform tasks that typically require human intelligence, such as learning, reasoning, and problem-solving.

Machine Learning, a subset of AI, focuses on algorithms that enable systems to learn from data and improve performance autonomously.

In higher education, AI and ML underpin adaptive learning platforms, learning analytics, intelligent tutoring systems, and automated administrative processes.

Review of Literature (ROL)- A rapidly expanding corpus of scholarly work has examined the transformative implications of Artificial Intelligence (AI) and Machine Learning (ML) in the domain of higher education. Early foundational studies conceptualize AI as a tool for enhancing, rather than replacing, human intelligence in educational settings. For instance, Holmes, Bialik, and Fadel (2019) argue that AI-driven systems enable personalized learning pathways by dynamically adapting instructional content to individual learner profiles, thereby improving engagement and academic outcomes. Similarly, Luckin et al. (2016) emphasize the concept of "intelligence augmentation," wherein AI supports educators in decision-making, curriculum design, and learner assessment.

From an institutional and systemic perspective, reports by UNESCO (2021) and the OECD (2022) underscore AI as a strategic driver of innovation in education systems globally. UNESCO emphasizes ethical AI deployment, raising concerns regarding data privacy, algorithmic transparency, and inclusivity, particularly in diverse socio-economic contexts. The OECD report highlights AI's potential in optimizing administrative efficiency, curriculum design, and predictive modeling for student success, while also stressing the need for regulatory frameworks.

Within the Indian higher education landscape, the National Education Policy (2020) strongly advocates for the integration of emerging technologies, including AI and ML, to enhance access, equity, and quality. Complementing this policy direction, empirical studies by Sharma and Gupta (2021) indicate that AI-based learning platforms have a positive impact on student engagement and academic performance in Indian universities. Additionally, research by Mishra et al. (2020) highlights the role of digital platforms and AI tools during the COVID-19 pandemic in ensuring continuity of education in India.

Despite these advancements, a critical strand of literature cautions against the uncritical adoption of AI technologies. Selwyn (2019) argues that excessive reliance on AI may lead to the depersonalization of education and exacerbate existing inequalities. Zawacki-Richter et al. (2019), through a systematic review, identify a significant gap in empirical research on AI applications in education, noting that much of the existing work is conceptual rather than evidence-based. Similarly, Williamson (2017) critiques the growing influence of datafication in education, warning against the commercialization and surveillance risks associated with AI systems.

Furthermore, issues related to algorithmic bias and digital inequality have been widely discussed in recent literature. O'Neil (2016) highlights how biased algorithms can reinforce social inequalities, while Eubanks (2018) examines the ethical implications of automated decision-making systems in public services, including education. These concerns are particularly relevant for developing countries, where infrastructural limitations and digital divides may hinder equitable access to AI-driven educational tools.

Overall, the literature reveals that AI and ML possess substantial potential to transform higher education by enhancing personalization, efficiency, and innovation. However, the successful integration of these technologies requires a balanced approach that considers ethical implications, contextual challenges, and the need for robust empirical validation. The existing research also indicates a gap in longitudinal and large-scale empirical studies, particularly in developing country contexts, thereby providing a strong rationale for further investigation in this domain.

Research Methodology (RM)- This study adopts a qualitative and exploratory research design to analyze the role of AI and ML in higher education.

Research Design- The research is descriptive and analytical in nature, focusing on conceptual understanding and policy analysis.

Data Sources:

1. The study is based on secondary data collected from:
2. Academic journals and peer-reviewed articles
3. Government reports and policy documents (e.g., NEP 2020)
4. International organization publications (UNESCO, OECD)
5. Books and conference proceedings

Method of Analysis- A thematic analysis approach has been employed to identify key trends, patterns, and insights related to AI and ML in higher education. Comparative analysis has also been used to examine global and Indian perspectives.

Scope and Limitations- The study is limited to secondary data and conceptual analysis. Empirical validation through primary data could further strengthen the findings.

Evolution of Technology in Higher Education- The integration of technology in higher education has evolved from basic computer-assisted instruction to advanced AI-driven ecosystems.

Earlier phases focused on e-learning and learning management systems, while contemporary approaches emphasize adaptive, predictive, and intelligent systems.

AI and ML represent the culmination of this evolution, enabling real-time personalization and institutional intelligence.

Global Trends and Practices- Globally, higher education institutions are leveraging AI-driven technologies to enhance teaching effectiveness, student engagement, and institutional governance.

Universities in the United States, Europe, China, and Singapore have adopted AI-based analytics for student retention, curriculum design, and campus management. These practices demonstrate the scalability and impact of AI in diverse educational contexts.

AI-enabled Personalized Learning- Personalized learning is one of the most significant contributions of AI in education. AI-powered platforms analyze learner behavior, cognitive patterns, and performance data to customize instructional content. Such systems support diverse learning styles, promote inclusivity, and improve academic outcomes. Personalization also empowers learners to progress at their own pace, fostering self-directed learning.

Intelligent Assessment and Evaluation Systems- AI and ML have revolutionized assessment practices through automated grading, adaptive testing, and real-time feedback mechanisms. These technologies enhance objectivity, reduce evaluation bias, and support competency-based assessment models.

AI-driven plagiarism detection and proctoring systems further strengthen academic integrity.

AI in Academic Administration- Administrative efficiency is a critical component of higher education ecosystems.

AI and ML technologies streamline admission processes, enrollment forecasting, timetable scheduling, and resource allocation. Predictive analytics help institutions identify at-risk students and implement timely interventions to improve retention and success rates.

Role of AI in Research and Knowledge Creation- AI tools significantly enhance research productivity by supporting data analysis, literature review automation, and predictive modeling. Machine learning algorithms enable researchers to analyze complex datasets across disciplines, fostering interdisciplinary collaboration and innovation.

Ethical, Legal, and Privacy Issues- Despite the benefits of AI and ML, ethical and legal challenges remain significant. Issues related to data privacy, algorithmic bias, transparency, and accountability require careful consideration. Institutions must establish ethical governance frameworks and comply with data protection regulations to ensure responsible AI adoption.

Challenges in Developing Countries- In developing nations, the adoption of AI in higher education is constrained

by infrastructural limitations, digital divides, and financial constraints. Limited access to technology, inadequate faculty training, and policy gaps hinder effective implementation.

Targeted investments and capacity-building initiatives are essential to overcome these challenges.

Indian Higher Education and NEP 2020- India's National Education Policy (NEP) 2020 emphasizes the integration of technology, digital learning, and innovation in higher education. AI and ML are identified as strategic enablers for improving access, quality, and global competitiveness. Initiatives such as the National Digital University and AI-focused research centers reflect this vision.

Faculty Role and Professional Development- Faculty members play a central role in the successful integration of AI and ML in education.

Continuous professional development, digital literacy, and pedagogical training are essential for effective adoption .Institutions must support faculty through training programs and collaborative learning environments.

Student Engagement and Learning Outcomes- AI-driven learning environments enhance student engagement by providing interactive, adaptive, and feedback-rich experiences. Learning analytics enable educators to monitor progress, identify learning gaps, and implement evidence-based interventions.

Future Prospects of AI in Higher Education- The future of higher education lies in human-centered AI systems that complement pedagogical goals. Emerging technologies such as generative AI, immersive learning, and advanced analytics will further redefine academic ecosystems.

Policy Implications and Recommendations- Governments and institutions must develop comprehensive AI strategies, ethical guidelines, and regulatory frameworks. Collaboration between academia, industry, and policymakers is crucial for sustainable AI integration in higher education.

Conclusion- Artificial Intelligence (AI) and Machine Learning (ML) have emerged as powerful catalysts with the potential to fundamentally transform higher education ecosystems in the twenty-first century. Their integration into academic environments enables institutions to move toward more adaptive, data-driven, and student-centered models of education. By facilitating personalized learning pathways, enhancing assessment mechanisms, streamlining administrative processes, and supporting advanced research capabilities, AI and ML contribute significantly to improving the overall quality, accessibility, and efficiency of higher education systems.

In conclusion, Artificial Intelligence and Machine Learning hold immense promise for redefining the future of higher education. Their long-term success will depend on achieving a careful balance between technological innovation and human values, supported by robust ethical frameworks, inclusive policies, and context-sensitive implementation strategies. Such an approach will ensure that AI-driven transformation contributes not only to institutional effectiveness but also to the broader goals of equity, inclusivity, and holistic educational development.

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Impact of Digitalization on Apparel Manufacturing Units in Delhi: A Review of Technologies and Adaptation Levels

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Abstract - The apparel manufacturing industry of Delhi is a major contributor to India's garment production and export ecosystem. With growing global competition, digitalization has emerged as a transformative force reshaping production processes, quality control, supply chain efficiency and market responsiveness. This review paper examines the impact of digital technologies including CAD/CAM, automated cutting, ERP systems, virtual sampling, IoT applications and cloud-based workflow tools on apparel manufacturing units in Delhi. By synthesizing findings from recent studies, and literature, the paper highlights the current levels of technology adoption, key challenges faced by manufacturers and opportunities for digital transformation. The study concludes that although digital adoption in Delhi's apparel sector is steadily increasing, MSMEs still face barriers related to cost, skills and technological awareness.
Keywords- Digitalization, Apparel Manufacturing, Delhi Garment Industry, Technology Adoption, MSME Sector.

Introduction - The apparel manufacturing industry in Delhi is one of the largest urban manufacturing clusters in India, known for its extensive network of small-scale and medium-scale garment units. These units support domestic fashion markets, e-commerce platforms and export houses by supplying a wide range of apparel products. Traditionally dominated by labor-intensive operations, the sector has undergone significant transformations due to rising demand for quality, speed, precision and global competitiveness.

Digitalization has emerged as a crucial driver of growth in this industry. Technologies such as Computer-Aided Design (CAD), Computer-Aided Manufacturing (CAM), Enterprise Resource Planning (ERP), 3D virtual sampling, automated cutting machines and Internet of Things (IoT) devices are gradually reshaping production lines. Manufacturers worldwide are shifting toward Industry 4.0, which emphasizes automation, real-time data usage, cloud-based communication and intelligent manufacturing.

However, the adoption of digital technologies in Delhi's apparel manufacturing sector is uneven. While export-oriented units are integrating automation and advanced tools, small-scale MSMEs especially those in unorganized clusters such as Gandhi Nagar, Tank Road, Shahpur Jat and Okhla still rely heavily on manual processes. This digital divide affects production speed, product quality, cost efficiency and global competitiveness.

Given this backdrop, there is a need to critically review the current digitalization landscape, understand technological adoption levels, identify barriers and assess opportunities for the apparel manufacturing ecosystem in Delhi. This review paper aims to address this gap by synthesizing existing literature and evaluating the impact of digitalization on the sector.

Literature Review

Singh and Arora (2021) focused on Industry 4.0 applications in garment manufacturing. They noted that technologies such as IoT devices, cloud-based monitoring, and smart sensors enhance real-time visibility of production. The authors observed that Delhi's export-oriented apparel factories were gradually integrating IoT for machine performance tracking, whereas smaller units still relied on manual supervision, restricting overall efficiency gains.

Chatterjee (2022) analyzed the role of 3D virtual sampling in the fast fashion supply chain. The review concluded that virtual sampling drastically reduces sample-making costs, fabric wastage, and development lead times. In the context of Delhi, the study highlighted that fashion design houses and export units increasingly used 3D sampling, but MSMEs lacked access due to software costs and lack of technical training.

Gupta (2023) studied the impact of e-commerce expansion on digital adoption in garment manufacturing. He found that rising online demand and quick response requirements have pushed many Delhi manufacturers to adopt digital cutting and workflow systems. The study concluded that digital pressure from e-commerce buyers has accelerated modernization in Delhi's garment industry, although gaps remain in training and advanced technology usage.

Malhotra and Desai (2024) conducted a comprehensive review of AI-assisted pattern-making and predictive demand forecasting in the apparel sector. Their study highlighted that AI-enabled pattern generation significantly reduces development time and ensures higher design accuracy compared to traditional CAD-only systems. They also found that predictive analytics helps manufacturers forecast demand more accurately, reducing overproduction and inventory waste. According to their findings, a few advanced garment units in Delhi have started experimenting with AI-based systems, especially those catering to export markets and fast-fashion e-commerce brands. However, the study also noted that MSMEs in Delhi remain hesitant due to high software subscription costs and limited technical expertise.
Bansal (2025) reviewed the integration of robotics and semi-automated sewing lines in urban garment clusters. The study emphasized that global manufacturers are rapidly shifting toward robotic sewing systems to solve labor shortages and enhance precision. In the Delhi context, Bansal noted that although full-scale robotics adoption is still rare, a growing number of medium-sized factories in Okhla and Udyog Vihar have begun incorporating semi-automated sewing lines, automated hemming machines, and robotic quality-inspection tools. The paper concluded that Delhi's apparel industry is slowly entering a transition phase where robotic support systems will likely become essential for meeting fast production cycles required by international buyers and online retail platforms.
Digital Technologies in Apparel Manufacturing- Digital technologies have transformed the apparel manufacturing industry by integrating automation, data intelligence and virtual production systems into every stage of the value chain. Modern apparel units increasingly adopt Computer-Aided Design (CAD) systems, allowing designers to create patterns, modify silhouettes and visualize samples digitally without relying on physical prototypes. The rise of 3D virtual prototyping enables garments to be simulated on digital avatars, reducing fabric wastage, development time and the number of real samples required for approval. Computer-Aided Manufacturing (CAM) further accelerates production through automated cutting machines, marker-making software and smart spreading systems that optimize fabric usage and decrease human error.

The introduction of digital supply-chain platforms has strengthened coordination between buyers, manufacturers and vendors by providing real-time visibility regarding orders, inventory, and shipment status. Technologies such as RFID tagging support precise tracking of materials, while Enterprise Resource Planning (ERP) systems integrate procurement, production scheduling, costing, and quality assurance into a single digital environment. Several apparel factories have also begun adopting Internet of Things (IoT) devices, where sensors collect live data from sewing lines to monitor machine speed, operator efficiency, downtime and overall equipment effectiveness. The use of AI-driven analytics allows production managers to analyze these data streams to detect bottlenecks, predict maintenance needs and improve workflow efficiency.

In addition, cloud-based collaboration tools and digital communication platforms have revolutionized interactions between Delhi's apparel manufacturers and global buyers. Many manufacturers use PLM (Product Lifecycle Management) systems to store fabric specifications, measurement charts, trim details and sampling updates, ensuring seamless communication across teams. Sustainability goals have also accelerated the adoption of digital tools such as automated fabric utilization software, energy-monitoring systems and blockchain solutions that trace garment origins and certify ethical manufacturing practices. E-commerce integration and digital marketing platforms further support manufacturers in reaching global markets while reducing dependence on intermediaries.

Overall, digital technologies are reshaping the apparel manufacturing landscape by improving productivity, reducing waste, enabling transparency and enhancing design-to-delivery speed. For Delhi's apparel industry, these tools are becoming essential for maintaining competitiveness, meeting global compliance norms and responding to fast-changing consumer demands. Digital transformation has thus emerged as a strategic necessity for manufacturers aiming to operate efficiently, sustainably and globally in the modern apparel ecosystem.
Enterprise Resource Planning (ERP) in Apparel Manufacturing- Enterprise Resource Planning (ERP) has become a central digital backbone for the apparel manufacturing industry, integrating all major functions procurement, inventory, production, costing, quality control, human resources and order management into a unified software platform. In traditional apparel units, information often flows in fragmented and disconnected ways across departments, leading to delays, duplication of work, communication gaps and inefficient decision-making. ERP systems resolve these issues by connecting every operational activity into a single real-time database, allowing managers to access accurate and updated information instantly. This centralization improves planning accuracy, reduces manual paperwork and supports timely coordination across the production chain.

In apparel manufacturing, ERP plays a crucial role during order processing. Once a buyer confirms an order, the ERP system generates a complete workflow, including fabric requirements, trim consumption, production timelines, costing sheets and delivery schedules. All relevant departments merchandising, fabric sourcing, cutting, sewing, finishing and dispatch receive synchronized information, ensuring clarity and reducing the risk of errors. For Delhi's export-oriented garment hubs, ERP helps track multiple orders from international brands, each with specific compliance norms, size ratios and delivery windows, making the production environment highly organized and

transparent.

ERP also supports material management by maintaining real-time stock levels of fabrics, accessories, threads, and packaging materials. It prevents shortages and over-purchasing by issuing automatic alerts when stocks fall below predefined levels. The system tracks material movement from warehouses to cutting floors and sewing lines, ensuring that every meter of fabric and every accessory is accounted for. This reduces wastage and improves cost efficiency, which is critical for apparel manufacturers operating with tight margins. Fabric utilization reports and consumption analysis allow firms to plan procurement more accurately and negotiate better with suppliers.

In the production department, ERP enhances workflow efficiency by monitoring each stage of garment manufacturing. Production planning modules schedule cutting, sewing, and finishing activities based on machine availability, operator skill levels, and order deadlines. Line managers can track daily output, machine downtime, defect rates, and worker efficiency in real time. If any delays or bottlenecks appear, the ERP dashboard immediately highlights the issue, enabling quick corrective action. For large factories in Delhi where multiple sewing lines operate simultaneously, ERP provides visibility across all lines and supports data-based decision-making to optimize productivity.

Overall, ERP has transformed apparel manufacturing into a more structured, data-driven, and efficient industry. It enables manufacturers to handle high order volumes, manage complex supply chains, reduce operational costs, and enhance productivity. As digitalization becomes essential for competitiveness, ERP adoption is rapidly rising among Delhi's apparel factories, positioning them to meet global standards and respond effectively to fast-changing market dynamics.

Conclusion- The review concludes that digital transformation has become a fundamental requirement for the growth and competitiveness of the apparel manufacturing industry in Delhi. Digital tools such as ERP, CAD/CAM, 3D visualization, IoT monitoring, and digital fabric printing have significantly improved production accuracy, reduced lead times, enhanced supply chain coordination, and strengthened overall efficiency. These technologies allow manufacturers to respond more quickly to global fashion trends, fulfill customized orders, and maintain higher quality standards.

While the benefits of digitalization are clear, the review also shows that adoption varies widely across the industry. Larger export-oriented units have embraced digital systems more rapidly, whereas smaller manufacturing units continue to rely on traditional methods due to financial limitations, skill gaps, and lack of technological exposure. Addressing these challenges through capacity-building programs, government incentives, and industry partnerships is essential to ensure inclusive digital growth.

In essence, digitalization presents a strong pathway for Delhi's apparel sector to become more sustainable, globally competitive, and innovation-driven. By strengthening technological infrastructure, promoting digital skill development, and encouraging strategic adoption of smart manufacturing systems, the industry can achieve higher productivity and meet the evolving expectations of international markets. The transformation is ongoing, and its future success will depend on how effectively manufacturers integrate technology with organizational culture and market demands.

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Equity, Ethics, and Learner Well - Being in Technology-Enhanced Education: Implications for Excellence in Management and Adaptive Technologies

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Abstract - The increasing adoption of adaptive and digital technologies has brought profound changes to contemporary education, influencing both instructional practices and institutional management. While technology-enabled education creates possibilities for improved efficiency, personalized learning, and wider reach, it simultaneously introduces important challenges related to equity, ethical accountability, and learner well-being. This paper explores the role of effective educational management in responding to these challenges by ensuring that adaptive technologies are implemented in inclusive, ethical, and learner-centered ways. Based on an analysis of recent academic literature and international policy frameworks, the study highlights persistent digital inequalities, ethical concerns linked to data-driven educational tools, and the effects of technology-mediated learning on learners' psychological, social, and physical health. The paper emphasizes that equity, ethics, and learner well-being are closely interconnected and must be addressed collectively within educational management strategies. Integrating these dimensions is essential for achieving sustainable and responsible transformation in technology- enhanced education.
Keywords- technology-enhanced education, equity, ethics, learner well-being, digital divide.

Introduction - Technology-enhanced education has become a defining feature of contemporary educational transformation, particularly in the areas of institutional management and adaptive technological practices. Digital learning platforms, artificial intelligence–based tools, learning management systems, and mobile applications have reshaped both instructional delivery and administrative decision-making processes.

These innovations are often presented as effective means to improve efficiency, scalability, and personalized learning. However, the growing dependence on digital technologies has also brought forward pressing concerns related to educational equity,ethical responsibility, and learner well-being. Addressing these concerns is central to achieving excellence in educational management and ensuring that technological advancement supports inclusive and sustainable educational development.

The rapid expansion of technology- mediated education during the COVID-19 pandemic clearly illustrated both the strengths and shortcomings of digitally driven educational systems.

Educational institutions across the world adopted online and blended learning models to ensure academic continuity, relying heavily on adaptive technologies for teaching, assessment, and learner monitoring. While these responses demonstrated institutional flexibility and innovation, they also exposed deep-rooted inequalities in access to digital infrastructure. Learners from economically disadvantaged backgrounds, rural areas, and marginalized communities frequently faced barriers such as inadequate devices, limited internet connectivity, and insufficient institutional support. These challenges resulted in unequal learning experiences and outcomes, emphasizing the need for educational management frameworks that treat equity as a fundamental dimension of excellence.

Equity in technology- enhanced education extends beyond the mere provision of digital tools and infrastructure. It must be embedded within institutional planning, curriculum design, and governance mechanisms. Many adaptive learning systems implicitly assume uniformity in learners' cognitive abilities, language proficiency, and socio-cultural backgrounds. Such assumptions risk excluding learners with disabilities, limited digital skills, or diverse linguistic identities. From a management perspective, equitable technology integration requires the systematic application of inclusive design principles, such as Universal Design for Learning, along with ongoing assessment of accessibility, usability, and cultural relevance. Without intentional and reflective management practices, adaptive technologies may reinforce existing structural inequalities rather than promote educational transformation.

Ethical governance is another essential component of excellence in technology-enhanced educational management. The increasing use of learning analytics, artificial intelligence, and automated decision-making tools has enhanced institutional capacity to track learner performance and engagement. While data-driven approaches can support informed managerial decisions, they also raise serious ethical questions related to privacy, consent, and transparency. Educational technologies often collect large volumes of learner data, sometimes without clear communication regarding how this data is stored, analyzed, or shared. Such practices can undermine learner autonomy and trust, particularly when surveillance-oriented tools, such as online proctoring systems, are employed.

Algorithm-driven educational systems further complicate ethical accountability. Adaptive technologies that recommend learning content, predict academic performance, or automate assessment processes are built on datasets shaped by historical and institutional biases. If these biases remain unexamined, algorithmic decisions may disproportionately disadvantage certain learner groups, contradicting principles of fairness and inclusivity. For educational leaders and managers, ethical excellence involves not only regulatory compliance but also active oversight of technological systems, transparency in decision-making processes, and the provision of mechanisms through which learners can question or challenge automated outcomes.

Learner well – being has increasingly been recognized as a vital indicator of educational quality in digitally managed learning environments. Well-being encompasses psychological, emotional, social, and physical dimensions, all of which are influenced by institutional policies and technological design choices. Adaptive technologies can positively contribute to learner well- being by offering flexible learning pathways, personalized pacing, and timely academic feedback. However, excessive reliance on digital systems may also lead to heightened stress, cognitive overload, and emotional fatigue. Continuous assessment, performance monitoring, and expectations of constant online availability can negatively affect learners' mental health and motivation.

Taken together, these discussions highlight the need for integrated management approaches in technology-enhanced education. Inequitable access to digital resources can intensify learner stress and disengagement, while unethical data practices may weaken institutional credibilityand learner trust. Conversely, technologies that are ethically governed and inclusively designed can enhance learner well-being, support equitable participation, and contribute to institutional excellence.

Achieving meaningful transformation through adaptive technologies requires collaborative leadership and strategic governance. Policymakers and institutional leaders must establish clear ethical guidelines, inclusive digital strategies, and robust evaluation mechanisms to guide technology integration. Educators play a crucial mediating role in shaping learners' experiences with technology and must be supported through professional development that emphasizes ethical awareness, learner-centered pedagogy, and digital well-being. Technology developers also share responsibility for designing adaptive systems that prioritize accessibility, transparency, and human values.

Research Methodology- This study adopts a qualitative, conceptual–analytical research methodology to examine the interrelated dimensions of equity, ethics, and learner well-being within technology-enhanced education. Rather than empirical experimentation, the research is grounded in systematic literature analysis and policy interpretation, which are appropriate for exploring normative, governance-oriented, and management-focused questions. Peer-reviewed academic studies, international policy documents, and institutional reports were critically reviewed to identify recurring patterns, conceptual frameworks, and governance challenges associated with adaptive educational technologies. The methodology emphasizes interpretive synthesis, allowing diverse sources to be integrated into a coherent an analytical narrative. Through thematic categorization, the study evaluates how managerial decisions, ethical frameworks, and institutional practices shape learner experiences in digitally mediated environments. This approach enables a comprehensive understanding of socio-technical dynamics while maintaining theoretical rigor and contextual relevance.

Key Challenges in Technology -Enhanced Education-Despite its transformative potential, technology-enhanced education faces several structural and managerial challenges. Digital inequity remains a primary concern, as disparities in access to devices, connectivity, and digital literacy continue to disadvantage learners from marginalized backgrounds. Beyond access, design-level exclusions emerge when adaptive systems fail to account for linguistic diversity, disability, or socio-cultural differences. Ethical challenges further complicate technology adoption, particularly in relation to data privacy, informed consent, and algorithmic opacity. Many institutions rely on data-driven tools without adequate transparency or accountability mechanisms, raising concerns about surveillance and learner autonomy. Additionally, the well-being of learners is increasingly at risk due to excessive screen exposure, continuous performance monitoring, and reduced opportunities for social interaction. These challenges highlight the tension between efficiency-driven management models and the human dimensions of education.

Proposed Solutions and Strategic Interventions- Addressing these challenges requires integrated and value-driven management strategies rather than isolated technological fixes. To reduce inequity, institutions must move beyond infrastructure provision and adopt inclusive digital planning, incorporating accessibility standards and

differentiated learner support mechanisms. Ethical risks can be mitigated through the establishment of institutional ethical governance frameworks, including clear data policies, transparency in algorithmic decision-making, and participatory oversight structures involving educators and learners. Learner well-being should be embedded into digital strategies through balanced technology use, flexible assessment models, and the intentional design of collaborative and socially engaging learning environments. Capacity-building initiatives for educators and administrators are equally essential, enabling informed and ethical mediation between technology and pedagogy. Together, these solutions reposition adaptive technologies as supportive tools rather than controlling systems.

Way Forward for Educational Managemen- The way forward lies in redefining excellence in educational management as a balance between innovation and responsibility. Institutions must adopt human-centered digital leadership, where technological decisions are evaluated not only on efficiency but also on their social, ethical, and psychological implications. Equity, ethics, and well-being should be treated as core performance indicators within institutional quality assurance frameworks. Embedding ethical review processes into technology procurement, curriculum design, and assessment systems will enable proactive risk identification. Moreover, collaborative governance—bringing together policymakers, educators, technologists, and learners—can strengthen trust and legitimacy in technology-enhanced education. Such an approach ensures that digital transformation remains aligned with educational values rather than managerial convenience.

Future Roadmap for Technology- Enhanced Education- The future roadmap for technology-enhanced education must prioritize sustainable, inclusive, and ethically grounded digital ecosystems. Short-term priorities include developing institutional guidelines for ethical data use and learner protection, alongside targeted interventions to address access and accessibility gaps. In the medium term, educational systems should invest in adaptive technologies that are transparent, auditable, and culturally responsive, supported by continuous monitoring and evaluation mechanisms. Long-term transformation will depend on embedding learner well-being and social inclusion into national digital education policies and management training programs. Future research should focus on interdisciplinary frameworks that integrate educational management, ethics, and technology studies. By following this road map, institutions can ensure that digital innovation enhances educational quality while safeguarding equity, dignity, and holistic learner development.

Conclusion- Technology-enhanced education offers significant opportunities to improve educational access, personalization, and institutional effectiveness through adaptive technologies and informed management practices. However, excellence in this transformation depends on sustained and deliberate attention to equity, ethical governance, and learner well-being. Digital technologies are not neutral tools; they are socially embedded systems shaped by institutional values, policies, and managerial decisions. In diverse educational contexts, the responsible integration of adaptive technologies requires a human-centered approach that balances innovation with inclusivity, ethical accountability, and holistic learner development. Such an approach is essential for realizing the transformative potential of education in an increasingly digital and interconnected world

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Innovative Teaching Methods for Digital Learning Environment

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Abstract - The rapid expansion of digital technology has significantly transformed contemporary education systems and learning practices. Digital learning environments provide flexibility, accessibility, and new opportunities for teaching and learning, but they also demand innovative pedagogical approaches to ensure effective learner engagement. This research paper examines innovative teaching methods suitable for digital learning environments and analyzes their role in improving learning outcomes. The study discusses approaches such as blended learning, flipped classrooms, gamification, and project-based learning, along with the effective use of digital tools and platforms. It also highlights the changing role of teachers as facilitators and mentors in technology-enabled education. The paper is based on a conceptual and analytical review of existing literature related to digital pedagogy and innovative instructional practices. The findings suggest that innovative teaching methods promote learner-centered education, enhance critical thinking, and support personalized learning. The study concludes that innovative teaching practices are essential for creating inclusive, flexible, and effective digital learning environments in the modern educational context.
Keywords - Digital Learning Environment, Innovative Teaching Methods, Online Pedagogy, Technology-Enabled Education, Student Engagement.

Introduction - The advancement of digital technology has brought significant changes to the education system worldwide. The integration of the internet, digital devices, and online platforms has shifted teaching and learning from traditional classroom settings to digital learning environments. This transformation has accelerated with the increasing adoption of online and blended learning models in schools and higher education institutions.

Digital learning environments offer flexibility by allowing learners to access educational resources anytime and anywhere. They support interactive content, collaboration, and self-paced learning, which enhance learner engagement. However, the direct application of conventional teaching methods in online settings often results in limited participation and reduced learning effectiveness. This situation highlights the need for innovative teaching methods that are specifically designed for digital contexts.

Innovative teaching approaches emphasize active learning, creativity, collaboration, and problem-solving. These methods encourage learners to take an active role in the learning process and improve overall learning outcomes. Therefore, the adoption of innovative teaching methods is essential for enhancing the quality, effectiveness, and inclusiveness of education in digital learning environments.

Concept of Digital Learning Environment - A digital learning environment refers to an educational setting where teaching and learning activities are supported through digital technologies and online platforms. It enables interaction between teachers and learners using multimedia resources, virtual classrooms, and digital tools. Unlike traditional classrooms, digital learning environments provide flexibility by allowing access to learning materials beyond the limits of time and place.

Digital learning environments include components such as learning management systems, online discussion forums, digital libraries, and assessment tools. These environments support various modes of learning, including synchronous learning, which involves real-time interaction, and asynchronous learning, which allows learners to study at their own pace. Blended learning, combining online instruction with face-to-face teaching, is also an important form of digital learning.

The key features of digital learning environments include accessibility, interactivity, personalization, and collaboration. These characteristics promote learner autonomy, enhance engagement, and support innovative teaching practices in contemporary education systems.

Need for Innovative Teaching Methods in Digital Learning - The rapid expansion of digital learning environments has revealed the limitations of traditional

teaching methods in online education. Conventional lecture-based approaches often fail to maintain learners' attention and motivation in virtual classrooms. As a result, there is a growing need for innovative teaching methods that can address the unique challenges of digital learning.

Learners in digital environments differ in terms of learning styles, abilities, and levels of digital literacy. Innovative teaching methods help accommodate this diversity by promoting learner-centered, flexible, and inclusive instruction. These methods encourage active participation, collaboration, and critical thinking, which are essential for meaningful learning experiences.

Moreover, digital learning requires continuous interaction, engagement, and timely feedback, which cannot be achieved through traditional pedagogical practices alone. Innovative teaching approaches integrate technology with pedagogy to create interactive and engaging learning experiences. Therefore, innovative teaching methods are essential for improving the effectiveness, quality, and inclusiveness of education in digital learning environments.

Major Innovative Teaching Methods in Digital Learning - Innovative teaching methods play a vital role in improving learning effectiveness within digital learning environments. These methods focus on active participation, learner engagement, and meaningful interaction rather than passive content delivery. One widely used approach is the flipped classroom model, in which students study instructional materials such as videos and readings before the class. Online class time is then utilized for discussion, problem-solving, and collaborative activities, leading to deeper understanding.

Another significant approach is blended learning, which combines face-to-face instruction with online learning components. This method offers flexibility and allows teachers to personalize instruction according to learners' needs. Gamification is also an innovative teaching method that incorporates game-based elements such as points, badges, and challenges to motivate learners and enhance engagement in digital platforms.

Project-based learning encourages students to apply theoretical knowledge to real-life situations through collaborative projects supported by digital tools. This approach helps develop critical thinking, creativity, and teamwork skills. Additionally, micro-learning, which delivers content in small and focused units, improves knowledge retention and suits the attention span of digital learners. Together, these innovative teaching methods contribute to interactive, learner-centered, and effective digital education.

Role of Technology in Innovative Teaching - Technology serves as the foundation of innovative teaching in digital learning environments. It enables educators to design flexible, interactive, and learner-centered instructional practices. Learning Management Systems help teachers organize learning content, manage assignments, monitor learner progress, and provide timely feedback, thereby supporting effective teaching and learning.

Multimedia tools such as videos, animations, presentations, and simulations make learning more engaging and help learners understand complex concepts more easily. Interactive digital tools, including online quizzes, discussion forums, and virtual classrooms, promote active participation and collaboration among learners. Video conferencing platforms facilitate real-time interaction between teachers and students, despite geographical distance.

In addition, emerging technologies such as artificial intelligence and adaptive learning tools support personalized instruction by responding to individual learning needs. Online assessment technologies also enable continuous evaluation and immediate feedback. Overall, technology enhances accessibility, engagement, and effectiveness, making innovative teaching methods more impactful in digital learning environments.

Role of Teachers in Digital Innovative Teaching - In digital learning environments, the role of teachers has shifted from traditional knowledge providers to facilitators and mentors of learning. Teachers design meaningful and engaging digital learning experiences that encourage active participation, collaboration, and critical thinking among learners. Through innovative teaching methods, teachers help students effectively use digital platforms and learning resources.

To succeed in digital education, teachers must possess strong digital competencies, including the ability to use online tools, multimedia content, and virtual communication platforms. Continuous professional development is essential to help teachers remain updated with emerging technologies and innovative pedagogical practices. Teachers also play a key role in providing guidance, motivation, and timely feedback, which are crucial for maintaining learner engagement in online settings.

Furthermore, teachers ensure inclusiveness and ethical use of technology in digital learning environments. By creating supportive and learner-centered spaces, teachers address diverse learning needs and promote collaboration. Therefore, teachers act as central agents in implementing innovative teaching methods and enhancing the quality of digital learning.

Impact of Innovative Teaching Methods on Learners - Innovative teaching methods have a positive impact on learners' engagement and academic performance in digital learning environments. These methods encourage active learning by involving students in discussions, collaborative tasks, and problem-solving activities rather than passive content consumption. As a result, learners develop better conceptual understanding and improved knowledge retention.

Digital innovative approaches also support personalized and self-paced learning. Learners can access resources according to their individual needs and learning

styles, which enhances motivation and confidence. Teaching methods such as project-based learning and gamification help develop essential skills including critical thinking, creativity, communication, and collaboration.

Moreover, regular interaction with digital tools improves learners' technological skills and digital literacy. Overall, innovative teaching methods create a learner-centered environment that promotes autonomy, inclusiveness, and lifelong learning, thereby enhancing the overall effectiveness of digital education.

Challenges in Implementing Innovative Teaching Methods - Despite the advantages of innovative teaching methods in digital learning environments, their implementation faces several challenges. One major issue is inadequate technological infrastructure, including limited access to digital devices and reliable internet connectivity, particularly in rural and economically weaker regions. Such limitations create inequality among learners and restrict effective participation in digital learning.

Another challenge is the lack of digital skills and pedagogical training among teachers. Many educators are unfamiliar with advanced digital tools and innovative instructional strategies, which can reduce the effectiveness of online teaching. Resistance to change from traditional teaching practices also slows the adoption of innovative methods.

Additionally, technical problems such as software failures, data security concerns, and privacy issues can disrupt digital learning processes. Maintaining learner motivation and engagement in virtual classrooms is another significant challenge. These issues highlight the need for institutional support, proper training, and systematic planning to successfully implement innovative teaching methods.

Findings of the Study - The findings of the study indicate that innovative teaching methods significantly improve the effectiveness of digital learning environments. Learner-centered approaches such as blended learning, flipped classrooms, and project-based learning enhance student engagement, participation, and conceptual clarity. These methods encourage active learning and support the development of higher-order thinking skills.

The study also finds that the effective integration of technology with pedagogy increases flexibility and accessibility in education. Digital tools facilitate personalized learning and continuous assessment, which positively influence learners' academic performance. Furthermore, the role of teachers as facilitators and mentors is identified as a critical factor in the successful implementation of innovative teaching practices.

Overall, the findings suggest that innovative teaching methods contribute to improved learning outcomes, digital competence, and the overall quality of education in digital learning environments.

Suggestions and Recommendations - To enhance the effectiveness of innovative teaching methods in digital learning environments, several key suggestions can be made. Educational institutions should strengthen digital infrastructure by ensuring access to reliable internet connectivity, modern devices, and learning management systems for both teachers and learners. Equal access to technology is essential for inclusive digital education.

Continuous professional development programs should be organized to improve teachers' digital skills and pedagogical competencies. Training in innovative instructional strategies and digital tools will enable educators to design engaging and learner-centered learning experiences. Institutional support and encouragement are also necessary to promote the adoption of innovative practices.

Additionally, policymakers should integrate innovative teaching approaches into curriculum frameworks and digital education policies. Promoting research, collaboration, and experimentation in digital pedagogy will support sustainable and high-quality digital learning environments.

Conclusion - Innovative teaching methods are essential for the success of digital learning environments in contemporary education. Traditional teaching approaches alone are insufficient to address the diverse needs of learners in online and technology-enabled settings. The adoption of innovative strategies such as blended learning, flipped classrooms, gamification, and project-based learning enhances learner engagement, supports critical thinking, and promotes personalized learning.

This study emphasizes the important roles of both technology and teachers in implementing innovative teaching practices. While technology provides the tools and platforms for interaction and flexibility, teachers act as facilitators who guide, motivate, and support learners throughout the digital learning process. Despite challenges related to infrastructure, digital skills, and accessibility, innovative teaching methods offer long-term benefits.

In conclusion, the effective integration of innovative teaching methods can lead to inclusive, flexible, and learner-centered education, ensuring improved learning outcomes and sustainable development in the digital era.

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A Comprehensive Study on the Impact of Work from Home Models on Employee Productivity, Engagement, and Organizational Performance in the Digital Age

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Abstract - The COVID-19 pandemic catalyzed a rapid transition to remote and hybrid work arrangements, fundamentally reshaping organizational dynamics. This study explores the multifaceted effects of remote work (often termed Work from Home or WFH) on employee productivity, job engagement, and overall organizational performance amid advancing digital technologies. Drawing on a synthesis of empirical evidence, it evaluates advantages such as enhanced flexibility and autonomy alongside drawbacks including isolation and collaboration barriers. Key success factors are identified, and practical recommendations are offered to help organizations refine remote work policies for sustainable outcomes.
Keywords- Remote Work, Hybrid Models, Employee Productivity, Job Engagement, Organizational Performance, Post-Pandemic Work, Digital Transformation.

Introduction - In the contemporary digital landscape, remote work has evolved from a contingency measure during the pandemic to a persistent feature of many workplaces. While it promises greater flexibility, reduced commuting, and improved work-life integration, its influence on core performance metrics—individual productivity, employee engagement, and firm-level outcomes—remains nuanced and context-dependent. This research addresses this by systematically analyzing remote work's implications, informed by pre- and post-pandemic studies. It seeks to clarify conditions under which remote arrangements thrive or falter, contributing to evidence-based strategies for modern organizations.

Literature Review- Scholarly work on remote work predates the pandemic but accelerated dramatically afterward. Early studies linked telecommuting to productivity gains through reduced distractions and autonomy (e.g., Bloom et al., 2015). Post-2020 research largely affirms positive effects in many contexts: systematic reviews indicate that remote work often boosts individual productivity, driven by factors like quieter environments, flexible scheduling, and diminished commuting (Anakpo et al., 2023). Aggregate analyses show positive correlations between increased remote work prevalence and total factor productivity growth across industries (BLS, 2024).

Employee engagement also benefits in hybrid or well-supported remote setups, with greater autonomy fostering motivation and satisfaction (Wijaya, 2025; Abhishek, 2025). However, challenges persist: social isolation, blurred work-life boundaries, communication hurdles, and reduced informal interactions can diminish collaboration and team cohesion (Dong, 2025; Ipsen et al., 2021). Organizational performance reflects this duality—cost savings from reduced office space and lower turnover contrast with potential innovation barriers in fully remote settings (Aksoy et al., 2025).

Table 1 (see in last page)

Research Framework and Hypotheses-The framework positions remote work models as the independent variable, with employee productivity, engagement, and organizational performance as dependent variables. Moderators include communication quality, managerial trust, technological infrastructure, and employee well-being support.

Hypotheses:

1. **H1:** Remote work models positively influence employee productivity, particularly in knowledge-based roles with high autonomy.
2. **H2:** Remote work models enhance employee engagement when supported by clear communication and resources.
3. **H3:** Remote work models improve organizational performance through cost efficiencies and talent access, though moderated by collaboration challenges.

Methodology-This investigation employs a mixed-methods design to capture both quantitative trends and qualitative nuances. Data sources include:

1. Online surveys measuring self-reported productivity (e.g., output metrics), engagement (e.g., Utrecht Work Engagement Scale), and performance indicators.
2. Semi-structured interviews with employees and

managers for experiential depth.

3. Organizational case studies examining implementation in varied sectors.

Sampling targets diverse industries (e.g., IT, finance, services) using purposive and snowball techniques for representativeness. Ethical considerations include informed consent and anonymity.

Data Analysis- Quantitative data undergo regression analysis to test relationships and moderators. Qualitative components use thematic analysis for recurring patterns, supplemented by comparative techniques across cases.

Findings and Discussion- Emerging evidence aligns with hypotheses but reveals contingencies. Productivity often rises (e.g., 9–13% in controlled settings) due to flexibility and fewer interruptions, yet fully remote setups may reduce it by ~10% in collaborative or mentoring-intensive roles (Aksoy et al., 2025; Stanford research). Engagement improves with autonomy but declines amid isolation or poor digital tools (Gallup insights, 2025). Organizational benefits include lower turnover and broader talent pools, though hybrid models frequently outperform pure remote or in-office for balanced outcomes.

Challenges—such as miscommunication, technostress, and work-family conflict—underscore the need for intentional design (Özsoy & Griffiths, 2025). Success hinges on robust virtual collaboration tools, trust-based management, and well-being initiatives.

Conclusion- Remote work offers substantial potential to elevate productivity, engagement, and performance in the digital era, yet its efficacy depends on thoughtful implementation. Organizations thrive by prioritizing hybrid flexibility, investing in digital infrastructure, and fostering inclusive cultures.

Recommendations:

1. Adopt hybrid policies balancing in-office collaboration with remote autonomy.
2. Strengthen virtual communication channels and regular check-ins.
3. Provide ergonomic support, mental health resources, and remote leadership training.
4. Regularly assess outcomes via feedback and metrics to refine approaches.

Implications- Findings guide organizations in crafting adaptive policies, inform employees on optimizing remote setups, and support policymakers in promoting equitable digital infrastructure.

Limitations and Future Research- Reliance on self-reports may introduce bias; future work could incorporate objective metrics (e.g., performance logs) and longitudinal designs. Industry-specific studies, long-term hybrid effects, and impacts on underrepresented groups (e.g., caregivers, disabled employees) warrant exploration.

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Table 1: Key Insights from Recent Literature on Remote Work

Study/Source	Methodology/Approach	Primary Findings
Anakpo et al. (2023)	Systematic review (2020–2022 studies)	Majority report positive productivity impact; depends on job nature, home setup, and support.
BLS (2024)	Industry-level analysis (2019–2022)	Rise in remote work linked to higher total factor productivity growth.
Aksoy et al. (2025)	Natural experiment (call center firm)	Fully remote work increased calls/hour by ~10%; quieter home environment key driver.
Wijaya (2025)	Empirical study	Positive effect on engagement with strong communication and autonomy.
Dong (2025)	Review	Remote work boosts engagement/productivity but risks well-being if unsupported.

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Transforming Education through Excellence in Management and Adaptive Technologies in the Context of Eco-Friendly Practices in Indian Schools

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Abstract - The growing environmental crisis and rapid technological advancement have compelled education systems worldwide to rethink their approaches toward sustainability and quality learning. In India, schools play a critical role in nurturing environmentally responsible citizens while simultaneously adapting to digital transformation. This paper examines how excellence in educational management and the integration of adaptive technologies can collectively promote eco-friendly practices in Indian schools. Drawing upon national education policies, sustainability frameworks, and recent empirical studies, the paper analyses the role of leadership, governance, and technology-enabled innovations in embedding sustainability into school operations and pedagogy. It argues that adaptive technologies such as information and Communication Technologies (ICT), Artificial Intelligence (AI), and Digital Resource Management Systems enhance personalized learning while reducing ecological footprints. The paper concludes that a synergistic approach combining effective management practices with adaptive technologies can transform Indian schools into sustainable, resilient, and future-ready institutions.

Keywords- Educational Management, Adaptive Technologies, Eco-Friendly Practices, Sustainable School Education, Indian Schools.

Introduction - Education is increasingly recognised as a powerful instrument for achieving sustainable development. Schools serve as foundational spaces where knowledge, values, attitudes, and behaviours related to environmental responsibility are shaped. In the Indian context, rising concerns such as climate change, resource depletion, pollution, and biodiversity loss necessitate a systemic integration of sustainability into school education (UNESCO, 2021).

Simultaneously, the education sector is undergoing rapid digital transformation. Adaptive technologies are reshaping teaching-learning processes, school administration and resource management. However, the effective use of technology requires strong institutional leadership and sound management practices. Excellence in educational management—characterised by visionary leadership, participatory governance, and strategic planning—provides the foundation for integrating eco-friendly practices within schools (Leithwood et al., 2020).

This paper explores how the convergence of management excellence and adaptive technologies can foster sustainable and eco-friendly practices in Indian schools.

Policy Context for Sustainable School Education in India

1. National Education Policy 2020-The **National Education Policy (NEP) 2020** marks a paradigm shift towards holistic, multidisciplinary, and value-based education. It explicitly emphasizes environmental awareness, climate change education, and sustainable development as integral components of school curricula (Government of India, 2020). The policy encourages experiential learning, project-based approaches, and the use of technology to address real-world problems including environmental challenges.

2. Samagra Shiksha and Environmental Education- The **Samagra Shiksha** scheme integrates environmental education into school programs through eco-clubs, awareness campaigns, and community participation. These initiatives institutionalize sustainability practices and enable students to engage actively in activities such as waste management, water conservation, and biodiversity protection (Government of India, 2021).

3. National Green Corps- The **National Green Corps (NGC)**, implemented by the Ministry of Environment, Forest and Climate Change, promotes eco-clubs across thousands of Indian schools. The programme focuses on developing environmental leadership among students and encouraging sustainable lifestyles through hands-on learn-

ing experiences (Ministry of Environment, Forest and Climate Change, 2022).

Excellence in Educational Management-

1. Leadership for Sustainability-Educational leadership plays a decisive role in shaping institutional culture and long-term sustainability outcomes. Research suggests that successful school leadership significantly influences innovation, collaboration, and continuous improvement (Bush & Glover, 2021). Leaders committed to sustainability integrate environmental goals into school vision statements, development plans, and daily practices.

2. Strategic Planning and Governance- Strategic planning ensures that eco-friendly initiatives are aligned with institutional objectives and adequately resourced. Participatory governance—engaging teachers, students, parents, and community members—enhances accountability and continuity of sustainability practices (Kumar & Dwivedi, 2022). Effective management also includes monitoring and evaluation mechanisms to assess environmental performance.

Adaptive Technologies and Sustainable Education-

1. ICT Integration in Schools- The integration of ICT tools such as digital textbooks, learning management systems, and smart classrooms has significantly reduced dependency on paper-based resources. Studies indicate that digital transformation contributes to environmentally sustainable learning environments while enhancing instructional quality (Bond et al., 2020; Verma & Sharma, 2023).

2. Artificial Intelligence and Smart Systems- AI-enabled technologies support personalized learning and data-driven decision-making. Smart resource management systems can monitor electricity, water, and waste consumption, enabling schools to optimize resource use and reduce environmental impact (OECD, 2021; Holmes et al., 2022).

3. Teacher Professional Development- The effective use of adaptive technologies requires continuous professional development. Training teachers in digital competencies and sustainability-oriented pedagogy enhances their capacity to integrate environmental themes into classroom instruction (Sharma & Gupta, 2021).

Eco-Friendly Practices in Indian Schools-

Indian schools are increasingly adopting eco-friendly practices such as rainwater harvesting, solar energy use, waste segregation, composting, and green landscaping. Empirical studies demonstrate that these practices significantly improve students' environmental awareness and promote sustainable behaviour (Kaur & Kaur, 2022). Green school initiatives also align with global sustainability agendas, particularly the **United Nations Sustainable Development Goals**, including SDG-4 (Quality Education) and SDG-13 (Climate Action) (UNDP, 2023).

Challenges and Opportunities- Despite strong policy support, several challenges persist. Infrastructure gaps, especially in rural and under-resourced schools, limit access to adaptive technologies. Additionally, resistance to change and inadequate teacher training can hinder effective implementation.

However, opportunities exist through government funding, public-private partnerships, and international collaborations. Scaling successful models and sharing best practices can accelerate the adoption of sustainable and technology-enabled education across Indian schools.

Conclusion- The transformation of Indian school education towards sustainability requires a holistic approach that integrates excellence in management with adaptive technologies. Visionary leadership, participatory governance, and digital innovation can embed eco-friendly practices into both institutional operations and pedagogical processes. By aligning school education with national policies and global sustainability frameworks, Indian schools can nurture environmentally responsible citizens and contribute meaningfully to sustainable development. Continued investment in leadership development, technological infrastructure, and research is essential to sustain this transformation.

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Evaluation of Inclusive Education Structure and Its Impact on Development of Students in Madhya Pradesh

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Abstract - The education which provides a right to all citizens and their children in the form of equal opportunity for education (Right to education) is called inclusive education. In other words, it can be said that the main objective of inclusive education is to recognize the right to equality of all citizens and to provide equal opportunities for education along with inclusive needs to those students who are handicapped and deprived of education. They should be given some restricted environment, which is provided in educational institutions. Therefore, inclusive education is that education in which handicapped children as well as gifted children get education like other children in a normal school. In simple words, it can be said that inclusive education is that education in which physically and mentally weak students along with normal and talented students get education without any discrimination. It is called inclusive education.
Keywords- Inclusive Education, Handicapped, Deprived, Discrimination.

Introduction - Education empowers children, youth, and adults to move forward, think, make choices, and live better lives. It also breaks the cycle of poverty and education is considered a key component of economic and social development (Johnson & Wilman, 2001; Peters, 2004). The World Education Encyclopedia (2004) highlights three main purposes of education:

- Education is a basic human right, meaning that people need education not only for structured information but also to acquire skills, attitudes, and values.
- Education is used as a means to meet other basic needs, such as employability and quality of life.
- Education is an activity that sustains and accelerates the economic development of countries. Education is a vehicle for investment because it trains and prepares skilled workers at all service levels and impacts every sector of the economy.

Education is a powerful tool for social change and often initiates upward mobility within the social structure, helping to bridge the gap between different segments of society. A country's education system does not function in isolation from the society it is a part of Caste hierarchy, economic status, gender, cultural diversity, and uneven economic development significantly impact issues related to access to education and equality. The framers of the Constitution considered providing educational opportunities to backward groups as a remedy to this long-standing discrimination. In almost every country, children with special needs (CWSN) are excluded from formal education; some of those who attend school fail to complete their studies. They are gradually and deliberately excluded from the school system because schools are not sensitive to their learning styles and backgrounds. To show empathy, these children are placed in separate special schools, away from their peers. This has led to the development of two separate systems of education: regular and special education.

Children with Special Needs- The concept of "children with special needs," which shapes policy, research, and practice in education, is of British origin. A government commission headed by Baroness Mary Warnock (1978) reported that identifying children based on their "handicap" is wrong. Rather, the report emphasized that we should recognize their educational difficulties and provide educational facilities accordingly. This led to the introduction of the term 'Special Educational Needs (SEN),' which has become a part of UK law, classrooms, and, most importantly, the teaching-learning process.

Principles of Inclusive Education:

1. Controlled Environment – The main principle of inclusive education works on a controlled environment.

2. Parental support – Parental support is also inherent in the principle of inclusive education.
3. Special Process – In this process the parents of physically and mentally weak or handicapped students have full right to decide and analyze the school arrangements.
4. Personality Education Program – Personality Education Program is for students who need special education.

Review of Literature

Miles, M. (1997) studied the condition of disabled children. In which the importance of contribution of attitude at all levels for inclusion of visually impaired children in classes was highlighted.

Freeman, S. F., & Alkin, M. C. (2000) has clarified in his book "Formula of Special Education" that in place of the integrated education scheme for disabled children, the scheme of inclusive education for disabled children was started in 2009-10 at the secondary level. In this scheme, disabled children are given assistance for inclusive education from 9th to 12th class. The objective of this scheme is to provide inclusive secondary level education from 9th to 12th class in a conducive environment for all students with disabilities for the next four years after completing the first eight years of primary education.

Yu, L., Su, X., & Liu, C. (2011) The first educational institution for the education of hearing impaired children was established in Britain by author. Braidwood's methods were a mixture of oral and physical methods to understand letters and symbols. Body language was used a lot in this.

Objectives of the Study- To find out the effect of inclusive education on overall development of students of disabled students of Madhya Pradesh

Research Methodology- Final Gap of the Study: So far, no research study has been found that explains the effect of inclusive education on academic development of disabled students in Madhya Pradesh.

Data Collection Methods: Research data is the factual material, records, or information collected, observed, generated, or processed to prove, verify, or support research findings.

Primary Data - Research Design: Both data i.e. Primary and secondary have been used in this research and collection of data will be done by the researcher himself.

Population: Major four cities like gwalior, bhopal, Indore and Jabalpur in Madhya Pradesh will be included as population for this study.

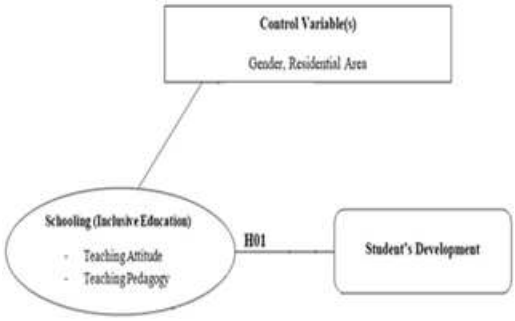
Sampling Frame: All government and non-government school for inclusive education under the purview of two major cities in Madhya Pradesh have been included in this study.

Sample Methods: Non-probability, purposive and convenience sampling techniques were used to identify the study respondents

Sample Size: A total of 600 questionnaires will be distributed among students while a total of 50 questionnaires will be distributed among employees/staff/authorities for the purpose of primary data collection.

Secondary Data: The researcher has collected secondary data through various sources like research articles and research papers, magazines, books, periodicals, reports (government/corporate, print as newspapers, television and online through internet)

Research Modal-



Data Analysis and Interpretations [Student's Views]

T-test and ANOVA for Perception towards School Structure-

Independent Sample t-test between Demographic and Perception towards School Structure

A T-test was used to determine the differences in opinions among different demographic groups across various variables. The obtained probability value was evaluated based on a significance level of 0.05.

$H_0$1: Girls and boys students do not have the same perception regarding satisfaction with school Structure.

(See in last page)

After analyzing the data, the following results were obtained:

Ï% The F value obtained from the Independent Samples Test table is 0.352, which is not significant at the 0.553 (>0.05) significance level, meaning that equal variances are assumed. The calculated T value is 0.292, which is also insignificant at the 0.770 significance level. This means that the opinions of male and female students regarding satisfaction with the **school structure** are not significantly different.

Independent Sample t-test for between type of school and Perception towards School Structure

An independent samples t-test was conducted to determine the differences in perceptions towards school structure among various demographic groups.

$H_0$2: The perceptions of students studying in government and private schools regarding satisfaction with the school's infrastructure are not the same..

(See in last page)

After analyzing the data, the following results were obtained:

Ï% The F value obtained from the Independent Samples Test table is 1.905, which is not significant at the 0.168 (>0.05) significance level, meaning that equal variances are assumed. The calculated T value is 0.949, which is also insignificant at the 0.343 significance level. This means that there is no significant difference in the opinions of

students studying in government and private schools regarding their satisfaction with the school's structure.

Regression Analysis

Linear Regression Analysis between Perception towards School Structure and Perception towards Development of Students

Here, linear regression was calculated using "Perception towards School Structure" as the independent variable and "Development of Students" as the dependent variable.

$H_0$3: According to the students, there is no direct impact on their perception towards school structure and the development of students.

Model Summary & ANOVA between Perception towards School Structure and Perception towards Development of Students

(See in last page)

- The value of R found 0.322 it means that correlation between Perception towards School Structure (independent variable) and Development of Students (dependent variable) is average positive, and value of R Square i.e. 0.105 shows percent of variance, according to this, students' perception of the school structure has a 10.5% impact on the development of students.
- The fitted model is good, as evidenced by the calculated F-value of 19.157, which is significant at the 0.032 level of significance. This indicates a direct relationship between the dependent variable and the overall model.

Coefficient between Perception towards School Structure and Perception towards Development of Students

Model	t	Sig.	Action
1	4.991	.000	null hypothesis rejected

a. Predictors: (Constant), Perception towards School Structure

b. Dependent Variable: Development of Students'

The regression coefficient table yielded a t-value of 4.991, which was significant at the 0.000 level of significance. This indicates that students' perception about school structure, as the independent variable, has a direct impact on the development of students, the dependent variable. Therefore, the null hypothesis **$H_0$3** was **rejected** based on this result.

Conclusion- Years ago, the birth of a child with physical or mental disabilities was seen as a curse. In many cases, the child was abandoned by the family after birth. However, governments have consistently developed programs to provide children with disabilities with the same education and rights as other children, thus boosting their morale. Thus, inclusive education was born.

On the other hand, inclusive education requires extensive learning for teachers themselves, as special methods and equipment are used to teach children with special needs. Teachers cited challenges such as a lack of confidence in teaching in an inclusive environment and a lack of training in inclusive education.

The behavior of children with special needs can sometimes be quite problematic. Teachers also face difficulties with parents' lack of involvement in any activities. Despite this, teachers continue to educate these children for their development and to build their confidence.

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Group Statistics					Independent Samples Test				
	Gender	Mean	Std. Deviation	Std. Error Mean	F	Sig.	t	Sig. (2-tailed)	Status
Perception towards School Structure	Girls	66.3716	3.10427	.25517	.352	.553	.292	.770	Null Accepted
	Boys	66.2754	3.16436	.20598					

Group Statistics					Independent Samples Test				
	School Type	Mean	Std. Deviation	Std. Error Mean	F	Sig.	t	Sig. (2-tailed)	Status
Perception towards School Structure	Government	66.4213	3.21430	.20168	1.905	.168	.949	.343	Null Accepted
	Private	66.1000	2.98277	.26161					

Model Summary[b]				ANOVA[b]		
Model	R	R Square	Durbin-Watson	F	Sig.	Action
1	.332[a]	.105	1.791	19.157	.032[a]	model is good fitted

a. Predictors: (Constant), Perception towards School Structure
b. Dependent Variable: Development of Students

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Digital Transformation of Stock Markets: How Technology Is Reshaping Trading, Investor Behaviour, and Market Efficiency

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Abstract - The stock market has undergone a profound transformation in recent decades due to rapid advances in digital technologies such as online trading platforms, algorithmic and high-frequency trading, big data analytics, artificial intelligence, blockchain, and fintech applications. These technologies have reshaped not only the structure and functioning of financial markets but also the behaviour of investors and the overall efficiency of trading systems. This paper examines how digital transformation is redefining stock market operations, investor participation, and market outcomes. Using secondary data from regulatory reports, stock exchange publications, financial market studies, and existing research, the paper adopts a descriptive and analytical approach to analyse (i) the transition from traditional floor-based trading to electronic markets; (ii) the growing role of data-driven and automated trading systems; and (iii) the expansion of retail investor participation through digital platforms. The analysis suggests that technology has improved market access, reduced transaction costs, enhanced speed and transparency, and strengthened liquidity and price discovery in many settings. At the same time, digitalisation introduces new risks, including heightened short-term volatility, technological asymmetries between institutional and retail investors, cybersecurity threats, and regulatory complexity. The paper argues that adaptive regulation, investor education, and robust digital governance are essential to ensure that technological progress contributes to fair, stable, and inclusive financial markets.

Keywords- Digital transformation; Stock markets; Investor behaviour; Market efficiency; Fintech; Algorithmic trading; Cybersecurity.

Introduction - Stock markets play a central role in modern economies by mobilizing savings into productive investment, enabling companies to raise equity capital, and offering investors a mechanism to allocate risk through diversified portfolios. Over the last three decades, however, the functioning of stock markets has been fundamentally reshaped by digitalisation. Trading has shifted from floor-based open outcry to electronic order books, market access has expanded through online brokerages and mobile apps, and decision-making has increasingly moved from manual judgment to data-driven automation.

Digital transformation in stock markets refers to the adoption of digital technologies across the trading and post-trade value chain: order placement, routing, and matching; market data dissemination; clearing and settlement; market surveillance; and risk management. The transformation is not only technical. It changes market microstructure (how orders interact), the composition of participants (institutional versus retail, domestic versus global), and outcomes such as liquidity, volatility, transparency, and informational efficiency.

Problem Statement and Rationale- Technology is frequently presented as a force that improves market quality by reducing costs and increasing transparency. Yet, the same innovations can create new vulnerabilities. Ultra-fast trading and automated strategies may amplify short-term price movements during stress; unequal access to low-latency infrastructure can raise concerns about fairness; and the digitisation of market infrastructure exposes trading and settlement systems to cyber and operational risks.

Moreover, digital platforms have expanded retail participation, but many new investors may face information and behavioural challenges, including attention-driven trading, overconfidence, and susceptibility to misleading online promotions. Therefore, a structured assessment is needed to understand when digital transformation strengthens market efficiency and inclusion, and when it creates instability, mispricing, and investor harm.

Objectives:

1. To explain how key digital technologies are transforming the structure and functioning of stock markets.
2. To develop a conceptual framework linking digitalisation with changes in investor behaviour and market efficiency.
3. To identify pathways through which technology can improve liquidity and price discovery as well as pathways through which it may intensify volatility and risk.
4. To propose policy and institutional measures that make digitally transformed markets safer, fairer, and more resilient.

Brief Review of Literature- Market microstructure research shows that electronic trading can narrow bid-ask spreads and improve execution quality by increasing competition and enabling transparent priority rules in electronic limit order books. A substantial body of work on algorithmic and high-frequency trading suggests that automation can supply liquidity in normal conditions, but may withdraw liquidity or contribute to rapid price dislocations during extreme events. Regulatory studies emphasize safeguards such as circuit breakers, pre-trade risk controls, and robust surveillance to maintain integrity in high-speed markets.

Behavioural finance and fintech research indicates that digital platforms reduce entry barriers and broaden retail participation, but also influence attention and risk-taking through social signals, notifications, and interface design. Studies on AI and big data in finance highlight the benefits of faster information processing and improved risk management, while noting concerns about model risk, data bias, herding from similar models, and limited explainability. Overall, the literature suggests that the impact of technology on efficiency depends on market design, participant composition, and governance capacity.

Conceptual Framework- Figure 1 presents a simple framework. Digital technologies (electronic trading, low-latency connectivity, APIs, AI/ML analytics, fintech distribution, and post-trade automation) change the trading environment by altering speed, access, and information flow. These changes influence the strategies of market participants and investor behaviour, including higher trading frequency, automation of decisions, and attention-driven flows. The combined interaction affects market outcomes such as transaction costs, liquidity, price discovery, volatility, transparency, and resilience during stress. Regulatory and institutional supports (risk controls, cybersecurity governance, data and surveillance capacity, and investor protection) moderate these effects.

Figure 1: *Self-structured framework of digital transformation and stock market outcomes.*

Research Methodology- The study is conceptual and descriptive, based on secondary data and existing research. It synthesizes evidence from stock exchange publications, regulatory documents, international standard-setter reports, and peer-reviewed studies on market microstructure, behavioural finance, and fintech. The approach follows three steps: (i) mapping major technologies reshaping trading and post-trade processes; (ii) identifying behavioural and microstructure mechanisms through which these technologies affect market outcomes; and (iii) discussing policy and governance measures that can strengthen inclusion, integrity, and resilience. The paper aims to provide a practical framework and policy directions rather than estimating new causal econometric effects.

Discussion: Pathways And Likely Outcomes-

1. Efficiency and access pathways. Electronic trading and online platforms can reduce transaction costs, improve execution speed, and broaden participation by lowering account-opening friction and enabling low-cost order placement. Faster information diffusion and automated matching can strengthen liquidity and price discovery, particularly in highly traded securities.

Table 1: The Surge in Retail Participation in Indian Securities Markets (2020–2024)

Metric	Pre-Pandemic (Mar 2020)	Post-Digital Acceleration (Aug 2024)	Growth Multiplier
Total Demat Accounts	4.1 Crore	17.1 Crore	~4.2x
Active Investors	~20 Million (May 2015)*	~119 Million (Aug 2025)	~6x
Mutual Fund Retail Accounts	N/A	22.03 Crore (Jun 2025)	Significant Growth
Derivatives Traders	~4.5 Million (FY22)**	~10 Million (FY25)	~120% Increase

Source: Compiled from SEBI and Depository (NSDL/CDSL) Reports

2. Risk and volatility pathways. Automation and speed can also intensify short-term volatility through feedback loops, rapid order cancellations, and sudden liquidity withdrawals during stress. Operational glitches, outages, and cyber incidents can disrupt trading and settlement, affecting confidence and systemic stability.

Table 2: Global High-Frequency Trading (HFT) Market Dynamics & Projections

Parameter	Statistic / Trend	Implication for Market Structure
Global Market Size	USD 10.36 Billion (2024)	High capital investment in low-latency infrastructure.
Projected Growth	USD 16.03 Billion (by 2030)	Continued shift towards automated market making.
Market Share (US)	~73% of Equity Order Volume	Algo trading is now the dominant liquidity provider.
Market Share (Emerging)	5-10% (Growing Rapidly)	Developing markets are following the US/EU structural model.
Key Risk Factor	"Microscopic Profits on Large Volumes"	Reliance on high turnover creates fragility during liquidity shocks.

Source: Grand View Research & Industry Estimates

3. Investor behaviour implications. Digital interfaces, social media signals, and always-on connectivity can shape investor attention and encourage frequent trading, which may increase speculative behaviour and behavioural biases such as overconfidence. At the same time, well-designed platforms can support better decisions through transparent costs, risk warnings, and educational tools.

4. Market efficiency and fairness implications. Digitalisation can improve informational efficiency, but it may also widen technological asymmetries between sophisticated participants and ordinary investors. Ensuring fair access to data, transparent order handling, and robust best-execution standards is therefore critical for maintaining trust and integrity in digitally transformed markets.

Table 3: Impact of Electronic Trading on Transaction Costs and Liquidity

Trading Mechanism	Cost Impact	Liquidity Impact
Electronic/Automated Trading	**Reduces costs by 33–46 basis points** compared to floor trading.	**Narrower Spreads:** Automation eliminates small bid-ask spreads by increasing competition.
Floor/Manual Trading	Higher explicit commissions and implicit delay costs.	Slower price discovery; wider spreads due to lack of anonymity and competition.
Regulatory Intervention	**Case Study:** Introducing fees on HFT in Canada increased retail spreads by 9%.	Demonstrates that low costs are often subsidized by high-speed liquidity providers.

Source: Comparative Market Microstructure Studies

Policy and Institutional Implications- To ensure that digital transformation strengthens efficiency without compromising stability and fairness, interventions should target both market design and governance capacity. First, regulators should require strong pre-trade risk controls for automation, including testing protocols, kill switches, audit trails, and accountability for algorithm developers and brokers. Second, market institutions should implement robust cybersecurity and operational resilience frameworks, including vendor risk management, periodic drills, and incident reporting. Third, investor protection should address online mis-selling and misleading promotions, with clear disclosures, suitability checks where relevant, and accessible grievance redress mechanisms. Finally, investor education should be expanded to improve digital financial literacy, helping new participants understand risks, costs, and behavioural pitfalls.

Conclusion- Digital transformation has reshaped stock markets by changing how trades are executed, how information is processed, and how investors participate. Electronic and algorithmic systems can improve access, reduce costs, and enhance transparency and price discovery. However, they also introduce new challenges, including volatility amplification, technological asymmetry, cyber and operational risks, and regulatory complexity. A balanced approach-adaptive regulation, resilient infrastructure, and strong investor protection-is essential to ensure that technology contributes to fair, stable, and inclusive market development.

Key Findings and Suggestions:

1. Digital platforms and electronic trading reduce transaction costs and expand access, contributing to deeper participation and faster execution.
2. Algorithmic and high-frequency trading can support liquidity in normal conditions but may amplify short-term volatility and create flash-type disruptions during stress.
3. Digitalisation increases cyber and operational risks, making resilience, vendor governance, and incident response essential for market integrity.
4. Retail participation benefits from low-friction access, but behavioural biases and online mis-selling risks require stronger investor education and protection.
5. Regulatory frameworks should combiine nnovation-friendly principles with enforceable safeguards: pre-trade controls, surveillance capacity, and transparent best-execution standards.

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Impact of Green Human Resource Management on Employee Green Behaviour: Evidence from the Indian Context

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Abstract - This study examines the impact of Green Human Resource Management (GHRM) practices on employee green behavior in Indian organizations. GHRM practices are increasingly recognized as strategic tools that integrate environmental sustainability into HR policies, fostering ecofriendly behaviour at the workplace. Using data collected from employees across public and private sector firms in India, the research explores whether practices such as green recruitment, training, performance management, and rewards have a positive impact on employees' environmentally responsible behavior. The findings reveal that GHRM significantly influences employee green behaviour, mediated by environmental awareness and organizational support for sustainability
Keywords- Green HRM, Employee Green Behaviour, India, Sustainability, Organizational Support.

Introduction - Environmental challenges pose significant threats to organizational sustainability globally. In response, businesses are increasingly adopting environmental management strategies to integrate ecological concerns into core operations. Within this paradigm, Green Human Resource Management (GHRM) has emerged as a framework that aligns HR practices with environmental objectives, encouraging employees to adopt sustainable behaviours.

India, with its rapid economic growth and environmental concerns, presents a unique context to examine the effectiveness of GHRM. Indian enterprises face regulatory pressures and stakeholder expectations to improve environmental performance. Thus, understanding how GHRM influences employee green behaviour is critical for both researchers and practitioners.

Literature Review -

Green Human Resource Management (GHRM) - Green Human Resource Management (GHRM) refers to the integration of environmental sustainability into human resource policies and practices of an organization. It aims to promote the efficient use of resources, reduce environmental degradation, and encourage eco-friendly behaviour among employees. According to Renwick, Redman, and Maguire (2013), Jabbour and Santos (2008) emphasized that GHRM acts as a strategic mechanism linking environmental management and HR practices, enabling organizations to achieve sustainable competitive advantage.

A study by Tang et al. (2018) found that green recruitment positively influences employee environmental commitment and engagement in eco-friendly practices. Similarly, Ahmad (2015) suggested that selecting candidates aligned with green values ensures long-term sustainability and reduces resistance to environmental initiatives.

Research by Jabbour et al. (2010) revealed that organizations with green performance metrics experience improved environmental compliance and employee engagement

According to Renwick et al. (2013), green rewards strengthen the link between environmental performance and employee motivation.

Studies have shown that reward systems play a significant role in reinforcing green behaviour. A study by Farooq et al. (2021) found that green rewards positively influence employees' willingness to participate in sustainability initiatives.

Norton et al. (2015) suggested that when organizations actively support environmental initiatives, employees are more likely to engage in discretionary green behaviour

Employee Green Behaviour - Employee green behaviour refers to voluntary actions that contribute to environmental sustainability, such as reducing waste, conserving energy, and supporting green initiatives at work. Prior research indicates that employees are more likely to engage in green behaviour when organizations formally integrate environmental values into their HR practices.

GHRM and Green Behaviour - The Social Exchange Theory posits that supportive organizational policies trigger

reciprocal positive behaviour from employees. When GHRM practices signal organizational commitment to sustainability, employees are likely to respond with increased green behaviour. Similarly, the Theory of Planned Behaviour suggests that environmental attitudes shape behavioural intentions, influenced by organizational norms and practices.

Research Gap in the Indian Context - Although international studies highlight the positive influence of GHRM on green behaviour, evidence from India remains limited. The socio-cultural and regulatory environment in India presents distinct challenges and opportunities for implementing effectively.

Research Objectives:

1. To examine the relationship between GHRM practices and employee green behaviour
2. To identify which GHRM practices most strongly influence green behaviour.
3. To analyze mediating factors (environmental awareness, organizational support) affecting this relationship.

Hypotheses :

H1: GHRM practices are positively related to employee green behaviour.

H2: Green training significantly predicts employee green behaviour.

H3: Perceived organizational support mediates the GHRM–green behaviour relationship.

H4: Environmental awareness strengthens the effect of GHRM on employee green behaviour.

Research Methodology-

1. Research Design -A quantitative research approach was employed using structured questionnaires.

2. Sample and Data Collection - Data were collected from 350 employees working in manufacturing and services sectors in major Indian cities (e.g., Delhi, Mumbai, Bangalore). A purposive sampling method ensured respondents with exposure to GHRM practices.

Measures-All variables were measured using validated scales from prior research:

1. GHRM Practices: 16-item scale covering recruitment, training, performance management, and rewards.

2. Employee Green Behaviour: 10-item scale assessing eco-friendly workplace behaviours.

3. Environmental Awareness: 8-item scale measuring environmental knowledge and attitudes.

4. Organizational Support: 7-item scale capturing perceived support for sustainability initiatives.

Responses were collected using a 5-point Likert scale (1 = strongly disagree; 5 = strongly agree).

Data Analysis - Data were analyzed using SPSS and Structural Equation Modeling (SEM). Reliability and validity were confirmed through Cronbach's alpha and confirmatory factor analysis (CFA).

Table 1 (see in last page)

Demographic Variable	Category	Frequency	Percentage
Gender	Male	203	58%
	Female	147	42%
Age	Below 25 years	72	20.6%
	26–35 years	161	46.0%
	36–45 years	89	25.4%
	Above 45 years	28	8.0%
Education	Graduate	196	56%
	Postgraduate	154	44%
Sector	Manufacturing	178	50.9%
	Services	172	49.1%

Table 2: Descriptive Statistics of Study Variables

Variable Deviation	Mean	Standard
Green Recruitment	3.82	0.71
Green Training	4.01	0.65
Green Performance Management	3.76	0.73
Green Rewards	3.69	0.78
Organizational Support	3.88	0.69
Environmental Awareness	4.05	0.61
Employee Green Behaviour	4.12	0.58

Table 3: Reliability Analysis

Construct	Number of Items	Cronbach's Alpha
Green HRM Practices	16	0.88
Organizational Support	7	0.85
Environmental Awareness	8	0.87
Employee Green Behaviour	10	0.90

(All values > 0.70 indicate good reliability)

Table 4: Correlation Matrix

Variables	GHRM	Org. Support	Env. Awareness	Green Behaviour
GHRM	1			
Organizational Support	0.52	1		
Environmental Awareness	0.47	0.49	1	
Employee Green Behaviour	0.61	0.56	0.58	1

Hypothesis	Relationship	β	p-value Value	Result
H1	GHRM→Green Behaviour	0.45	<0.001	Supported
H2	Green Training→Green Behaviour	0.30	<0.01	Supported
H3	Mediation of Org. Support	—	<0.01	Supported
H4	Moderation of Env. Awareness	0.27	<0.05	Supported

Table 5: Regression Analysis Results

- $R^2 = 0.52$
- GHRM and associated factors explain 52% variance in Employee Green Behaviour.

Results

· **Descriptive Statistics -**The sample comprised 58% male and 42% female employees, with an average age of

32 years. The majority held undergraduate degrees and had at least 3 years of work experience.

- Reliability and Validity -**All constructs exhibited strong reliability (Cronbach's $\alpha > 0.80$).**
- Hypotheses Testing -

H1: GHRM practices positively predicted employee green behaviour ($\beta = 0.45$, $p < .001$).

H2: Green training showed a significant effect on green behaviour ($\beta = 0.30$, $p < .01$).

H3: Organizational support mediated the relationship between GHRM and employee green behaviour.

H4: Environmental awareness significantly moderated the GHRM–behaviour link.

Discussion - The results confirm that GHRM practices significantly influence employee green behaviour in Indian organizations The mediating role of organizational support suggests that when employees perceive their organization as genuinely supportive of environmental initiatives, they are more engaged with green practices. Environmental awareness further strengthens this relationship, highlighting the importance of knowledge and attitudes in shaping behaviour.

Implications - The study extends GHRM literature by establishing empirical evidence from India. It supports theoretical frameworks such as Social Exchange Theory and the Theory of Planned Behaviour.

1. Organizations should integrate GHRM into HR policy frameworks.
2. Emphasis should be placed on green training programs and reward systems.
3. Leadership should actively promote environmental awareness to enhance employee engagement.

Limitations and Future Research:

1. The study is cross-sectional; future research could adopt longitudinal designs.
2. Qualitative insights from interviews could enrich understanding.
3. Future studies may explore industry-specific differences in the adoption of GHRM.

Conclusion - The present study examined the impact of Green Human Resource Management (GHRM) practices on employee green behaviour within the Indian organizational context. In response to increasing environmental challenges and sustainability pressures, this research highlights the critical role of human resource systems in shaping environmentally responsible behaviour among employees.

In conclusion, the study emphasizes that effective implementation of Green Human Resource Management is not merely an environmental initiative but a strategic organizational approach that fosters a culture of sustainability. Indian organizations aiming for long-term environmental and competitive performance must integrate green principles into their HR policies and actively engage employees in sustainability efforts. Future research may build upon these findings by adopting longitudinal designs, exploring industry-specific practices, and incorporating qualitative insights to further enrich understanding of GHRM's role in promoting sustainable organizational behaviour.

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Empowering Higher Education through MicroSaaS Innovation: A Case Study on AI-Enabled Career Development Platforms

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Abstract - Innovation in Micro Software-as-a-Service (MicroSaaS) is transforming higher education by facilitating targeted, agile, and reasonably priced digital solutions that promote employability and entrepreneurship. This study looks at how AI-enabled MicroSaaS platforms support institutional innovation, career readiness, and skill-based learning in academic ecosystems. The study shows how automated resume creation and individualized career assessment improve digital literacy and student employability using cvinpdf.in, an AI-driven career development MicroSaaS platform, as a case study. The results show that MicroSaaS is a scalable and inclusive method for incorporating AI into higher education, promoting long-term creativity, innovation, and entrepreneurial results.
Keywords- MicroSaaS, Higher Education, Academic Entrepreneurship, Innovation Ecosystem.

Introduction - Higher education is changing as a result of the quick development of digital technology, which is forcing institutions to implement creative approaches to administration, instruction, and learning. MicroSaaS has become a lightweight, economical, and targeted solution to certain academic and professional problems. In contrast to large-scale EdTech systems, MicroSaaS platforms can be created by individuals or small teams, allowing students and educators to take on the role of entrepreneurs and innovators [1]. MicroSaaS fits well with the goals of entrepreneurship, innovation, and digital transformation in education, where MBA students are the future leaders of businesses. Research has examined SaaS adoption in education, predominantly concentrating on large enterprise systems, thereby creating a deficiency in comprehension regarding how MicroSaaS can stimulate grassroots innovation within academic ecosystems. Many institutions still have trouble creating a culture of hands-on innovation. To exemplify this, the paper cites cvinpdf.in, an AI-driven MicroSaaS platform designed to aid students and professionals in creating ATS-compatible resumes and evaluating LinkedIn profiles.

Section –I

This part puts together Indian and global research on AI-enabled MicroSaaS in higher education. It also points out the reasons for the case study and the areas where more research is needed.

Background- The digital transformation of higher education is changing how schools handle teaching, administration, and helping students find jobs. More and more, people expect universities to not only use digital platforms, but also to encourage students and faculty to be creative, start their own businesses, and solve real-world problems.[2] Even though big educational technologies have made things easier and more accessible, they are still often expensive, inflexible, and not very useful for specific academic needs. MicroSaaS has come about because of the combination of cloud computing, artificial intelligence, and low-code development environments. These conditions let teachers and students make, test, and improve small digital applications that solve specific problems at their school or in their careers.

Literature Review

Previous studies on Software-as-a-Service (SaaS) in higher education underscore its revolutionary effect on institutional efficiency, scalability, and student engagement. SaaS platforms let universities get rid of old systems and make their operations more efficient. Case studies show that both administrators and students have better experiences, are more flexible, and save money [3].

SaaS entrepreneurship in academia has gained traction, with bibliometric analyses charting a significant increase in related publications and collaborative efforts over the past decade. New SaaS tools have led to new ways of learning, encouraged people to start their own businesses, and made it easier for people to learn and work together from afar [4].

Recent literature has also recorded the shift toward MicroSaaS models, which use lightweight, scalable applications to meet the needs of specific institutions or

learners. MicroSaaS solutions are praised for being flexible, having short development cycles, and being easy for non-technical users to use. This makes them appealing for academic settings that want to encourage new ideas and save money [5, 6].

Trends in Higher Education Entrepreneurship- Universities are quickly adopting AI, setting up digital innovation labs, and starting incubation centers to encourage entrepreneurship. In 2025, 86% of students around the world—and 92% in the UK—will be using AI-powered academic tools, a big jump from previous years. This is because more people are ready for digital learning and want to learn through innovation [7]. 57% of institutions around the world now see AI as a top priority, which is changing the way they invest in technology infrastructure, AI curriculum design, and student entrepreneurship. More than half of higher education institutions in India have official AI policies, and more than 40% are using AI-powered tutoring and adaptive learning systems to help with both curricular and startup projects.

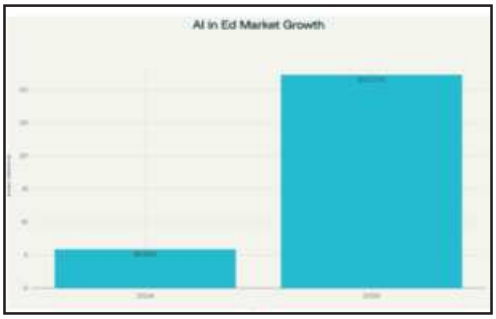

Fig. 1: Global AI in Education Market Projections

MicroSaaS and Academic Innovation- MicroSaaS models fit perfectly with the entrepreneurial spirit that is common in management and engineering around the world. They provide quick, cheap, and scalable ways to bring new ideas to life in the digital world. MicroSaaS has sparked student- and faculty-led businesses in European innovation labs and Asian business schools, making it easier to make prototypes, work with people in the same field, and launch digital products across borders [8].

Global University AI Incubation Models- Most existing academic literature and innovation policy reports concentrate on general SaaS integration and conventional business incubation, seldom examining the distinctive role of MicroSaaS in modern academic entrepreneurship. While the proliferation of AI incubators and digital innovation labs is extensively recorded, there exists a deficiency of empirical research assessing the particular outcomes, sustainability, and innovation dynamics of MicroSaaS-driven solutions within academic incubators worldwide. Moreover, although regional surveys emphasize tools, policies, and partnerships, there is a scarcity of cross-comparative analyses and real-world case studies, particularly from high-impact, AI-enabled MicroSaaS ventures [9].

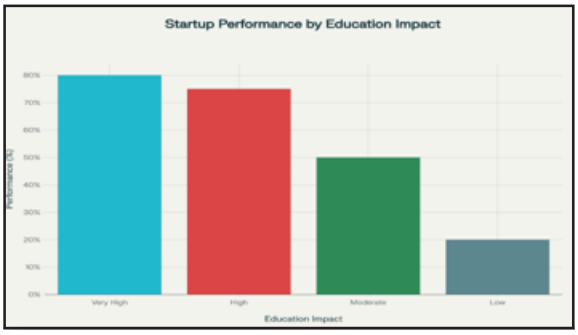

Fig 2: Startup Performance Rate by Entrepreneurial Education Impact (IJIRT, Jan 2025)

The table below shows the global adoption rates of AI incubation programs in higher education by region as of 2025, along with trends and other information:

Region	AI Incub -ation Adoption Rate (2025)	Notable Trends	Yearly Growth
North America	62%	Tech leadership, high VC investment	~25-30%/yr
Asia-Pacific	55%	Gov. initiatives, innovation hubs	~30-35%/yr
Europe	48%	Ethics, regulation focus	~20-25%/yr
Middle East	35%	National AI plans, infrastructure	~15-20%/yr
Latin America	28%	Limited infra, growing interest	~10-15%/yr

Table 1: Global Adoption of AI Incubation Programs in Higher Education by Region

AI Adoption in Indian Higher Education- India's higher education institutions are rapidly aligning with global AI-driven innovation trends, supported by initiatives such as the National AI Strategy and AI Centres of Excellence, as reflected in Table 2.

Year	Key Metrics
2020	Early pilot AI labs in select IITs, IISc, and top NITs; ~12 research-driven AI incubators operating nationally
2021	Launch of National AI Strategy; IndiaAI mission begins; ~18 university AI labs/incubators; 80+ universities roll out introductory AI programs
2022	2X increase in AI research incubators; over 40 data & AI labs at central/state institutes; NASSCOM AI Index: 2.45/4.0, "enthusiast" stage
2023	India has emerged as the second-largest AI talent base, with 120+ AI-focused incubators, over 105 HEIs offering advanced AI programs, and projected AI investment CAGR of 30.8%.
2024	India recorded a 4× rise in AI startups, AI adoption in 75% of incubators, 173 AI CoEs, a NASSCOM AI Index of 2.47/4.0, and 87% 'enthusiast/expert' adopters.
2025	AI adoption has accelerated with national Centres of Excellence, 27 new AI labs in Tier-2/3 cities, 500+ funded

	research projects, and AI incubation active in over 80% of technical universities.

Table 2: Yearly Adoption of AI-Based University Programs & Incubators in India

AI Tools Enabling Academic MicroSaaS- AI tools enable MicroSaaS platforms in higher education through development, automation, and personalization, with about 40% of colleges using AI chatbots for academic support and 53% of institutions using generative AI for curriculum design and content creation.

Section-II - AI-driven automation, career-focused features, and scalable, lightweight solutions that improve employability and academic innovation are highlighted in this section's analysis of cvinpdf.in as a real-world MicroSaaS case [10].

Platform Overview- Cvinpdf.in has been chosen as a case study to practically illustrate these ideas based on the discussion in Section I regarding the increasing need for micro-SaaS solutions in higher education. The platform bridges the gap between theoretical learning and employability readiness by combining automation, simplicity, and practical usability.

MicroSaaS Features and Functionality- Because it focuses on addressing a particular problem for recent graduates and job seekers—creating polished, ATS-optimized resumes with little effort—Cvinpdf.in is eligible as a MicroSaaS platform. It combines several pertinent services into a single, lightweight web application, including resume and cover letter creation, LinkedIn profile analysis, and resume enhancement. A crucial feature of MicroSaaS endeavors, the platform's revenue model, which is based on nominal per-user fees, shows its scalability and self-sustainability.

Fig 3: A simple demonstration of Case Study MicroSaaS(cvinpdf.in)

AI Integration and Automation- By automating important tasks and offering intelligent, context-aware support, cvinpdf.in exemplifies the revolutionary potential of AI in career development.

Automation on the platform goes beyond creating content. The user experience is streamlined by cloud-based storage, secure login, and real-time updates, allowing for quick iterations and ongoing development. Cvinpdf.in demonstrates how MicroSaaS can operationalize complex digital tools without overwhelming users by fusing AI intelligence with a lightweight, user-friendly interface.

Sustainability and Scalability- An important step toward automation and intelligent career support is the incorporation of Artificial Intelligence (AI) into Cvinpdf.in. The platform performs tasks like LinkedIn profile analysis and resume enhancement with exceptional accuracy and contextual understanding by using the API key of an advanced Large Language Model (LLM). These AI-powered modules provide users with instant access to personalized improvement recommendations and improved resumes in addition to producing comprehensive analytical reports.

Fig 4: A MicroSaaS feature of cvinpdf.in Uses AI

Conclusion- This study emphasizes how MicroSaaS can revolutionize higher education by promoting innovation, entrepreneurship, and employability through flexible, scalable, and context-specific digital solutions. Through the integration of cloud-based frameworks, entrepreneurial pedagogy, and AI-enabled tools, MicroSaaS fosters an innovative academic ecosystem and facilitates the development of practical skills. MicroSaaS is positioned as a workable solution to localized institutional and learner-specific challenges, as evidenced by the literature and global trends that show gaps in the widespread adoption of EdTech.

Acknowledgment- The author developed the MicroSaaS platform cvinpdf.in, which is used in this study solely for academic and research purposes to demonstrate the potential of educator-led AI-driven innovation in higher education [10].

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Transforming Education through Excellence in Management and Adaptive Technologies

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Abstract - The rapid evolution of global education systems demands innovative frameworks that ensure quality, inclusivity, and sustainability. This paper examines the transformative potential of integrating **excellence management** with **adaptive educational technologies** to address contemporary learning challenges. Excellence management emphasizes strategic leadership, continuous quality improvement, stakeholder engagement, and performance-based outcomes, providing a robust governance structure for educational institutions.

Adaptive technologies—such as artificial intelligence–driven learning platforms, data analytics, and personalized digital tools—enable real-time customization of learning pathways based on individual learner needs, abilities, and progress. When aligned with excellence management principles, these technologies enhance instructional effectiveness, learner engagement, and institutional accountability.

Introduction - Excellence in educational management with adaptive technologies has emerged as a powerful catalyst for transforming teaching–learning processes, institutional governance, and overall educational outcomes. Traditional education models, often characterized by rigid structures and standardized approaches, are no longer sufficient to address the complexities of the 21st-century knowledge society.

Excellence in educational management plays a crucial role in shaping vision-driven institutions that emphasize strategic planning, effective leadership, accountability, and continuous improvement. Sound management practices enable educational institutions to optimize resources, foster innovation, enhance faculty performance, and ensure learner-centered environments. When management excellence is aligned with institutional goals, it creates a supportive ecosystem for the meaningful adoption of technology and pedagogical reform.

Objectives Of The Research- Following are the main objectives of the research :

1. **To examine the role of excellence in educational management** in enhancing institutional effectiveness, leadership quality, and decision-making processes in educational institutions.
2. **To analyze the impact of adaptive technologies**—such as digital learning platforms, artificial intelligence, and learning management systems—on teaching, learning, and assessment practices.
3. **To study the integration of management excellence and adaptive technologies** in transforming traditional education systems into learner-centered, flexible, and outcome-oriented models.
4. **To assess the effectiveness of adaptive technologies** in improving student engagement, personalized learning, and academic performance.
5. **To identify challenges and barriers** faced by educational institutions in adopting excellence-driven management practices and adaptive technological solutions.

Hypothesis of the Research

1. **H1:** Excellence in educational management has a significant positive impact on institutional effectiveness and quality of education.
2. **H2:** The adoption of adaptive technologies significantly enhances teaching–learning processes and student engagement.

Delimitations of The Study

1. **Scope of the Study:** The study is confined to examining the role of excellence in educational management and the use of selected adaptive technologies in transforming education, and does not include other factors such as curriculum reforms or socio-cultural influences.
2. **Type of Institutions**: The research is limited to selected educational institutions (such as schools, colleges, or universities) and does not include informal or non-formal education settings.
3. **Geographical Area:** The study is restricted to a specific geographical region or country, and findings may not be generalized to other regions with different educational

systems and technological infrastructures.

Method of Investigation

Research Design - The study adopts a descriptive and analytical research design to examine the role of excellence in educational management and adaptive technologies in transforming education. A mixed-method approach is employed to collect both quantitative and qualitative data, enabling a comprehensive understanding of the research problem.

Population and Sample: The population of the study consists of educational administrators, teachers, and students from selected educational institutions. A purposive and stratified random sampling technique is used to select the sample, ensuring representation from different institutional roles and academic levels.

Variables of the Study

Independent Variables:

1. Excellence in educational management (leadership quality, planning, decision-making, resource management)
2. Adaptive technologies (learning management systems, digital platforms, AI-based tools)

Dependent Variables:

1. Quality of education
2. Teaching–learning effectiveness
3. Student engagement and academic performance
4. Institutional efficiency

Data Collection Methods

Primary Data:

1. Structured questionnaires administered to teachers, administrators, and students
2. Semi-structured interviews with institutional leaders and faculty members

Secondary Data:

3. Review of books, research journals, policy documents (e.g., NEP-2020), institutional reports, and online resources related to educational management and adaptive technologies

Research Tools

1. Likert-scale questionnaires to measure perceptions of management excellence and technology use
2. Interview schedules to gather in-depth qualitative insights
3. Document analysis checklists for institutional policies and practices

Data Analysis Techniques

Quantitative Data:

1. Percentage analysis, mean, standard deviation
2. Inferential statistics such as t-test, ANOVA, and correlation analysis

Qualitative Data:

1. Thematic analysis to identify patterns and emerging themes related to management practices and technology adoption

Validity and Reliability:

1. Content validity of research tools is ensured through expert review
2. Reliability is established using appropriate statistical measures such as **Cronbach's Alpha**

Ethical Considerations

1. Informed consent is obtained from all participants
2. Confidentiality and anonymity of respondents are maintained
3. Data is used solely for academic and research purposes

Research Tools and Techniques

1. Research Tools

a) Questionnaires:

1. Structured and semi-structured questionnaires are designed for **teachers, administrators, and students**.
2. Likert-scale items measure perceptions of management excellence, adaptive technology usage, and educational transformation.
3. Open-ended questions capture additional insights regarding challenges, best practices, and suggestions.

b) Interviews:

1. Semi-structured interviews are conducted with **institutional leaders, department heads, and technology coordinators**.
2. This tool helps gain **qualitative insights** into leadership practices, technology integration strategies, and institutional experiences.

c) Observation Checklists

1. Observations of classroom teaching, use of adaptive technologies, and administrative processes are documented using structured checklists.
2. Helps in assessing **actual usage patterns** of technology and management practices in real-time.

d) Document Analysis:

1. Institutional policies, strategic plans, reports, training manuals, and technology adoption guidelines are reviewed.
2. Helps in evaluating **management practices, technology implementation, and alignment with educational goals**.

2. Research Techniques

a) Quantitative Techniques

1. Descriptive statistics: Mean, percentage, standard deviation to summarize survey responses.

2. Inferential statistics: Correlation, regression, t-tests, and ANOVA to test hypotheses about the relationship between management excellence, adaptive technologies, and educational outcomes.

b) Qualitative Techniques

1. Thematic analysis: Coding and categorizing interview and open-ended questionnaire data to identify patterns, themes, and emerging insights.

2. Content analysis: Evaluating institutional documents, reports, and policies to assess alignment with management excellence and technology adoption goals.

c) Mixed-Method Triangulation

1. Combining **quantitative survey results** with **qualitative insights** from interviews, observations, and document analysis.
2. Ensures **data validity and reliability** and provides a holistic understanding of how management and technology drive educational transformation.

d) Validation Techniques

1. **Pilot testing of questionnaires** to ensure clarity and reliability
2. **Expert review** of research tools to enhance content validity
3. **Cronbach's Alpha** to determine internal consistency of survey scales

This combination of tools and techniques ensures a **comprehensive, reliable, and valid investigation** into how excellence in management and adaptive technologies can transform education.

Statistics Used in the Study: The study uses both descriptive and inferential statistics to analyze the data collected from questionnaires, interviews, observations, and institutional documents. The choice of statistical tools ensures a comprehensive evaluation of the relationship between management excellence, adaptive technologies, and educational outcomes**.**

1. **Descriptive Statistics:** Used to summarize and describe the main features of the collected data.
1. **Frequency Distribution:** To show the number of respondents in different categories (teachers, administrators, students).
2. **Percentage Analysis:** To present the proportion of responses for various aspects of management excellence, technology usage, and student engagement.
3. **Mean & Standard Deviation:** To determine the **average perception** of participants regarding the effectiveness of management practices and adaptive technologies, and the variability in responses.
4. **Graphs & Charts:** Pie charts, bar graphs, and histograms are used to **visually represent trends and patterns** in the data.

2. Inferential Statistics: Used to test hypotheses and draw conclusions beyond the sample data.

1. **Correlation Analysis (Pearson/Spearman):** To examine the relationship between management excellence and adaptive technology use, and their combined effect on educational outcomes.
2. **Regression Analysis:** To determine the **predictive power** of management practices and adaptive technologies on student performance, engagement, and institutional effectiveness.
3. **t-Test / ANOVA:** To compare perceptions or outcomes among different groups (e.g., teachers vs. students, public vs. private institutions).
4. **Chi-Square Test:** To test associations between categorical variables, such as type of institution and adoption of specific technologies.

3. Reliability and Validity Statistics

1. **Cronbach's Alpha:** To measure the internal consistency and reliability of the questionnaire scales.
2. **Factor Analysis (if applicable):** To identify underlying dimensions of management excellence and technology adoption.
4. **Use of Statistical Software:** SPSS, MS Excel, or R can be used for data entry, analysis, and graphical representation.

Purpose: These statistical tools help the researcher to quantify perceptions, identify trends, test hypotheses, and provide evidence-based conclusions on how excellence in management and adaptive technologies contribute to educational transformation.

Hypothesis : 1

There is no significant impact of Information and Communication Technology on Teachers.

Table : 1: Impact of Information and Communication Technology on Teachers at various levels

S.	Level	Scores	Percentage
1	High	21	35.0
2	Average	32	53.3
3	Low	7	11.7
	Total	**60**	**100.00**

The above table no. 1 shows the impact of Information and Communication on Teachers at various levels- High 21 (35.00%), Average 32 (53.3%) and Low 07 (11.7%).

Table 2: Chi-Square Value of impact of Information and Communication Technology on Teachers

F_o	21	32	7	60
F_e	20	20	20	60
$F_o - F_e$	1	12	-13	
$(F_o - F_e)^2$	1.00	144.00	169.00	
$(F_o - F_e)^2/F_e$	0.05	7.20	8.45	**15.70**

Observed Frequency (F_o)

Expected Frequency (F_e)

$$X^2 = \Sigma \{ \frac{(F_o - F_e)^2}{F_e} \}$$

= 0.05+ 7.20 + 8.45

= **15.70**

(Degrees of Freedom) df = 3-1 =2

The above table no. 2 shows the scores of three levels High, Average and Low and X^2 is applied on the scores of teachers. In which according to frequency, the Observed Frequency (F_o) in High is 21, Average is 32 and Low is 07. Whereas, The Expected Frequency (Fe) in High is 20, Average is 20 and Low is 20 and the value of X^2 is **15.70.** It is inferred from the above table that for 2 df the standard value of X^2 at 0.01 level of significance is 9.21 and at 0.05 level of significance it is 5.991. The calculated Value of X^2 is 15.70, is more than these two standard values, hence significant. So, Hypothesis is rejected.

Therefore, There is significant impact of Information and Communication on Teachers

Hypothesis : 2

There is no significant role of ICT in assisting a teacher in technical aspects.

Table3: The role of ICT in assisting a teacher in technical aspects at various levels

S.	Level	Scores	Percentage
1	High	42	70.0
2	Average	15	25.0
3	Low	3	5.0
	Total	**60**	**100.00**

The above table no. 3 shows role of ICT in assisting a teacher in technical aspects at various levels - High 42 (70.00%), Average 15 (25.00%) and Low 03 (5.00%).

Table:4 : Chi-Square Value for- role of ICT in assisting a teacher in technical aspects

F_o	42	15	3	60
F_e	20	20	20	60
F_o-F_e	22	-5	-17	
$(F_o-F_e)^2$	484.00	25.00	289.00	
$(F_o-F_e)^2/F_e$	24.20	1.25	14.45	**39.90**

Observed Frequency (F_o)

Expected Frequency (F_e)

$$X^2 = \Sigma \{ \frac{(F_o-F_e)^2}{F_e} \}$$

=24.20+ 1.25 + 14.45

=39.90

(Degrees of Freedom) df = 3-1 =2

The above table no. 4 shows the scores of three levels High, Average and Low and X^2 is applied on the scores of teachers. In which according to frequency, the Observed Frequency (F_o) in High is 42, Average is 15 and Low is 03. Whereas, The Expected Frequency (Fe) in High is 20, Average is 20 and Low is 20 and the value of X^2 is **39.90**.

It is inferred from the above table that for 2 df the standard value of X^2 at 0.01 level of significance is 9.21 and at 0.05 level of significance it is 5.991. The calculated Value of X^2 is **39.90**, is more than these two standard values, hence significant. So, Hypothesis is rejected.

Therefore, There is significant role of ICT in assisting a teacher in technical aspects.

Findings :

1. It is found that There is significant impact of Information and Communication Technology on Teachers. The tools of ICT helps to not only convert and store but also process, transmit and retrieve information. So we can say that overall ICT impacts teachers significantly
2. It is found that , there is significant role of ICT in assisting a teacher in technical aspects. It is the often stereotypes of technology being advance and difficult to understand but as per the responses, we get that teachers find tools of ICT useful and it helps teachers to use is judiciously. Now a days, using the tools of ICT is need of hour and teachers are constrained to use ICT tools to teach children through which a teacher can update herself in technical aspects. Information and Communication toolsnare well designed that they can lend a hand in to assist a teacher technical side through which he or she can work on them easily. In fact, the scores of the students suggest that most of the teachers have updated themselves in technological manner.
3. The role of ICT as a medium to enhance teaching skills and quality of education is significant. As ICT is an amazing tool in uprising the teaching skills. Teachers can easily improvise their study material and explain with the help of PPT which will definitely enhance their explanation and through this they can easily inculcate their chapter in one's mind. ICT tools have been a blessing for all the teachers.

Suggestions for Further Research :

1. A similar research work can also be conducted comparison between the MP Board and CBSE school teachers.
2. A similar research work can also be conducted on analysing the impact of ICT on students of varying age.
3. A similar study can also be conducted on a much larger sample with a larger research area.
4. Effectiveness of Adaptive Learning Technologies.
5. Measuring the long-term impact of AI-based personalized learning systems on academic performance.
6. Comparative analysis of adaptive learning versus traditional teaching methods.
7. Subject-wise effectiveness of adaptive platforms (e.g., STEM vs. humanities).
8. Strategic Educational Management Practices.
9. Role of visionary leadership in successful digital transformation.
10. Impact of strategic planning and governance on technology integration.

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To Study the Impact of Digitalization in Purchasing Buying Behavior

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Abstract - This study examines the impact of digitalization on consumer purchasing behavior in the modern marketplace. It explores how digital technologies have transformed the way consumers search for, evaluate, and purchase products and services. Through the analysis of digital adoption trends, technological advancements, and changing consumer preferences, the study highlights the growing importance of digital platforms in the purchasing process. The findings indicate that nearly 87% of purchasing decisions are influenced by digital channels, while mobile commerce continues to grow rapidly. The research also shows that consumers have become more informed and empowered, expecting seamless, personalized, and omnichannel shopping experiences. Furthermore, the study analyzes purchasing patterns across different demographic groups and product categories. The results provide valuable insights for businesses to understand evolving consumer behavior and develop effective digital marketing and engagement strategies.
Keywords- Digitalization, Consumer Behavior, E-commerce, Mobile Commerce, Online Shopping.

Introduction - The way that consumers make purchases has completely changed as a result of the quick development of digital technologies. New avenues for product discovery, assessment, and purchase have been made possible by digitalization, which is defined as the incorporation of digital technologies into every facet of business and consumer interaction. In today's marketplace, it is critical for businesses to comprehend how digitalization affects consumer behavior. In order to take into consideration digital influences, multi-channel touchpoints, and technology-enabled decision-making processes, traditional consumer behavior models that were created for offline retail environments need to be significantly revised.

Research Problem- Before making a purchase, customers engage with brands through a variety of digital touch points in a complex ecosystem created by the growing digitization of commerce. Due to this change, conventional knowledge of consumer behavior is no longer adequate for forecasting and influencing purchase outcomes. Businesses find it difficult to comprehend how digital technologies affect consumers' decision-making processes and to effectively interact with customers through digital channels.

Research Objectives:

1. To Analyze how various digital channels affect the customer buying habits.
2. To Evaluate the influence of digital reviews and social proof on buying behavior
3. To Identify emerging trends in digital purchasing behavior

Literature Review

Digital Transformation and Consumer Behavior

According to **Verhoef et al. (2021)**, digital transformation has created "connected consumers" who can easily move between online and offline channels during the purchasing process. This connectivity provides consumers with greater access to information, enabling them to make more informed decisions while also increasing expectations for personalized experiences. **Deloitte (2022)** reported that about **73% of consumers research products online** before making a purchase, even when they intend to buy from physical stores, reflecting the growing trend of research online and purchase offline (ROPO).

Mobile Commerce and Purchasing Behavior-Mobile commerce has become a major component of digital retail. Studies indicate that mobile devices generate **58% of website traffic** and nearly **45% of e-commerce transactions**. Mobile technology encourages impulse buying, location-based shopping, and social shopping through integrated digital platforms.

Social Media and Digital Influence-Social media significantly influences consumer purchasing decisions through reviews, recommendations, and influencer marketing, with **68% of consumers** making purchases based on social media suggestions.

Methodology- This study employs a mixed-methods

approach combining quantitative analysis of consumer behavior data with qualitative insights from consumer interviews and focus groups. The research design includes:

Quantitative Component:

1. Survey of nearly 500 consumers across different demographics and geographic regions
2. Analysis of e-commerce transaction data and digital behavior patterns
3. Statistical analysis of digital channel usage and purchasing correlations

Qualitative Component:

1. In-depth interviews with 75 consumers representing diverse purchasing behaviors
2. Focus groups examining specific digital purchasing scenarios
3. Ethnographic studies of digital shopping behavior

Data Collection Methods: The data has been collected with the primary source like online surveys, mobile app, purchase history of retailer and social media and secondary data like industry reports, research work, government statistics etc.

Analytical Framework" The research utilizes a comprehensive framework examining:

Digital Touchpoint Analysis:

1. Purchase Journey Mapping
2. Behavioral Segmentation
3. Technology Adoption Analysis

Digital Landscape and Consumer Behavior Evolution-Current State of Digital Adoption- Digital adoption has expanded rapidly worldwide, with nearly **6 billion internet users by 2025**. This widespread connectivity has created consumers who expect smooth digital experiences across multiple platforms. Global **e-commerce sales reached $6.4 trillion**, accounting for about **21.8% of total retail sales**. **Mobile devices contribute nearly 60% of digital commerce transactions**, highlighting the importance of mobile platforms. In addition, **5.2 billion people actively use social media**, while **76% of consumers regularly use digital payment methods**, showing the growing reliance on digital technologies in everyday purchasing activities.

Demographic Variations in Digital Behavior- Digital purchasing behavior differs across age groups. **Gen Z (1997–2012)** is highly digital, with about 95% researching products online and nearly 78% purchasing directly through social media. **Millennials (1981–1996)** are informed shoppers; around 90% compare prices across websites and 65% read online reviews before buying. They are comfortable shopping on both smartphones and computers. **Generation X (1965–1980)** often researches products online but prefers completing purchases in physical stores, with limited trust in online reviews. **Baby Boomers (1946–1964)** are gradually adopting online shopping, though fewer rely on mobile shopping or digital recommendations.

Product Category Differences- Digital influence really depends on what you're shopping for. When it comes to big-ticket items like electronics or cars, people go all in—they hop between websites, pore over expert reviews, and check out specs. They'll hit more than 15 digital touch points on average before finally hitting "buy," usually online after all that research.

Key Findings: Impact of Digitalization on Purchasing Behavior

Information Gathering and Research Behavior- Digitalization has significantly changed how consumers gather product information before making purchases. Modern consumers conduct more extensive research compared to the pre-digital era, using an average of **11.4 information sources**, while traditional shopping offered only about **5.3 sources**. Digital platforms have become major sources of information. About **87% of consumers use search engines**, **76% visit brand websites**, and **82% read online reviews** before purchasing. Additionally, **54% rely on social media** and **69% use price comparison websites**. As a result, consumers spend more time researching products online, averaging **79 minutes**, compared to **32 minutes** in traditional retail settings.

Decision-Making Process Changes-The digital environment has transformed the traditional linear decision-making process into a more complex, iterative journey:

1. Non-Linear Pathways: Consumers now follow non-linear paths to purchase, with 73% of consumers switching between different digital channels during their purchasing journey.

2. Comparison Shopping: Digital platforms enable extensive comparison shopping, with 84% of consumers comparing prices across multiple online platforms before purchasing. This behavior show price sensitivity and low brand loyalty in many categories.

3. Delayed Decision-Making: The ability to save items, create wishlists, and receive notifications has led to more deliberate purchasing decisions. 67% of consumers use digital tools to postpone purchase decisions, leading to longer consideration periods.

Channel Preferences and Omni channel Behavior- Digital consumers use multiple channels during their purchasing journey. Around **89% of consumers switch between different channels**, using an average of **3.2 channels per purchase**, which highlights the importance of Omni channel strategies. Despite the growth of online shopping, **43% of consumers research products online but prefer to complete purchases in physical stores**, especially for high-value items. Consumer behavior also includes **show rooming** (researching in-store and buying online) and **web rooming** (researching online and buying in-store). Additionally, **62% of consumers begin their shopping journey on mobile devices**, and nearly **45% complete purchases through mobile platforms**, making mobile a key purchasing channel.

Social Influence and Peer Recommendations- Digital platforms have strengthened the role of social influence in

consumer purchasing decisions. Around **91% of consumers read online reviews** before buying products, and **84% trust these reviews as much as personal recommendations**. In digital environments, **social proof** plays an important role. About **79% of consumers are influenced by user-generated content**, such as photos and videos shared by other users, while **88% consider product ratings and reviews** during purchasing decisions. Additionally, **67% of consumers have made purchases based on social media recommendations**. Influencer marketing also affects buying behavior, with **54% of consumers purchasing products recommended by influencers**, especially micro-influencers.

Technology-Specific Impacts

Artificial Intelligence and Machine Learning- Digital influence on purchasing varies by product type. For high-value items like electronics or cars, consumers conduct extensive research across multiple websites and reviews, often interacting with over 15 digital touch points before buying. For everyday products, consumers make quicker decisions, relying on brand familiarity, mobile apps, subscriptions, and auto-replenishment for convenient repeat purchases.

Augmented Reality and Virtual Reality- Emerging technologies such as **Augmented Reality (AR), Virtual Reality (VR), and Block chain** are influencing consumer purchasing behavior. Around **61% of consumers prefer retailers offering AR virtual try-on features**, which increase conversion rates and improve shopping experiences. **Virtual showrooms** for products like cars and furniture reduce the need for physical visits while maintaining strong sales outcomes. Additionally, **3D product visualization** helps consumers better understand products and reduces return rates. Block chain technology also promotes **supply chain transparency**, influencing purchasing decisions, while **crypto currency payments** are gradually gaining popularity, especially among younger and technology-oriented consumers.

Challenges and Opportunities- Digital purchasing behavior creates both challenges and opportunities for consumers and businesses. Consumers often face **information overload**, with 58% feeling overwhelmed by excessive online information. **Trust and security concerns** also affect purchasing decisions, as 64% worry about data privacy and 23% avoid transactions due to security risks. Additionally, 47% struggle to verify product authenticity online.

For businesses, key challenges include **Omni channel integration**, managing large amounts of consumer data, and investing in new technologies. However, digitalization also creates opportunities such as **AI-based hyper-personalization**, conversational commerce through voice and chat platforms, and promoting **sustainable products**, which many consumers are willing to support even at higher prices.

Impact on Different Industries

Retail and E-commerce- The sector that has undergone the most radical changes as a result of digitalization is: "Retail."

1. **Growth of Online Retail:** Online retail has accelerated from 5.1% of total retail sales in 2008 to 24% of total retail sales as of 2025 and is expected to continue growing
2. **Omni channel Strategies:** Effective retailers today use Omni channel strategies with companies such as Wal-Mart investing considerable resources in digital integration.
3. **Direct to Consumer (D2C) Models:** Brands are now cutting out the middleman, hence the 45% yearly growth in D2C.

Financial Services-Digital transformation has significantly influenced purchasing behavior across major industries. In **financial services**, around 78% of consumers now use digital banking, primarily through mobile apps, while fintech companies provide innovative and user-friendly financial solutions. Additionally, about 27% of consumers invest in crypto currencies and digital assets.

In **healthcare**, digitalization has increased the adoption of telemedicine, with 76% of consumers using virtual consultations. Online pharmacy services and health applications are also gaining popularity.

The **travel and hospitality** sector has also shifted toward digital platforms, with 87% of travelers booking accommodations online. Mobile bookings, sharing-economy platforms, and AI-based travel recommendations are reshaping consumer travel decisions.

Future Trends and Implications- Emerging technologies are expected to further transform consumer purchasing behavior. The **Internet of Things (IoT)** will enable automatic product replenishment through connected devices, while **5G connectivity** will support faster and richer digital shopping experiences, including AR and VR applications. Advanced technologies like **quantum computing** may improve predictive analytics and personalized marketing. At the same time, **privacy and data protection** will become increasingly important. Many consumers prefer platforms that collect minimal personal data and demand greater transparency, with about **71% wanting clear information** on how their data is used and shared.

Recommendations- To adapt to digital purchasing behavior, **businesses** should invest in strong Omni channel infrastructure, prioritize mobile-friendly platforms, and use advanced analytics such as AI and machine learning to understand consumer preferences. Building trust through transparent data practices and strong security systems is also essential.

Policymakers should create regulations that protect consumer privacy, ensure fair competition in digital markets, and promote sustainable consumption practices.

Consumers, on the other hand, should develop digital literacy to better understand online platforms, practice safe

online shopping by using secure payment methods, and manage information overload to make more informed and responsible purchasing decisions.

Conclusion- Digitalization has significantly transformed purchasing and buying behavior by changing the way consumers search, evaluate, and purchase products and services. Digital platforms such as websites, mobile applications, and social media now play an important role in influencing consumer decisions. Mobile commerce and online shopping have become increasingly popular due to their convenience, accessibility, and speed. The growth of social commerce, artificial intelligence–based personalization, and omnichannel retailing has created new opportunities for businesses to connect with customers and enhance their shopping experiences.

The study also highlights demographic differences in digital adoption, with younger consumers showing higher engagement with digital platforms, while older consumers are gradually adapting to online purchasing methods. Emerging technologies like augmented reality (AR), virtual reality (VR), and artificial intelligence are expected to further shape consumer purchasing behavior in the future. Therefore, businesses must invest in digital technologies, maintain consumer trust, and focus on customer experience to remain competitive in the rapidly evolving digital marketplace.

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Rental Case A Prefaced Study on the Design, Architecture and Development of a MERN-Based Rental System Web Application

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Abstract - This research paper presents the design and development of a full-stack web-based rental management system implemented using the MERN (MongoDB, Express.js, React.js, and Node.js) technology stack. The study focuses on the practical implementation of the MERN (MongoDB, Express.js, React.js, and Node.js) stack for the design and deployment of a scalable rental system web application. The internship bridged the gap between theoretical learning and real-world software engineering practices by emphasizing database design, RESTful API development, frontend-backend integration, authentication mechanisms, and deployment strategies. Through structured mentorship and access to cloud-based and collaborative learning tools, the project enhanced technical proficiency, analytical reasoning, and professional competencies. The results demonstrate the effectiveness of the MERN architecture in developing responsive, secure, and user-centric web applications suitable for real-world deployment.
Keywords- MERN Stack, Full-Stack Development, Rental System, Web Application, RESTful APIs, MongoDB, React.js, Node.js, Software Engineering Internship.

Introduction - Practical system development projects play a critical role in aligning academic knowledge with industry requirements by enabling the application of theoretical concepts in real-world software engineering environments. This research is based on the structured design and implementation of a MERN stack-based rental system developed as an academic and practical software engineering project. The primary objective of the program was to facilitate hands-on experience in designing and implementing a complete web-based rental management system using modern full-stack technologies.

The project emphasized the end-to-end development lifecycle, including system planning, database modeling, application programming interface (API) development, user interface design, testing, and documentation. The exposure to industry-standard tools and collaborative platforms enabled the development of problem-solving abilities, technical competence, and professional communication skills.

Objectives of the Study- The main objectives of this study were:

1. To design and implement a full-stack rental system using the MERN architecture.
2. To develop secure and scalable RESTful APIs for data communication.
3. To integrate frontend and backend components for seamless data flow.
4. To apply version control and collaborative development practices using Git and GitHub.
5. To explore cloud-based learning and development tools provided by Google for Education Partners.

Project Support and Learning Resources- The development process was supported by access to digital learning resources, technical documentation, and collaborative platforms. These tools facilitated effective communication, streamlined project management, and ensured alignment with current industry standards. Cloud-based services enabled real-time collaboration and continuous system updates.

Scope of the Work- The scope of this research encompassed the complete development of a rental system web application using the MERN stack. The work involved database schema design, API development, frontend interface creation, authentication implementation, and system testing. Emphasis was placed on understanding real-world software development workflows, debugging strategies, and performance optimization techniques. The project aimed to simulate industry-level development practices to enhance technical readiness and professional confidence.

Project Structure and Methodology- The system development process was organized into six progressive

phases, each focusing on specific technical and practical outcomes.

Fundamentals of MERN Stack Development - This phase introduced the core components of the MERN stack, including MongoDB for database management, Express.js and Node.js for backend services, and React.js for frontend development. The learning outcomes included environment setup, understanding client-server communication through RESTful APIs, and implementing version control using Git and GitHub.

Practical Implementation:

Configuration of a basic Node.js server.

Establishment of database connectivity with MongoDB.

Execution of basic CRUD operations.

Development of a sample React component to display test data.

Web Technologies and Client-Side Development - This phase focused on building modern, component-based user interfaces using React and Tailwind CSS. Emphasis was placed on modular UI design, responsive layouts, and state-driven rendering to create dynamic and interactive user experiences. Tailwind CSS was utilized to achieve consistent styling, responsiveness, and layout efficiency, while React facilitated efficient DOM updates through its virtual DOM architecture.

Practical Implementation:

Development of responsive and reusable UI components using React.

Implementation of state management and event handling for user interactions.

Form handling and validation using controlled components.

Dynamic content rendering based on application state and user input

React and State Management - The third phase explored React fundamentals, including JSX, component-based architecture, props, and state management using hooks such as useState and useEffect. The use of React Router enabled multi-page navigation, while API integration facilitated dynamic data rendering.

Practical Implementation:

Creation of reusable React components.

Implementation of routing for application navigation.

Fetching and rendering external API data.

Backend Development and Database Integration - This stage focused on backend architecture using Node.js and Express.js. Key topics included middleware, API security, data validation, and database modeling using MongoDB and Mongoose.

Practical Implementation:

Development and testing of RESTful APIs using Postman.

Creation of database schemas and models.

Implementation of secure CRUD operations.

Frontend-Backend Integration

The integration phase ensured seamless communication between the React frontend and Express backend using Axios and Fetch APIs. User authentication and real-time data updates were implemented to maintain system interactivity and consistency.

Testing and Documentation

The final phase involved system testing, performance optimization, bug resolution, and comprehensive technical documentation. The application was evaluated for usability, reliability, and maintainability.

System Design and Project Overview-

Architecture - The rental system web application was developed as a full-stack MERN-based platform that enables users to register, log in, browse available rental items, and manage bookings. The architecture integrates a React-based frontend with a Node.js and Express-powered backend, while MongoDB serves as the data storage layer.

Tools and Technologies

Frontend: React.js, Tailwind CSS

Backend: Node.js, Express.js

Database: MongoDB with Mongoose

Version Control: Git and GitHub

Testing Tools: Postman, Browser Developer Tools

Features

Secure user authentication and authorization.

Creation, modification, and deletion of rental listings.

Real-time browsing and booking of rental items.

Responsive and user-friendly interface.

Robust API-based data communication.

Challenges and Solutions-

Identified Challenges

Ensuring secure and reliable user authentication.

Maintaining consistency between frontend and backend data flow.

Designing a scalable and normalized database structure.

Achieving cross-device UI responsiveness.

Applied Solutions

Implementation of error handling and input validation within APIs.

Use of structured Mongoose schemas for database normalization.

Integration of responsive design principles in React components.

Continuous testing and debugging using Postman and browser tools.

Skills and Learning Outcomes- The project significantly enhanced both technical and professional competencies. Technical outcomes included proficiency in full-stack development, database management, API design, authentication mechanisms, and version control practices. Professional skills such as teamwork, time management, technical documentation, and problem-solving were strengthened through collaborative system development.

Conclusion- This research highlights the successful development and deployment of a MERN-based rental system web application as part of a structured internship

program. The project demonstrated the practical applicability of modern full-stack technologies in building scalable, secure, and user-oriented systems. The use of modern digital learning resources and technical documentation contributed to the overall quality and effectiveness of the development process. Beyond technical achievements, the internship fostered professional growth by enhancing communication, collaboration, and critical thinking skills. The outcomes of this study establish a strong foundation for future research and development in web application engineering using contemporary technology stacks.

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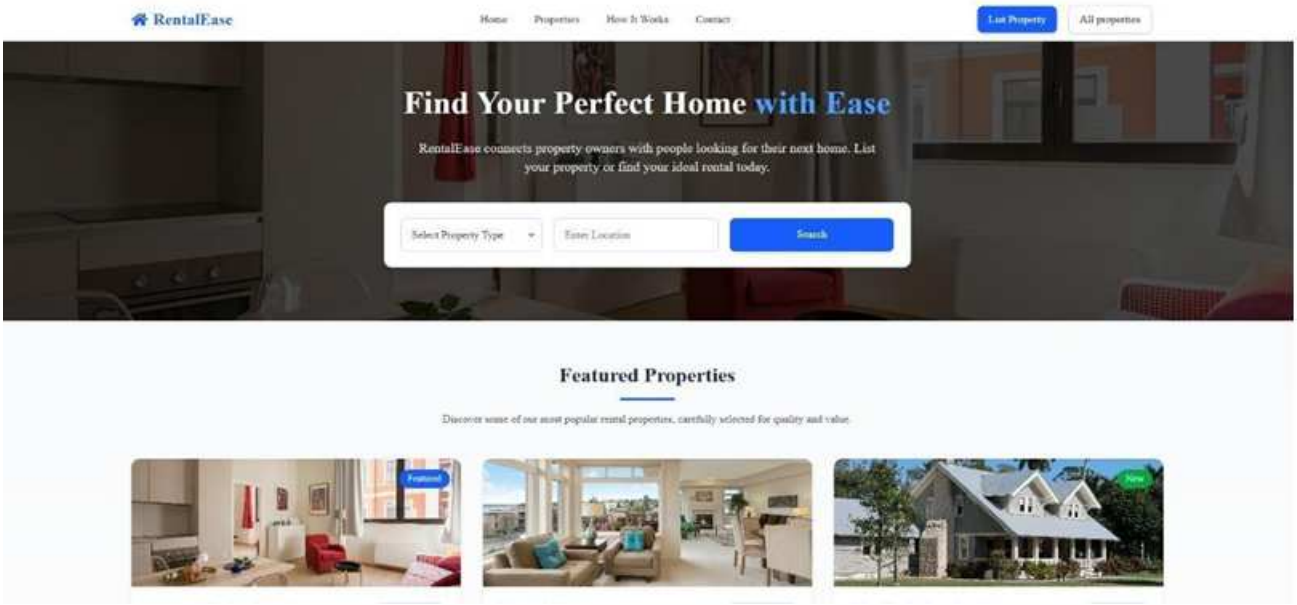

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Project Report with Work Activities and Water Management for the Proposed Sikandra-Kakraita (Agra) Biodiversity Park

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Abstract - Biodiversity parks and river-based landscape restoration projects assume significance in the context of sustainable ecologies, climate change, and environmental quality within rapidly urbanizing cities. The Sikandra-Kakraita Agra Biodiversity Park project is an example of a nature-based solution for restoring a degraded river-adjacent environment along the Yamuna River through a comprehensive landscape development and restoration strategy. The study examines the application of a Project Report and planning framework to improve biodiversity, habitat creation, hydrologic balance, and urban ecological resilience. Based on the site-specific application for ecological principles and assessments, landscape zoning planning, hydrological studies, and nature-based solutions, the paper examines key ecosystem services such as soil stabilization, groundwater recharge, pollution treatment, carbon sequestration, and microclimate regulation. Suggested approaches include native vegetation restoration, wetland restoration, constructed wetland wastewater treatment systems, stormwater management infrastructure, and climate-resilient landscape architecture design. Aside from its ecological principles, the proposed project also supports socio-environmental objectives to encourage environmental education, eco-tourism opportunities, and community participation. Drawing on the results of the proposed study, it is clear that the application of biodiversity parks in urban planning frameworks significantly improves sustainable development and river rejuvenation initiatives. The proposed measures consist of restoration of native vegetation, wetland restoration, constructed wetlands for wastewater treatment, stormwater management infrastructure, and climate-adaptive landscape architecture. The application and significance of inter-disciplinary planning and scientifically ecologically-driven restoration methods are demonstrated in the creation of resilient urban ecologies through this research endeavor. The role of inter-disciplinary planning and scientific restoration techniques is highlighted in the development of resilient urban environments by this study. The Sikandra-Kakraita Biodiversity Park is presented as a model for sustainable urban restoration that is commensurate with the environmental vision of the country and the United Nations Sustainable Development Goals (SDGs).

Keywords-Biodiversity Park, ecological restoration, nature-based solutions, water management, Yamuna River, urban resilience, sustainable landscape, climate adaptation.

Introduction - Agra represents a very evident manifestation of the crisis. The fact that Agra is a riverine city along the banks of the Yamuna River, which was an integral part of its culture and ecology, has actually become a source of vulnerability today. The river health in the Agra stretch is adverse because it suffers from low levels of dissolved oxygen, excessive levels of nutrients in the water, habitat loss in the form of reduction in the riparian vegetation, and groundwater contamination.

Figure 1 Location Map of Sikandra–Kakraita Biodiversity Park, Agra

Figure 2 Contour Plan

River floodplains and ravine areas like those found in the Sikandra and Kakraita regions are extremely prone to human-induced interventions. Traditional and engineered approaches by means of wastewater treatment plants may effectively provide solutions to pollution but do nothing to improve ecological habitats. Nature-Based Solutions

provide such improvements through ecological functions enhancement (Figure 1 & 2).

Need for the Project- The Sikandra-Kakraita Biodiversity Park functions as a solution for a range of challenges being faced by cities, such as ravine management, sewage treatment by nature's processes, improvement of green space vegetation, management of Urban Heat Island effects, and provision of accessible public space for recreation. This development project is in line with the rejuvenation of rivers in the country and with global targets for sustainability objectives (Figure 3).

Figure 3 Elements showing the need of the Biodiversity Park

Methodology-

Figure 4 Old elevated floodplain having ravines

Figure 5 (A) Plantation of Holoptelia (B) Bamboo and (C) area by Prosopis juliflora.

Figure 6 Recording Floral and Faunal Evidences

Figure 7 Map of Plot Division

The methodology applied in this study is an integrated approach that involves site analysis, flora and fauna surveys, as well as planning assessment. The field study was done in an effort to understand the landform conditions, drainage, soils, vegetation, and hydrology present in the area. Additionally, flora and fauna assessments are used to identify the existing biodiversity, while GPS mapping helps in the definition of the habitat (Figure 4 to 11).

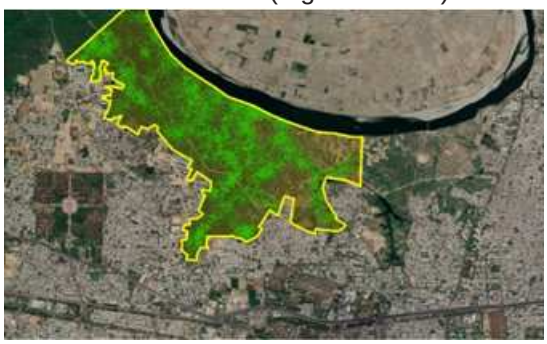

Figure 8 Existing Vegetation

Figure 9 Existing Dry patches

Particular emphasis was made to the degraded ravines, waterlogged zones, and sewerage drains to assess their suitability for treatment via wetland systems. Landscape zonation plans were designed to integrate conservation requirements with regulated visiting and education activities for recreation purposes. Secondary data from the Detail Project Report and various literary sources on wetland ecology and biodiversity

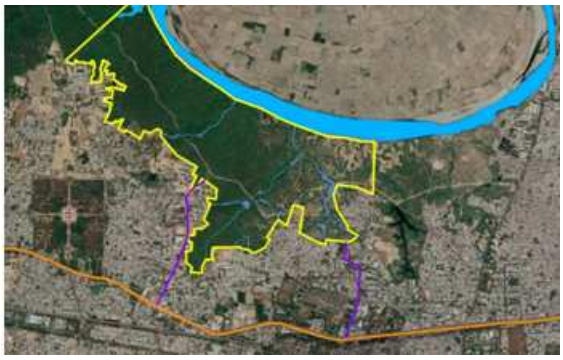

Figure 10 Existing Water zones

Figure 11 One of Existing wetlands located at lower gradient of the site.

conservation were used as a broader planning tool. (Existing Ravines, Drains, and Wetland Conditions at Site)

Problem Statement and Research Objectives-

The Yamuna River in Agra is encountering several interlinked problems such as the disposal of untreated wastewater, destruction of riparian vegetation, the spread of invasive alien species, disruption of the interaction between the surface and ground waters, eutrophication, degradation of habitats, and rising levels of urban heat stress in the neighboring residential zones. The local people's engagement in rejuvenating the river is minimal.

To address these problems, it is imperative to adopt a comprehensive strategy that addresses water quality, restoring the hydrological balance, biodiversity, and climate resilience simultaneously (Figure 12 & 13).

Figure 12 (A) Survey conducted by experts of WILDLIFE SOS

Figure 13 GPS mapping

Aim- The study aims to assess the species diversity within a designated forest area and propose the importance of a biodiversity park. By conducting a detailed survey of the forest's species composition, we highlight the importance of preserving and protecting the diverse array of Flora and Fauna. Through this report, we aim to advocate for establishing a biodiversity park to safeguard these invaluable natural resources and promote conservation efforts.

Research Objectives: Assessment of this paper includes evaluating the importance of the Sikandra Kakraita Biodiversity Park to restore degraded riparian biomes, minimize surface and groundwater pollution through natural treatment systems, optimize groundwater recharge, counter urban climate change effects, facilitate environmental awareness and community involvement, and optimize urban River restoration.

Environmental Education and Community Participation: The biodiversity Park serves as a learning spot for schools and universities as well as the general public. In this project, community participation is institutionalized with citizens engaging in plantation drives, maintaining, and governing, among other processes. This helps in creating ownership and sustainability of efforts towards environmental restoration. (Figure 14).***Figure 14 Community Participation***

Key Restorative Process Tasks and Services-

A. Restoration of Native Vegetation: Basically, the Sikandra Kakraita project's ecological bedrock involves native vegetation restoration. In fact, the approach adopted in restoring the natural vegetation targets the re-establishment of native trees such as Neem, Kikar, Peepal, and Sal; shrubs; grasses; and herbaceous vegetation that normally existed in the natural riparian environment of the Yamuna. Deep-rooted upland grasses, especially those that have root depths of 6-10 feet, are more beneficial in the role of carbon sequestration and interactions with groundwater. Other plant families that are more responsible for carbon accumulation in the soil include Fabaceae and Rosaceae. (Figure 15 to 18).

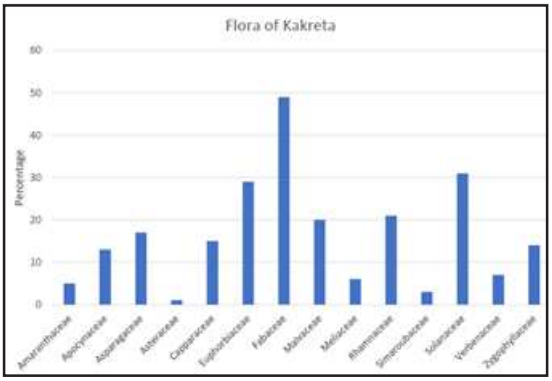

Figure 5 Graph showing Family wise Distribution of Floral Species

S.NO	Scientific name	Family
1	*Parthenium hysterophorus*	Asteraceae
2	*Croton sparsiflorus*	Euphorbiaceae
3	*Ailanthus excelsa*	Simaroubaceae
4	*Acacia nilotica*	Fabaceae
5	*Amaranthus deflex*	Amaranthaceae
6	*Azadiractha indica*	Meliaceae
7	*Lantana camera*	Verbenaceae
8	*Acacia leucophloea*	Fabaceae
9	*Solanum Xanthocarpum*	Solanaceae
10	*Nicotiana quadrivalvis*	Solanaceae
11	*Acalypha indica*	Euphorbiaceae
12	*Datura stramonium*	Solanaceae
13	*Calotropis procera*	Apocynaceae
14	*Balanites roxburgii*	Zygophyllaceae
15	*Capparis decidua*	Capparaceae
16	*Ricinus communis*	Euphorbiaceae

Figure 5 List of floral species

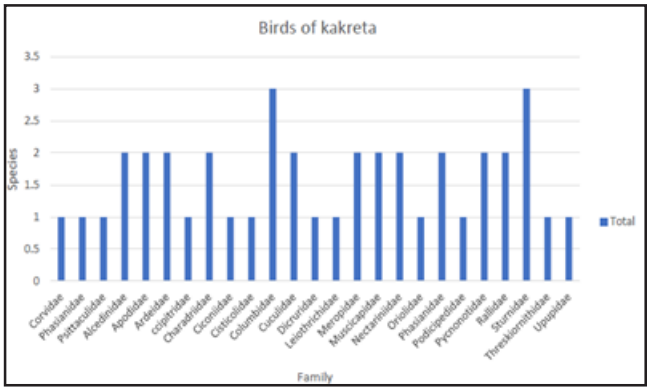

Figure 5 Birds of Kakraita

S.no	Bird name	Family
1	Red Wattled Lapwing	Charadriidae
2	Yellow Wattled Lapwing	Charadriidae
3	Black Kite	ccipitridae
4	white breasted kingfisher	Alcedinidae
5	Green bee-eater	Meropidae
6	Cattle Egret	Ardeidae
7	Indian Peacock	Phasianidae
8	Indian Peafowl	Phasianidae
9	Red Vented Bulbul	Pycnonotidae
10	White Cheeked Bulbul	Pycnonotidae
11	Purple Sunbird	Nectariniidae
12	Purple Rumped Sunbird	Nectariniidae
13	Rufous treepie	Corvidae
14	Laughing dove	Columbidae
15	Collared dove	Columbidae
16	Indian robbin	Muscicapidae
17	Jungle Myna	Sturnidae
18	Common Kingfisher	Alcedinidae
19	Indian pond heron	Ardeidae
20	Blue-tailed bee-eater	Meropidae
21	Black Drongo	Dicruridae

Figure 5 List of the Birds Species found in Kakreta

B. Wetland Restoration and Constructed Wetlands: The proposed initiative introduces the concept of wetland preservation as well as the use of constructed wetland technologies for the treatment of wastewater. Constructed wetlands are systems used to remove various contaminant particles from the wastewater through sedimentation, filtration, biochemical processes, as well as plant uptake, thereby ensuring that the contaminant particles are significantly reduced before the water is released into the river Yamuna. (Figure 19)

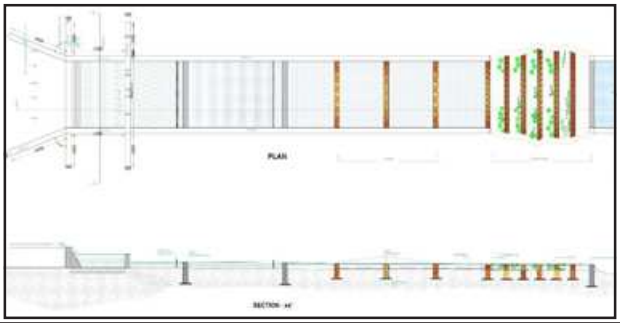

Figure 19 CWS (constructed wetland system) plan and section

C. Storm Water Management System: Green infrastructure for storm water management purposes, including bio retention ponds, porous materials, and detention ponds, is introduced to allow harvesting runoff water from the urban area.

Figure 20 Single drain carrying sewage partially treated by constructed wetland at the confluence with the river Yamuna

Figure 21 Single drain carrying sewage partially treated by constructed wetland at the confluence with the river Yamuna (view-2)

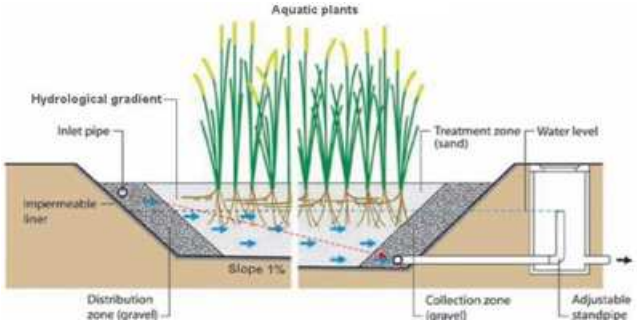

Figure 22 CWS (constructed wetland system)

There are 8 to 10 drains; except one, all the 7-9 drains discharge their contents into wetlands, which ultimately enter into a deep storm drain that joins the river Yamuna. The water that enters into the last drain from the interconnected wetlands is clean but a drain carrying raw sewage joins the last drain that has clean water to river Yamuna (Figure 20, 21 & 22).

D. Climate Resilient Landscape Architecture: An example of a 'CLIMATE-RESILIENT LANDSCAPE DESIGN' is a method of addressing UHI effects by using tree positioning, porous materials, and water sensitive design. The use of tree canopies, parks, and bioretention areas provides cooling by shading and evaporative cooling. An integrated design method may enhance climatic resilience.

Findings: According to the study, there is evidence that, in spite of the long period of stress caused by human activities, a high level of ecological resilience and restoration potential in the Sikandra-Kakraita landscape still exists. Stabilization activities in ravines showed a high level of success in reducing erosion and sediment runoff, while restoring natural vegetation improved carbon sequestration and microclimatic conditions.

Importance of Wetlands: Wetlands are an essential component of a biodiversity park, providing critical habitats for a variety of species, filtering and purifying water, reducing the impact of floods, sequestering carbon, and providing educational opportunities for visitors.

Wetlands are characterized by unique hydrological, soil (substrate), and biotic conditions. Since wetlands are transitional zones of terrestrial and aquatic ecosystems, they are zones of rich biodiversity, often inhabited by plants and animals of both wet and dry environments, demonstrating a phenomenon called the 'edge effect.' They provide a habitat to many invertebrates, fish, reptiles, and amphibian species. (Figure 23 & 24).

Figure 23 Importance of wetlands

Figure 24 Benefits of wetlands

Alignment with Sustainable Development Goals: The Sikandra–Kakraita Biodiversity Park supports various Sustainable Development Goals. It helps to accomplish SDG 6 by upgrading surface and groundwater quality through natural wastewater treatment systems and SDG 12 by practicing resource-efficient and low-energy wastewater management and sanitation. Ecological restoration activities also help to accomplish SDG 14 and SDG 15 directly by regenerating aquatic and terrestrial habitats successfully. Furthermore, activities aimed at advancing green infrastruc-

ture support SDG 3 by advancing environmental health and SDG 13 by advancing resilience to climate change by reducing heat and storing carbon.

Conclusion- One such successful biodiversity park that converts the otherwise depreciated landscape along rivers in urban settings into a sustainable ecological system by adopting a (Figure 25). nature-based planning approach is the Sikandra-Kakraita Biodiversity Park. The pilot park has a large-scale application potential for sustainable restoration of rivers in Indian cities.

Figure 1Visitor's zone master plan

Suggestions- Yamuna Biodiversity Park & Rajahmundry's biodiversity park models should be replicated in other polluted river corridors in the country as a measure of urban river restoration. Long-term ecological monitoring should be institutionalized to measure ecological performance. Biodiversity planning tenets should incorporate urban master plans in the urban planning legislation to ensure sustained restoration of the landscapes. Finally, interdisciplinary collaboration between urban planners, ecologists, and engineers will play a critical role in meeting the long-term ecological goal of sustainability in urban development.

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Effect of social media marketing on consumer brand engagement: A study with reference to the hotel industry

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Abstract - This research investigates the impact of social media marketing on customer brand engagement in the hotel sector, emphasizing entertainment and electronic word-of-mouth (eWOM) as primary factors. Social media has emerged as an essential medium for hospitality enterprises to engage with consumers, facilitating real-time communication, visual storytelling, influencer collaborations, and user-generated content. The research employs a descriptive mixed-method approach, gathering primary data from 80 participants via structured questionnaires and evaluating the findings using SPSS (version 22). Regression and ANOVA analyses were used to evaluate hypotheses regarding the influence of eWOM and entertainment on customer brand engagement. Research demonstrates that both electronic word-of-mouth (eWOM) and entertainment substantially affect engagement, with eWOM contributing 26.5% and entertainment 23.2% to the variance in consumer brand engagement, respectively. The findings indicate that favorable consumer evaluations, endorsements, and compelling content significantly enhance brand engagement and loyalty within the hotel industry. The distributions of gender and age revealed varied opinions, with heightened participation noted among younger users and regular social media participants. This study underscores the significance of digital tactics in the hospitality sector, indicating that hotels should invest in interactive, engaging, and genuine social media content to foster consumer trust and sustained involvement. It also emphasizes the significance of peer-driven communication in influencing customer views and decisions. This research experimentally validates these linkages, enhancing academic literature and offering practical recommendations for hospitality marketers aiming to enhance social media strategies for improved consumer engagement and competitive advantage.
Keywords- Social Media Marketing, Consumer Brand Engagement, Electronic Word of Mouth (eWOM), Entertainment, Hotel Industry, Customer Loyalty.

Introduction - The development of digital communication technologies and the widespread use of social media platforms have significantly transformed marketing practices across industries. Social media platforms such as Facebook, Instagram, TikTok, and X (formerly twitter) have become powerful tools for organizations to communicate with customers, promote products, and establish strong brand relationships. Unlike traditional marketing channels that rely primarily on one-way communication, social media enables interactive communication where businesses and customers can exchange information instantly. This interactive nature of social media allows organizations to create personalized experiences and develop long-term relationships with consumers.

In the hospitality industry, social media marketing has become an essential component of promotional strategies. Hotels increasingly depend on digital platforms to showcase their services, share visual experiences, respond to customer feedback, and build brand awareness. Modern travelers frequently rely on online content, customer reviews, and digital interactions when planning trips and selecting accommodation. As a result, hotels must maintain an active social media presence in order to remain competitive in the market.

This research examines the **effect of social media marketing on consumer brand engagement in the hotel industry**. In particular, the study focuses on two important dimensions of social media marketing: **Electronic Word of Mouth (eWOM)** and **Entertainment**. Electronic word of mouth refers to online reviews, recommendations, and shared customer experiences about hotel services, while entertainment refers to engaging and enjoyable social media content that attracts users' attention. These two factors are believed to influence how customers interact with hotel brands online. By analysing their impact, the research aims to provide insights into how hospitality organizations can improve their digital marketing strategies to strengthen consumer engagement and brand loyalty.

Importance of Social Media Marketing in the Hospitality

Industry- The hospitality industry increasingly uses social media to communicate with customers, promote services, and share engaging content. Strategies such as personalized communication, influencer marketing, user-generated content, and visual storytelling help hotels attract travelers and build trust. Real-time interaction with guests through digital platforms enhances customer satisfaction, strengthens relationships, and improves overall brand engagement.

The hospitality industry has been greatly influenced by digital technologies, especially social media platforms, which allow hotels to communicate directly with customers and promote their services effectively. Additionally, real-time communication allows hotels to respond quickly to inquiries and feedback, improving customer satisfaction and strengthening brand relationships.

Role of Entertainment in Social Media Marketing- Entertainment has become an essential factor in successful social media marketing campaigns. Content that is entertaining, creative, and visually engaging attracts attention and encourages users to interact with brands. In the hospitality industry, entertaining content may include travel videos, behind-the-scenes footage, interactive campaigns, storytelling posts, and humorous or trend-based content.

Entertaining content increases the likelihood that users will like, comment on, or share posts. These interactions help expand the reach of the brand and improve its visibility among potential customers. When users find content enjoyable, they develop positive emotional associations with the brand, which can enhance brand perception and loyalty. Research in marketing literature suggests that entertainment plays a significant role in increasing consumer engagement on social media.

Engaging content captures attention, stimulates curiosity, and encourages users to spend more time interacting with a brand's social media pages. As a result, hotels that consistently create entertaining content can improve brand awareness and maintain stronger relationships with their audience.

Electronic Word of Mouth (eWOM) in the Hospitality Industry- Electronic Word of Mouth (eWOM) refers to the sharing of opinions, experiences, and recommendations about products or services through digital platforms. In the hospitality industry, eWOM typically appears in the form of online reviews, customer ratings, travel blogs, and social media posts.

eWOM is particularly important in the hotel industry because travel decisions often involve significant financial investment and personal expectations. Potential guests frequently rely on online reviews to evaluate the quality of hotels before making reservations. Reviews from other travelers are considered more trustworthy than traditional advertising because they reflect genuine customer experiences.

Positive eWOM can significantly enhance a hotel's reputation and increase booking intentions. When satisfied customers share favorable reviews and recommendations, potential guests are more likely to develop trust in the brand. Conversely, negative reviews can harm a hotel's reputation and discourage potential customers from choosing the hotel.

Because social media platforms allow information to spread quickly, both positive and negative experiences can reach large audiences within a short time. Therefore, hotels must actively manage their online reputation by encouraging satisfied customers to share their experiences and by responding professionally to criticism.

Research Objectives: The main objective of this research is to examine the impact of social media marketing on consumer brand engagement in the hotel industry. The specific objectives include:

1. To evaluate the influence of **Electronic Word of Mouth (eWOM)** on consumer brand engagement.
2. To assess the role of **entertainment** in enhancing consumer engagement through social media marketing.
3. To provide recommendations for hospitality marketers to improve social media strategies and strengthen customer trust and loyalt

Literature Review

Previous studies have emphasized the increasing importance of social media marketing in influencing consumer behavior and brand engagement. Research conducted by Jetmir Zeqiri and colleagues found that social media marketing activities significantly improve brand awareness, consumer engagement, and purchase intention in emerging economies.

Another study by Reyvina examined the effect of social media marketing on brand awareness and brand image in the fashion industry. The findings revealed that social media marketing positively influences brand recognition through increased consumer engagement.

Similarly, research conducted by Samer M. Z. A. Tarabieh demonstrated that social media marketing activities significantly influence loyalty intentions by improving brand awareness and consumer brand engagement.

In addition, research by Matthew L. Cheung investigated the impact of various social media marketing elements, including entertainment, customization, interaction, and electronic word of mouth. The results indicated that eWOM and interaction strongly influence consumer brand engagement and brand knowledge.

These studies highlight the growing significance of social media marketing as a tool for enhancing brand relationships and influencing consumer decision-making.

Research Methodology- This study adopts a **descriptive research design** combined with a **mixed-method approach** that integrates both quantitative and qualitative

techniques. The purpose is to analyse how social media marketing elements influence consumer brand engagement.

Primary data was collected using a structured questionnaire distributed through an online survey. The questionnaire included both closed-ended and open-ended questions designed to capture respondents' perceptions of social media marketing and their engagement with hotel brands.

Secondary data was obtained from academic journals, books, research articles, and online resources related to social media marketing and hospitality management.

The study involved **80 respondents** who actively use social media platforms. A non-probability sampling technique was used to select participants. The respondents were individuals who use social media to search for hotel-related information.

The research variables included two independent variables—Electronic Word of Mouth and Entertainment—and one dependent variable, Consumer Brand Engagement.

The collected data was analysed using **SPSS version 22**. Statistical techniques such as percentage analysis, regression analysis, and ANOVA were applied to examine the relationship between the variables.

Demographic Analysis- The demographic characteristics of the respondents provide insights into the composition of the study sample.

In terms of gender distribution, 60 percent of the respondents were female and 40 percent were male. This indicates that female participants were slightly more represented in the study.

The age distribution showed that respondents belonged to various age groups. The largest group consisted of individuals above 50 years, representing 26.3 percent of the sample. Respondents below 20 years accounted for 22.5 percent, while those aged 41–50 represented 18.8 percent. Participants aged 31–40 accounted for 17.5 percent, and those aged 21–30 made up 15 percent of the sample.

Regarding educational qualifications, 27.5 percent of respondents were graduates, 25 percent were postgraduates, and another 25 percent held professional or doctoral qualifications. The remaining 22.5 percent had a high school education or below.

The study also examined the frequency with which respondents used social media to search for hotel information. Approximately 32.5 percent of respondents reported using social media daily, while 25 percent used it weekly. Another 17.5 percent used social media occasionally, and 25 percent reported using it rarely.

These results indicate that social media serves as an important source of information for many travelers when making accommodation decisions.

Hypothesis Testing and Results- Two hypotheses were tested in the study to determine the influence of electronic word of mouth and entertainment on consumer brand engagement.

The first hypothesis examined whether electronic word of mouth significantly affects consumer brand engagement. The regression analysis results showed that eWOM explains approximately **26.5 percent of the variance in consumer brand engagement**. The statistical significance of the model confirms that online reviews, recommendations, and shared experiences strongly influence customer engagement with hotel brands.

The second hypothesis tested the effect of entertainment on consumer brand engagement. The results indicated that entertainment explains **23.2 percent of the variance in consumer brand engagement**. The analysis confirmed that entertaining and engaging social media content positively affects how customers interact with hotel brands.

Findings- The findings of this study emphasize the important role of social media marketing in enhancing consumer brand engagement within the hospitality industry. Electronic word of mouth emerged as a stronger predictor of engagement, indicating that customer reviews and recommendations significantly influence consumer trust and decision-making.

In the hospitality sector, where service quality and guest experiences are critical, potential customers often rely on the opinions of other travelers before making booking decisions. Positive online reviews can strengthen a hotel's reputation and encourage new customers to choose the brand.

Entertainment also plays an important role in attracting attention and encouraging interaction on social media platforms. Creative campaigns, visually appealing posts, and storytelling techniques can increase user engagement and create memorable brand experiences.

The demographic analysis suggests that both younger and older consumers actively use social media to search for hotel information. This indicates that hospitality marketers should design content strategies that appeal to diverse audiences.

Overall, the integration of positive electronic word of mouth and entertaining social media content can significantly enhance customer engagement and strengthen brand relationships.

Conclusion- This study demonstrates that social media marketing has a significant impact on consumer brand engagement in the hotel industry. The findings reveal that both electronic word of mouth and entertainment are important factors influencing how consumers interact with hotel brands online.

eWOM enhances trust and credibility by allowing customers to share genuine experiences and recommendations. Positive reviews and endorsements can significantly improve a hotel's reputation and influence booking decisions.

Entertainment contributes to engagement by creating enjoyable and interactive social media experiences that capture user attention and encourage participation.

The study suggests that hotels should invest in social media strategies that combine authentic customer feedback with creative and engaging content. By effectively managing online reviews and producing entertaining digital campaigns, hotels can strengthen customer relationships, increase brand loyalty, and maintain a competitive advantage in the hospitality market.

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A Study on Lifelong Learning, Reskilling and Upskilling in the Digital Society

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Abstract- In the 21st century, rapid technological advancements and global economic shifts have transformed the nature of work. Lifelong learning, reskilling, and upskilling have become essential strategies for individuals, organizations, and nations to remain competitive and resilient. This paper explores the theoretical foundations, practical applications, and policy implications of these concepts in the digital society. It highlights the benefits, challenges, and future directions for fostering a culture of continuous learning. The rapid digital transformation of economies and societies has made lifelong learning, reskilling, and upskilling essential rather than optional. This paper explores the evolving role of continuous education in the digital age, examining its necessity, challenges, and opportunities. It highlights the interplay between individuals, organizations, and governments in fostering a culture of learning that supports employability, innovation, and social inclusion.

Keywords-Lifelong learning, reskilling, upskilling,employability, innovation, social inclusion.

Introduction - The digital society is characterized by automation, artificial intelligence (AI), and digital transformation across industries. Traditional career paths are being disrupted, requiring workers to adapt continuously. Lifelong learning is no longer a luxury but a necessity. Reskilling and upskilling initiatives are central to equipping individuals with the competencies needed to thrive in this evolving landscape. Policy-makers, educational institutions and employers recognize that the definition of a "tech job" has changed. All job roles now require some degree of tech literacy, and the adaptability to embrace and adopt new technologies. The future of work will see employers use GenAI to enhance human potential by automating repeatable tasks, reclaiming employee time for more complex, higher-value activities. But questions remain: What skills do we need for a future-ready workforce? And what steps should we take now to ensure we're prepared?

Anticipating the changing nature of work- An Access Partnership and Amazon Web Services (AWS) survey of over 6,500 employees and 2,000 employers in France, Germany, Spain and the UK found that 86% of employers anticipate their organizations will be driven by AI by 2028. Further, 80% of employees plan to use GenAI tools in the next five years.

On the other hand, at least half of American college students incorporate GenAI into their academic work compared to just 22% of faculty, although the adoption rate for both groups is growing. Still, more than 90% of teachers have never received any training or advice on how to use GenAI in school.

In its Skills Outlook: Reclaim the Clock report, Pearson identifies tasks that offer the greatest opportunity for automation with GenAI by 2026 in the US, UK, Australia, India and Brazil. One universal finding was that automation could help reclaim time spent "maintaining current knowledge in area of expertise", such as when employees must prepare for critical professional examinations.

Role redesign, reskilling and transferrable skills- The transformative potential of AI in the workplace depends not just on the sophistication of the technology, but also on the human skills and attitudes that enable its success. Technology is reshaping roles across industries — not by replacing workers, but by evolving tasks to leverage AI's efficiencies.

As routine activities become automated, employers should redesign roles to focus on work that only humans can do. This would drive creativity, problem-solving and innovation. Employers must understand the tasks within each role and the skills required to perform those tasks effectively in order to thrive.

Curriculum Associates is a US education technology company that brings personalized, evidence-based learning to primary and secondary education institutions. It has built a proof of concept on AWS that uses AI alongside human expertise to streamline the onerous process of aligning and integrating assessment taxonomies. This process now enables the company to work 3-5 times faster, allowing subject matter experts to redirect their resources and talents to developing more valuable educational tools.

This skills-based approach allows employers to build

a workforce that is more adaptable and purpose-driven. This empowers employees to focus on the work they are most passionate about, while ensuring AI solutions remain ethical and effective.

Reframing tech talent shortages- Employers have the chance to use the evolving workplace to turn tech talent shortages into a strategic advantage. By identifying future skill needs, automating repetitive tasks and providing learning opportunities tied to clear career outcomes, organizations can help their employees thrive. With 74% of workers preferring to learn through their employer, investing in employee development strengthens business performance, boosts workforce mobility and builds loyalty. Building these tech skills into the workforce requires collaboration that extends beyond employers. Educators design curricula that combine technical expertise with essential human skills, preparing students for jobs increasingly shaped by technology.

Conceptual Framework:

1. Lifelong learning: Continuous acquisition of knowledge and skills for personal fulfilment and professional adaptability.
2. Reskilling: Training individuals to transition into new roles or industries, often due to technological displacement.
3. Upskilling: Enhancing existing skills to meet higher demands within current roles, particularly digital literacy and advanced problem-solving.

Benefits in the Digital Society :

1. Individual benefits: Career mobility, employability, and personal growth.
2. Organizational benefits: Increased productivity, innovation, and workforce adaptability.
3. Societal benefits: Economic resilience, reduced unemployment and inclusive growth.

Challenges :

1. Access and equity: Socioeconomic disparities limit participation in lifelong learning programs.
2. Motivation and incentives: Individuals may lack motivation without clear career pathways or employer support.

Methodology-This study adopts a qualitative research design supported by secondary data analysis to explore the role of lifelong learning, reskilling, and upskilling in the digital society. The methodology is structured around the following components.

Research Approach :

1. Exploratory and descriptive: The paper investigates emerging trends, policies, and practices without testing a specific hypothesis.
2. Comparative analysis: Case studies from different regions (e.g., Singapore's Skills Future, EU's Digital Education Action Plan) are compared to identify best practices.
3. Thematic synthesis: Key themes such as accessibility, equity, and innovation are extracted from the literature.

Data Sources :

1. Academic literature: Peer-reviewed journals and conference papers on lifelong learning and workforce development.
2. Policy documents: Reports from international organizations (OECD, UNESCO, ILO, EU Commission).
3. Industry insights: White papers and surveys from consulting firms (McKinsey, Deloitte, CIPD).
4. Global initiatives: Case studies of national programs promoting reskilling and upskilling.

Data Collection

1. Systematic review: Relevant publications were identified through databases such as Google Scholar, Scopus, and organizational repositories.

2. Document analysis: Policy reports and industry studies were examined for strategies, outcomes, and challenges.

- **Case study selection criteria:** Programs were chosen based on scale, innovation, and relevance to digital transformation.

1. Data Analysis

2. Content analysis: Extracted data were coded into categories (e.g., accessibility, innovation, equity, collaboration).

3. Comparative evaluation: Differences and similarities across global initiatives were highlighted.

4. Synthesis of findings: Insights were integrated to form a coherent narrative about lifelong learning in the digital society.

Limitations:

1. Reliance on secondary data may limit the depth of empirical evidence.
2. Regional differences in policy and culture may affect generalizability.
3. Rapid technological change means findings may need continuous updating.

This methodology ensures that the paper is rigorous, evidence-based, and globally contextualized, while remaining flexible enough to capture the evolving nature of digital transformation.

Conclusion- The digital society is characterized by constant transformation, where technological innovation reshapes industries, economies, and social structures at unprecedented speed. In this context, lifelong learning, reskilling, and upskilling are not merely educational strategies but survival mechanisms for individuals and organizations. They ensure that workers remain employable, companies remain competitive, and societies remain inclusive.

The evidence suggests that the future of work will be defined less by static qualifications and more by the ability to adapt, relearn, and innovate. Lifelong learning fosters resilience, equipping individuals to navigate uncertainty and

seize new opportunities. Reskilling provides pathways for those displaced by automation to re-enter the workforce in emerging sectors, while upskilling enhances the capabilities of those already employed, enabling them to thrive in digitally augmented environments.

However, the responsibility for embedding these practices cannot rest solely on individuals. Governments must design inclusive policies that democratize access to education, employers must invest in structured learning ecosystems, and educational institutions must evolve to deliver flexible, modular, and technology-driven programs. Only through collective effort can societies bridge the digital divide and prevent widening inequalities.

Ultimately, lifelong learning, reskilling, and upskilling represent the foundation of a sustainable digital society. They empower individuals to remain relevant, organizations to remain innovative, and communities to remain cohesive. The challenge ahead lies not in recognizing their importance, but in operationalizing them at scale transforming rhetoric into reality. In doing so, societies can ensure that digital transformation becomes a force for empowerment rather than exclusion, shaping a future where adaptability, inclusivity, and continuous growth define human progress.

Suggestion & Recommendations

Government initiatives:

1. Invest in national lifelong learning platforms with free or subsidized access.
2. Provide tax incentives for companies that reskill employees.
3. Ensure digital literacy programs reach rural and marginalized communities.

Corporate strategies:

1. Embed continuous learning into workplace culture through microlearning and mentorship.
2. Partner with universities and online platforms to deliver tailored reskilling programs.
3. Use AI-driven learning analytics to personalize employee development.

Educational institutions:

1. Shift from degree-centric models to modular, stackable credentials.
2. Expand hybrid and online learning to accommodate working professionals.
3. Collaborate with industry to align curricula with emerging skill demands.

Individual responsibility:

1. Cultivate a growth mindset and embrace lifelong learning as part of personal identity.
2. Leverage MOOCs, online certifications, and peer-learning communities.
3. Regularly audit personal skills against market trends to identify gaps.

Findings:

1. **Lifelong learning is becoming a necessity, not a choice:** Continuous education is now essential for employability and adaptability in the digital economy. Workers who engage in lifelong learning are more resilient to technological disruption.
2. **Reskilling is critical for displaced workers:** Automation and AI are eliminating certain roles, but reskilling programs provide pathways into new industries such as data science, cybersecurity, and renewable energy.
3. **Upskilling enhances productivity and innovation:** Employees who upgrade their digital and technical skills contribute to organizational competitiveness, innovation, and efficiency.
4. **Digital platforms democratize access to learning:** MOOCs, online certifications, and micro-credentialing systems are expanding opportunities for learners globally, though disparities in access remain.
5. **Collaboration is essential:** Governments, employers, and educational institutions must share responsibility for building inclusive learning ecosystems. No single stakeholder can address the scale of reskilling needs alone.
6. **Equity challenges persist:** Marginalized groups face barriers such as cost, connectivity, and lack of institutional support, which risk widening the digital divide if not addressed.
7. **Global best practices show promise:** Initiatives like Singapore's Skills Future and the EU's Digital Education Action Plan demonstrate effective models for integrating lifelong learning into national strategies.

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Effectiveness of Digital Media in Building Teacher-Student Relationships (with Special Reference to Sheopur District)

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Abstract - The rapid growth of digital media has significantly transformed educational interaction and communication. Digital platforms such as learning management systems, social media, and online collaboration tools have reshaped how students communicate and build relationships. This research paper examines the effectiveness of digital media in building student relationships by analyzing its impact on communication, peer collaboration, emotional bonding, and inclusivity. The study adopts a qualitative and analytical approach based on secondary data.

With special reference to **Sheopur District, Madhya Pradesh**, the study highlights how digital media has played a crucial role in overcoming geographical isolation and limited educational infrastructure. The findings reveal that digital media enhances student interaction, peer support, and inclusivity, particularly in developing districts like Sheopur. However, challenges such as digital divide, limited internet access, and low digital literacy restrict its full effectiveness. The paper concludes that a balanced integration of digital and traditional learning approaches is essential for fostering strong and sustainable student relationships.

Keywords- Digital media, student relationships, Sheopur District, online learning, collaboration, educational technology.

Introduction - Teacher–student relationships are central to the teaching–learning process. Positive relationships foster trust, motivation, academic engagement, and emotional security among students. In the Indian education system, particularly at the higher level, teachers serve not only as instructors but also as mentors and guides. The National Education Policy (NEP) 2020 emphasizes the importance of meaningful teacher–student interaction for holistic development (Ministry of Education [MoE], 2020).

The integration of digital media into education has transformed traditional modes of communication. Platforms such as DIKSHA, Google Classroom, WhatsApp, and video conferencing tools have enabled continuous interaction beyond classroom boundaries. During and after the COVID-19 pandemic, digital media became essential for maintaining teacher–student relationships (MoE, 2021). In rural districts like Sheopur, digital media has expanded access to teachers, although challenges related to infrastructure and digital literacy remain.

Figure 1: Role of Digital Media in Building Teacher–Student Relationships

Digital Media Platforms
(Online Classes, LMS, WhatsApp, DIKSHA)
↓
Increased Communication
(Frequency, Accessibility, Feedback)
↓
Social Presence & Trust
(Emotional Support, Approachability)
↓
Teacher–Student Relationship Quality
(Mutual Respect, Understanding)
↓
Improved Academic Engagement
(Motivation, Participation, Retention)

Review of Literature

- **Teacher–Student Relationships:** Wentzel (2010) emphasized that supportive teacher–student relationships positively influence academic and behavioural outcomes. In the Indian context, Sharma and Singh (2021) found that teacher support significantly improves students' motivation and classroom participation.
- **Digital Media in Education:** Bates (2019) highlighted that digital technologies enable personalized and flexible interaction. Mishra and Panda (2020) observed that ICT tools in Indian secondary schools enhanced communication and reduced psychological distance between teachers and students.
- **Digital Media and Relationship Building:** Lowenthal et al. (2020) reported that rich digital media increases so-

cial presence. Verma and Gupta (2023) found that video-based platforms strengthened emotional connections during online learning in India.

- **Rural and Equity Perspective:** The Azim Premji Foundation (2021) and ASER (2023) reported that although digital platforms improved access, rural areas face challenges such as poor connectivity and lack of devices. These issues are evident in districts like Sheopur.

Research Gap: Limited studies focus specifically on the role of digital media in building teacher–student relationships in rural Indian districts, highlighting the need for the present study.

Research Questions:

1. How does digital media influence student communication?
2. How does digital media support peer collaboration?
3. Can digital media build emotional and social relationships among students?
4. How does digital interaction compare with traditional face-to-face interaction?
5. What challenges limit digital relationship building?

Objectives of the Study:

1. To examine the role of digital media in enhancing student communication in educational institutions of Sheopur district.
2. To analyze the impact of digital media on peer collaboration and academic relationships among students in Sheopur district.
3. To assess the effectiveness of digital media in developing emotional and social connections among students in Sheopur district.
4. To study the level of inclusivity created by digital media for rural and disadvantaged students in Sheopur district.
5. To identify the major challenges and limitations related to digital media use in building student relationships in Sheopur district.

Research Hypotheses-

1. $\mathbf{H_{01}}$: Digital media has no significant impact on student communication in Sheopur district.

$\mathbf{H_{11}}$**:** Digital media significantly enhances student communication in Sheopur district.

2. $\mathbf{H_{02}}$: Digital media does not significantly influence peer collaboration among students in Sheopur district.

$\mathbf{H_{12}}$**:** Digital media positively influences peer collaboration and academic relationships among students in Sheopur district.

3. $\mathbf{H_{03}}$ **:** Digital media has no significant role in developing emotional and social relationships among students in Sheopur district.

$\mathbf{H_{13}}$**:** Digital media plays a significant role in developing emotional and social relationships among students in Sheopur district.

4. $\mathbf{H_{04}}$ **:** Digital media does not significantly contribute to inclusivity and participation among students in Sheopur district.

$\mathbf{H_{14}}$**:** Digital media significantly improves inclusivity and participation among students in Sheopur district.

Research Methodology- The study adopts a secondary data research design. Data were collected from peer-reviewed journals, books, government reports, and policy documents published between 2019 and 2024. Thematic analysis was used to interpret data in relation to objectives and hypotheses.

Data Interpretation- The analysis of the present study has been organized systematically according to the **objectives and hypotheses** framed for Sheopur district, Madhya Pradesh. This objective-wise approach ensures logical clarity and strengthens the research structure.

Objective 1: To examine the role of digital media in enhancing student communication in Sheopur district

Analysis: In Sheopur district, digital media has emerged as an important medium for student communication due to geographical dispersion, limited institutional infrastructure, and transportation challenges. Students commonly use platforms such as **WhatsApp, Google Classroom, and YouTube** to communicate with peers and teachers.

The analysis indicates that:

1. Digital media enables continuous communication beyond classroom hours
2. Students can easily clarify doubts and share academic information
3. Shy and introverted students participate more actively online

However, communication remains largely **informal and peer-driven** due to limited institutional digital systems.

Interpretation: Digital media has a **positive and significant impact** on student communication in Sheopur district, supporting the alternative hypothesis (H_{11}).

Objective 2: To analyze the impact of digital media on peer collaboration and academic relationships

Analysis: Digital media has strengthened peer collaboration in Sheopur district through:

1. Sharing of notes and study material
2. Group preparation for examinations
3. Informal peer teaching via messaging platforms

Despite limited access to advanced tools, students collaborate effectively using basic digital resources.

Comparative Insight: Compared to urban areas where collaboration is structured through LMS platforms, collaboration in Sheopur district is **informal but meaningful**.

Interpretation: Digital media positively influences peer collaboration, thus rejecting the null hypothesis (H_{02}) and accepting the alternative hypothesis (H_{12}).

Objective 3: To assess the effectiveness of digital media in developing emotional and social connections

Analysis

Digital interaction in Sheopur district provides emotional support, especially during examination stress and academic

uncertainty. Online peer groups help students:

1. Share concerns
2. Motivate each other
3. Reduce feelings of isolation

However, the absence of face-to-face cues limits emotional depth.

Interpretation: Digital media supports **basic emotional and social bonding**, but it cannot fully replace traditional interaction. Hence, H_{13} is partially supported.

Objective 4: To study the role of digital media in promoting inclusivity in Sheopur district

Analysis: Digital media has enabled participation of:

1. Rural students
2. Economically disadvantaged learners
3. Students with limited mobility

At the same time, **digital divide** remains a major challenge due to:

1. Poor internet connectivity
2. Lack of smartphones
3. Low digital literacy

Interpretation: Digital media promotes inclusivity in principle, but infrastructural limitations restrict its effectiveness. Therefore, H_{14} is conditionally accepted.

Objective 5: To identify challenges related to digital media use in building student relationships

Analysis: The major challenges identified in Sheopur district include:

1. Unequal access to digital devices
2. Poor internet connectivity
3. Superficial online interactions
4. Digital distraction
5. Lack of teacher monitoring

These challenges directly affect the depth and sustainability of student relationships.

Interpretation

Without structured guidance and institutional support, digital media cannot achieve its full relational potential.

Hypothesis-wise Summary Table

Hypothesis	Result	Reason
H_{01} •	Rejected	Communication improved digitally
H_{02}	Rejected	Peer collaboration increased
H_{03}	Partially Rejected	Emotional bonding limited
H_{04}	Partially Rejected	Inclusivity affected by digital divide

Overall Systematic Interpretation: The systematic analysis confirms that **digital media plays a significant supportive role** in building student relationships in Sheopur district. Its impact is strongest in **communication and peer collaboration**, moderate in **emotional bonding**, and conditional in **inclusivity** due to infrastructural constraints.

Analytical Model (Sheopur District)

Limited Educational Infrastructure

↓

Adoption of Digital Media

↓

Enhanced Student Communication

↓

Peer Collaboration & Support

↓

Improved Student Relationships
(with existing limitations)

Findings of the Study (With Special Reference to Sheopur District)-

1. Digital media has significantly improved **student communication** in Sheopur district by overcoming geographical distance and limited physical infrastructure.
2. Students in Sheopur district actively use **basic digital platforms** such as WhatsApp, YouTube, and Google Classroom for academic discussion and peer support.
3. Digital media has strengthened **peer collaboration and academic relationships**, especially through informal group learning and sharing of study materials.
4. Online interaction has provided **emotional and social support** to students in Sheopur district, helping them reduce feelings of isolation and academic stress.
5. Digital media has enhanced **inclusivity**, enabling participation of rural and remote students who otherwise face access barriers.
6. The **digital divide** remains a major challenge in Sheopur district due to limited internet connectivity, lack of devices, and low digital literacy.
7. Compared to urban areas, digital relationship building in Sheopur district is **less structured but highly peer-dependent**.

Conclusion- Digital media has emerged as a powerful and transformative tool in modern education, significantly influencing how students build and maintain relationships. The present study concludes that digital media plays a positive and meaningful role in enhancing student communication, peer collaboration, inclusivity, and social support. These outcomes are particularly important in regions with limited educational infrastructure.

With special reference to Sheopur District, Madhya Pradesh, the study highlights that digital media has acted as a bridge between students, peers, and educational resources. In an area where physical access to institutions, libraries, and academic support is often limited, digital platforms have enabled students to remain connected, collaborate academically, and support each other emotionally. The use of basic digital tools such as messaging applications and online video platforms has strengthened informal peer networks and improved academic interaction.

However, the study also concludes that the effectiveness of digital media in Sheopur district is context-dependent. Challenges such as unequal access to smartphones, poor internet connectivity, limited digital literacy, and lack of institutional digital infrastructure restrict the full potential of digital relationship building. Additionally,

the absence of structured digital learning environments and professional monitoring reduces the depth and sustainability of student relationships.

The comparative analysis between Sheopur district and urban areas further confirms that while urban students benefit from advanced digital platforms and structured online engagement, students in Sheopur district rely more on peer-driven and informal digital interaction. Despite these limitations, digital media has significantly contributed to maintaining communication, collaboration, and a sense of belonging among students.

In conclusion, digital media should be viewed as a supportive and complementary educational tool, especially in developing districts like Sheopur. A balanced approach that combines digital platforms with traditional face-to-face interaction, along with improved digital infrastructure and teacher guidance, is essential for fostering strong, healthy, and sustainable student relationships. Future research may focus on empirical studies within districts like Sheopur to further evaluate long-term educational and relational outcomes of digital media integration.

Limitations of the Study:

1. Unequal access to digital technology
2. Superficial online interactions
3. Absence of non-verbal cues
4. Cyberbullying and online misconduct
5. Digital distraction
6. Differences in digital literacy
7. Limited emotional depth

Suggestions and Recommendations:

1. Provide equal digital access to all students.
2. Train teachers in digital facilitation.
3. Promote digital citizenship and ethics.
4. Combine digital and face-to-face interaction.
5. Establish clear guidelines for online conduct.

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कृत्रिम बुद्धिमत्ता के माध्यम से शिक्षा का परिवर्तन : छात्र परिणामों पर एआई-चालित अनुकूलन सीखने प्रणालियों के प्रभाव का एक व्यापक अध्ययन

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शोध सारांश – यह शोध पत्र शिक्षा के क्षेत्र में कृत्रिम बुद्धिमत्ता (ए आइ) की भूमिका विशेष रूप से अनुकूलन सीखने प्रणालियों के प्रभाव का विश्लेषण करता है। 21वीं सदी में शिक्षा पद्धति 'एक ही आकार में सबको फिट' के पारंपरिक दृष्टिकोण से हटकर व्यक्तिगत अनुभव की ओर बढ़ रही है। इस अध्ययन में एक मिश्रित-विधि दृष्टिकोण का उपयोग किया गया है जिसमें 500 छात्रों के मात्रात्मक डेटा और 20 शिक्षकों के गुणात्मक फीडबैक को शामिल किया गया है। परिणामों से पता चलता है कि एआई के उपयोग से गणित में 20 प्रतिशत और पढ़ने में 15 प्रतिशत की वृद्धि हुई है। यह शोध एआई के लाभों चुनौतियों और भविष्य की संभावनाओं पर विस्तार से चर्चा करता है।

शब्द कुंजी –कृत्रिम बुद्धिमत्ता, अनुकूलन प्रणाली, व्यक्तिगत अनुभव आदि।

प्रस्तावना – शिक्षा हमेशा से समाज की रीढ़ रही है, लेकिन इसकी वितरण पद्धति सदियों से स्थिर रही है। पारंपरिक कक्षाओं में एक शिक्षक के लिए 30-40 छात्रों की व्यक्तिगत जरूरतों को पूरा करना लगभग असंभव होता है। यहीं एआई अपनी भूमिका निभाता है।

एआई-चालित अनुकूलन शिक्षा-अनुकूलन शिक्षा एक ऐसी तकनीक है जो एल्गोरिदम और डेटा विश्लेषण का उपयोग करके छात्र की ताकत, कमजोरी और सीखने की गति के आधार पर शिक्षण सामग्री को वास्तविक समय में बदल देती है।

शोध के उद्देश्य:

1. छात्र परिणामों पर एआई प्रणालियों के प्रभाव को मापना।
2. छात्र की भागीदारी और प्रेरणा के स्तर का आकलन करना।
3. शिक्षकों के कार्यभार और प्रभावशीलता पर इसके प्रभाव की जांच करना।

साहित्य समीक्षा

- **ऐतिहासिक परिप्रेक्ष्य**-कंप्यूटर-आधारित शिक्षा की शुरुआत 1960 के दशक में हुई थी। कुलिक और कुलिक (1991) ने पाया कि तकनीक छात्रों को तत्काल फीडबैक प्रदान करने में सक्षम है, जो सीखने की प्रक्रिया को तेज करती है।
- **आधुनिक मशीन लर्निंग और शिक्षा**-आज का एआई 'न्यूरल नेटवर्क्स' पर आधारित है। पेन एट अल. (2017) ने तर्क दिया कि आधुनिक एआई न केवल छात्र के वर्तमान प्रदर्शन को देखता है बल्कि यह भविष्यवाणी भी करता है कि छात्र भविष्य में कहाँ गलती कर सकता है।
- **गैप विश्लेषण**-पिछले शोधों में अक्सर केवल तकनीक की उपलब्धता पर ध्यान दिया गया है लेकिन छात्र के मनोवैज्ञानिक विकास और प्रेरणा पर इसके प्रभाव को कम आंका गया है। यह अध्ययन इसी कमी को पूरा करने का प्रयास करता है।

शोध पद्धति

- **शोध डिजाइन**-अध्ययन में एक्सपेरिमेंटल रिसर्च डिजाइन का उपयोग किया गया है। छात्रों को दो समूहों में बांटा गया:

1. नियंत्रण समूह : जो पारंपरिक पद्धति से सीख रहे थे।
2. प्रयोगात्मक समूह : जिन्हें एआई-चालित एडैप्टिव प्लेटफॉर्म का एक्सेस दिया गया।

- **नमूना चयन**-एक बड़े शहरी स्कूल जिले से 500 छात्रों का चयन किया गया (ग्रेड 6 से 10)। इसके साथ ही 20 अनुभवी शिक्षकों को भी शामिल किया गया।

डेटा संग्रह के उपकरण

1. पूर्व-परीक्षण और पश्चात-परीक्षण स्कोर।
2. डिजिटल लॉग्स (छात्रों ने प्लेटफॉर्म पर कितना समय बिताया)।
3. 5-पॉइंट लिकर्ट स्केल पर आधारित छात्र सर्वेक्षण।
4. शिक्षकों के साथ गहन साक्षात्कार

विश्लेषण और परिणाम

शैक्षणिक उपलब्धि- डेटा के विश्लेषण से पता चला कि प्रयोगात्मक समूह के औसत अंकों में महत्वपूर्ण सुधार हुआ:

1. गणित: एआई का उपयोग करने वाले छात्रों के अंकों में 20 प्रतिशत की औसत वृद्धि देखी गई।
2. भाषा/पठन: इसमें 15 प्रतिशत का सुधार दर्ज किया गया।
3. तत्काल फीडबैक का प्रभाव: जिन छात्रों को एआई से तत्काल सुधार के सुझाव मिले, उन्होंने जटिल समस्याओं को 30 प्रतिशत तेजी से हल किया।

छात्र भागीदारी और प्रेरणा

सर्वेक्षण के परिणामों के अनुसार:

- 90 प्रतिशत शिक्षकों ने माना कि एआई के उपयोग से कक्षा में अनुशासन और भागीदारी बढ़ी।
- 80 प्रतिशत छात्रों ने कहा कि वे अब विषय से कम डरते हैं क्योंकि एआई उन्हें बिना किसी निर्णय (Non Judgemental) के सीखने की अनुमति देता है।

शिक्षकों का दृष्टिकोण – शिक्षकों ने रिपोर्ट किया कि एआई ने उनके प्रशासनिक कार्य (जैसे होमवर्क चेक करना और ग्रेडिंग) को 40 प्रतिशत तक कम कर दिया है, जिससे वे छात्रों के साथ भावनात्मक जुड़ाव और परामर्श पर अधिक समय बिता सके। एआई की सबसे बड़ी शक्ति इसकी लचीली प्रकृति है। यदि कोई छात्र 'बीजगणित' में कमजोर है, तो सिस्टम उसे सरल उदाहरणों की ओर ले जाता है जब तक कि वह उस अवधारणा में निपुण न हो जाए।

चुनौतियां और बाधाएं–अध्ययन के दौरान कुछ प्रमुख चुनौतियां भी सामने आईं:

1. डिजिटल डिवाइड: सभी छात्रों के पास घर पर हाई-स्पीड इंटरनेट और लैपटॉप नहीं थे।
2. गोपनीयता की चिंता: छात्रों के डेटा को सुरक्षित रखना एक बड़ी चुनौती है।
3. एल्गोरिथम पक्षपात: यदि डेटा संतुलित नहीं है तो एआई कुछ समूहों के प्रति पक्षपाती हो सकता है।

भविष्य की संभावनाएं और सिफारिशें:

हाइब्रिड मॉडल–भविष्य एआई बनाम शिक्षक का नहीं, बल्कि एआई + शिक्षक का है। एक हाइब्रिड मॉडल सबसे प्रभावी परिणाम देगा।

नीतिगत सिफारिशें –सरकारों को स्कूलों में एआई बुनियादी ढांचे में निवेश करना चाहिए और शिक्षकों के लिए अनिवार्य एआई प्रशिक्षण कार्यक्रम शुरू करने चाहिए।

निष्कर्ष–यह शोध पत्र इस बात की पुष्टि करता है कि कृत्रिम बुद्धिमत्ता शिक्षा के क्षेत्र में एक क्रांतिकारी परिवर्तन ला रही है। एआई-चालित प्रणालियाँ न केवल अकादमिक परिणामों को सुधारती हैं, बल्कि एक समावेशी वातावरण भी बनाती हैं, जहाँ हर बच्चा अपनी गति से सीख सकता है। हालांकि नैतिक और तकनीकी चुनौतियों का समाधान करना आवश्यक है, लेकिन शिक्षा का भविष्य निस्संदेह एआई के साथ गहराई से जुड़ा हुआ है।

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2. लकिन आर, होम्स डब्ल्यू, ग्रिफिथ्स एम और फोरफानी एल (2016)। इंटेलिजेंस अनलीश्ड: शिक्षा में कृत्रमई बुद्धिमता का भविष्य। पियर्सन एडुकेशन रिपोर्ट। (यह आधुनिक ए आई के प्रभाव को समझने के लिए महत्वपूर्ण है)।
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21वीं सदी में कौशल एवं दक्षता विकास के लिए डिजिटल पेडागॉजी

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शोध सारांश – 21वीं सदी के तृतीय दशक के उत्तरार्द्ध में आते आते,समग्र शिक्षा जगत , क्षेत्रीय स्तर से लेकर वैश्विक स्तर तक सर्वत्र तकनीकी और प्रौद्योगिकी परिवर्तनों,एआई उपकरणों तथा वैश्विक स्तर पर फैली महामारी कोविड' से इस सीमा तक प्रभावित हुआ है कि आज का शिक्षा जगत डिजिटल शिक्षा, डिजिटल शिक्षण – अधिगम , शिक्षा में डिजिटलीकरण, शिक्षा का डिजिटलीकरण,21वीं सदी में डिजिटल पेडागॉजी के कौशल एवं दक्षताओं आदि की संकल्पनाओं को लेकर तेजी से उभरा है । इस संदर्भ में भारत की राष्ट्रीय शिक्षा नीति 2020 में कहा गया है कि अब शिक्षा में डिजिटल तकनीक का उपयोग, केवल एक साधन नहीं, बल्कि शिक्षा में व्यापक परिवर्तन के लिए एक **'रणनीतिक उपकरण'** है। यही कारण है किएनईपी 2020के अंतर्गत डिजिटल शिक्षा के एकीकरण कादृष्टिकोण,बहुआयामी माना गया है। अतएवशिक्षा को अधिक लचीला, समावेशी और सीखने में रुचिकर बनाने के लिए डिजिटल उपकरणोंऔरडिजिटल पेडागॉजी के उपयोग पर बल दिया जाने लगा है। अत: '21वीं सदी के कौशल एवं दक्षता विकास के लिए डिजिटल पेडागॉजी' की संकल्पना पर चर्चा करना अपरिहार्य ही नहीं प्रासंगिक भी है। आज डिजिटल संसाधनों ने शिक्षा को प्रौद्योगिकी सक्षम बनाने की दिशा में समग्र दृष्टिकोण को अपनाते हुए न केवल शिक्षण पद्धति में सुधार का मार्ग प्रशस्त किया है बल्कि सीखने को अधिक व्यक्तिगत ,लचीला, सशक्त बनाने का प्रयास है। आज प्रौद्योगिकी तकनीक के अविष्कारों को देखकर यह कहना संगत होगा कि डिजिटलपेडागॉजी का उपयोग करके बच्चों के सीखने की गति, शैली और क्षमता के अनुरूप सामग्री उपलब्ध कराना सहज, सुलभ, संभव है। इससे व्यक्तिगत शिक्षणके व्यावहारिक प्रयासों को बढ़ावा मिलेगा साथ ही डिजिटल उपकरणों के माध्यम से विद्यार्थियों को व्यावसायिक कौशल, संप्रेषण कौशल, समस्या समाधान क्षमता और रचनात्मकता जैसे जीवनोपयोगी गुण सिखाए जा सकेंगे,जिससे वे मानवीय मूल्यों को सहजता से अधिगमित करते हुए वैश्विक नागरिक बन सकेंगे।प्रस्तुत शोध आलेख में प्रस्तावित शीर्षक डिजिटल पेडागॉजी:21वीं सदी में कौशल एवं दक्षताओं की प्रतिपुष्टि के लिए, द्वापर युग में मिट्टी से निर्मित गुरु द्रोणाचार्य और एकलव्य, के कथा प्रसंग को भी संक्षेप में संदर्भित किया गया है।जिससे स्पष्ट हो सकेगा कि समय और स्थान से परे जाकर कहीं भी,कभी भी, किसी को भी, उसके स्तर,अवस्था,आवश्यकता और उद्देश्य के अनुरूप लक्ष्यार्थ, डिजिटल पेडागॉजीका उपयोगकौशल और दक्षता विकास के लिए करना संभव है।

शब्द कुंजी – 21वीं सदी, कौशल एवं दक्षता :डिजिटल पेडागॉजी (प्रसंगार्थ संकलित एकलव्य और द्रोणाचार्य की संक्षिप्त कथा)

प्रस्तावना – 21वीं सदी में निरंतर परिष्कृत, सुलभ, सुविधाजनक, एवं समृद्ध हो रहे 'एआई' उपकरणों ने शिक्षा जगत की समग्र अवधारणा में, वैचारिक स्तर से लेकर व्यवहारिक स्तर तक व्यापक परिवर्तन लाने शुरू कर दिए हैं। परंपरागत शिक्षा प्रणाली में यह अवधारणा बहुतायत से प्रचलित है कि 'निर्धारित घंटों या दिनों के', प्रत्यक्ष अध्यापक–विद्यार्थी संपर्क में संपन्न शिक्षण–अधिगम प्रक्रिया के माध्यम से विद्यार्थी को पूर्व निर्धारित पाठ्यक्रम के आधार पर विषय संबंधी ज्ञान–विज्ञान में निपुणता प्राप्त करा देनाअथवा बालक काविकास बौद्धिक संपदा के रूप में कर देना ही, शिक्षा है।

जबकि आज की डिजिटल संचार–संप्रेषण प्रणाली ने शिक्षा की इस परंपरागत अवधारणा को परिवर्तित कर ब्लेंडेड लर्निंग ,हाइब्रिड लर्निंग जैसे संप्रत्ययों को समावेशित करते हुए, समग्र शैक्षिक दृष्टिकोण पर प्रभाव डाला है। इसके माध्यम से विद्यार्थी स्वेच्छा से स्वप्रेरित हो कर ,सक्रिय रूप से सीखने की प्रक्रिया में भाग लेकर , अपने अनुभव के आधार पर ज्ञान का निर्माण करते हुए, आत्मनिर्देशित अधिगम की ओर अग्रसर हो कर उसे जीवनोपयोगी बनाता है।अत: कह सकते हैं कि डिजिटल पेडागॉजी का उद्देश्य है –

- प्रथम– डिजिटल अध्यापन से संबंधित कौशल एवं दक्षताओं का विकास करना।
- द्वितीय– अधिगमकर्ता से सम्बन्धित कौशल एवं दक्षताओं के विकास को सुलभ बनाना।
- तृतीय– जीवन एवं जीविकोपार्जन से संबंधित कौशल एवं दक्षताओं के विकास हेतु मार्गप्रशस्त करना।

उपर्युक्त विवरण के आधार पर कह सकते हैं कि शिक्षा जगत में अब एक नए युग का सूत्रपात हो रहा है, जहाँ एक बार पुन:, हम श्री तुलसीदास जी द्वारा रचित श्री रामचरितमानस के बालकाण्ड मेंदोहा संख्या 203, चौपाई संख्या 2 में वर्णित –**'गुरगृहँ गए पढ़न रघुराई। अलप काल बिद्या सब आई ।।'** को आज के डिजिटल पेडागॉजी के माध्यम से कम समय में पर्याप्त शिक्षण–अधिगम का सफल सम्पादन कैसे हो , को 'स्मार्ट स्टडी' के रूप में परिभाषित होता पा सकेंगे।

डिजिटल पेडागॉजी की अवधारणा–डिजिटल पेडागॉजी की अवधारणा इस विचार पर आधारित है किएआई तकनीक केवल एक सहायक उपकरण नहीं, वरन् शिक्षण–अधिगम की संपूर्ण संरचना पद्धति और दर्शन को रूपांतरित करने की क्षमता से युक्त एक अन्त:अनुशासनात्मक विषय है।

यह विषय दो शब्दों से मिलकर बना है – डिजिटल और पेडागॉजी।
इस प्रकार डिजिटल पेडागॉजी का अर्थ है –**'डिजिटल तकनीकों और उपकरणों के माध्यम से अधिगमकर्ता का नेतृत्व करना या मार्ग प्रशस्त करना।'**

व्यापक अर्थ में – डिजिटल तकनीक के माध्यम से अधिगमकर्ता की प्रकृति, स्तर, अवस्था, आवश्यकता और उद्देश्यों के अनुरूप 21वीं सदी के वैश्विक और जीवन परिप्रेक्ष्य के संदर्भ में डिजिटल माध्यमों से कौशलों और दक्षताओं का विकास करना औरपारंपरिक शिक्षण अधिगम के वातावरण को डिजिटल वातावरण में रूपांतरित करना ही डिजिटल पेडागॉजी है।

हॉवेल–'डिजिटल तकनीक का उपयोग करके पढ़ने–पढ़ाने का अध्ययन ही डिजिटल पेडागॉजी है।'

डिजिटल पेडागॉजी : 21 वीं शताब्दी में कौशल एवं दक्षताएं –21वीं शताब्दी में तीव्र तकनीकी परिवर्तनों,वैश्वीकरण एवं अनुसंधान आधारित ज्ञान–विज्ञान द्वारा पुनर्स्थापित हो रही नवीन अवधारणाओं ने कौशल एवं दक्षताओं के बहुआयामी विकास को नवीन दिशा–धारा प्रदान की है। यह कौशल एवं दक्षताएं जहाँ अधिगमकर्ता को जटिल पारिस्तिथिकी तंत्र में प्रभावी निर्णय लेने,समस्या–समाधान करने और सतत सीखते रहने में कुशल एवं दक्ष बना सकती है ,वहीं ये कौशल एवं दक्षताएं, व्यक्ति को आर्थिक रूप से आत्मनिर्भर बनाकर सुख,शांति,स्वास्थ्य और प्रगति से युक्त जीवन जीने में सहायक बनाकर, राष्ट्र और विश्व में सद्भावना का प्रसार करा सकतीहैं।उपर्युक्त विवरण के आधार पर हम डिजिटल पेडागॉजी : 21वीं सदी में कौशल एवं दक्षताओं के विकास का वर्णन निम्नलिखित प्रकार से कर सकते हैं –

1. ऑनलाइन कक्षा प्रबंधन कौशल
2. कंप्यूटर व मोबाइल साक्षरता
3. डिजिटल कंटेंट निर्माण
4. डिजिटल संचार संप्रेषण कौशल
5. लर्निंग मैनेजमेंट सिस्टम का संचालन
6. ऑनलाइन टीमवर्क एवं सहयोग
7. वर्चुअल इंटरैक्शन की दक्षता
8. साइबर सुरक्षा एवं डेटा गोपनीयता की समझ
9. डिजिटल उपकरणों का प्रभावी उपयोग
10. छात्र–केंद्रित शिक्षण कौशल
11. नवाचारी शिक्षण से संबंधित कौशल
12. ब्लेंडेड एवं फ्लिप्ड लर्निंग की दक्षता
13. मूल्यांकन के डिजिटल तरीकों की समझ
14. व्यक्तिगत अधिगम से संबंधित कौशल
15. आलोचनात्मक सोच एवं समस्या–समाधान कौशल
16. रचनात्मकता एवं निर्णय–निर्माण के कौशल
1. 17. स्टार्टअप से सम्बंधित कौशल

एकलव्य और गुरु द्रोणाचार्य की संक्षिप्त कथा–निषादराज पुत्र एकलव्य धनुर्विद्या सीखने की स्वप्रेरित, उत्कृष्ट आकांक्षा से गुरु द्रोणाचार्य के पास जाकर, उनको गुरु रूप में वरण करने की, अपनी इच्छा व्यक्त करता है, परन्तु गुरु द्रोणाचार्य ने यह कहकर अस्वीकार कर दिया कि मैं केवल राजकुमारों को ही शिक्षित – दीक्षित करने का अधिकारी हूँ, वंचित वर्ग के बालकों को नहीं।

यह सुनकर एक पल के लिए तो एकलव्य निराश हुआ, परन्तु दूसरे ही पल उसने आशा से दृढ़ निश्चय किया कि शिक्षा तो मैं गुरु द्रोणाचार्य से ही लूँगा। ऐसा विचार कर, जंगल में गुरुदेव की मिट्टी से प्रतिमा निर्मित कर, उसे सौर उर्जा की तरंगों से प्राण–प्रतिष्ठित कर, उसी भांति जीवंत बना दिया, जैसे कि एआई से संचालित रोबोटिक मानव।

एकलव्य ने जीवंत प्रतिमा के परिचालन की तकनीक को स्वयं तक सीमित और गुप्त रखा, क्योंकि उसे भय था कि कोई और उस तकनीक का दुरुपयोग न कर सके।

इस प्रकार प्रयास एवं त्रुटि विधि के आधार पर निरंतर अभ्यास करते हुए, सर्वश्रेष्ठ धनुर्धर के रूप में कुशल एवं दक्ष होने के उपरांत गुरु आज्ञा से, गुरु दीक्षा में सहर्ष दाहिने हाथ का अंगूठा गुरुदेव को भेंट कर दिया।


कथा के सन्दर्भ में स्वनिर्मित परिकल्पनात्मक मान्यताएं – उपर्युक्त कथा के प्रस्तुतीकरण के सन्दर्भ में मेरी कुछ परिकल्पना आधारित मान्यताएं इस प्रकार हैं –

1. द्वापर युग में मिटटी से निर्मित गुरु द्रोणाचार्य की मूर्ति उसी प्रकार ही कार्यान्वित होती थी, जैसे कि आज के रोबोटिक मानव।
2. पर्यावरण को तकनीकी संसाधनों के प्रदूषण से मुक्त रखने के लिए ही प्रतिमा का निर्माण मिट्टी से ही किया गया।
3. जिस प्रकार, डिजिटल पेडागॉजी शिक्षार्थी केन्द्रित प्रक्रिया है, उसी प्रकार, सच्चे अर्थों में सीखना अधिगमकर्ता की इच्छा ,अभिप्रेरणा, रूचि तथा अभ्यास पर निर्भर है।
4. एकलव्य की सफलता का आधार उसका मूर्तिकला निर्माण (हार्ड वेयर), मूर्ति परिचालन(सॉफ्टवेयर) के समग्र ज्ञान से ही संभव था।
5. एकलव्य ने मूर्ति परिचालन की प्रक्रिया को गुप्त ही रखा, क्योंकि वह **'सुमति कुमति सबके उर रहहीं। नीति पुरान निगम अस कहहीं।।'**के रूप में मानव प्रकृति का ज्ञाता और सर्व जन हिताय नैतिकता और चरित्र के महत्व को समझने वाला था।

परिकल्पनात्मक आधार पर वर्णित कौशल एवं दक्षताएं –उपर्युक्त परिकल्पना के आधार पर स्पष्ट कर सकतें कि डिजिटल पेडागॉजी अधिगमकर्ता में बहुआयामी चिंतन शक्ति , कल्पना, सृजनात्मकता, नेतृत्व, उत्पादकता, आत्मनिर्देशन, सूचना सम्प्रेषण योग्यता, डिजिटल प्रोद्योगिकी का उपयोग और डिजिटल पेडागॉजी के निहितार्थ प्रयुक्त उपकरणों के कला कौशल का ज्ञान में कुशल एवं दक्ष बनाना है।

डिजिटल शिक्षण के प्रमुख उपकरण, तकनीकें एवं प्रमुख घटक –

1. डिजिटल शिक्षण के प्रमुख उपकरण –

1. कंप्यूटर/लैपटॉप
2. स्मार्टफोन/टैबलेट
3. स्मार्ट बोर्ड

4. प्रोजेक्टर
5. हेडफोन व माइक्रोफोन
6. वेब कैमरा

2. डिजिटल शिक्षण की प्रमुख तकनीकें –

1. ई–लर्निंग
2. ब्लेंडेड लर्निंग
3. ऑनलाइन वर्चुअल क्लास
4. क्लाउड कंप्यूटिंग
5. आर्टिफिशियल इंटेलिजेंस (एआई)
6. लर्निंग एनालिटिक्स
7. मल्टीमीडिया तकनीक

3. डिजिटल शिक्षण के प्रमुख घटक –

1. लर्निंग मैनेजमेंट सिस्टम (एलएमएस)
2. डिजिटल कंटेंट
3. इंटरनेट कनेक्टिविटी
4. शिक्षक (डिजिटल दक्ष)
5. शिक्षार्थी
6. मूल्यांकन प्रणाली
7. तकनीकी सहायता

4. सहायक डिजिटल प्लेटफॉर्म व संसाधन–

1. वीडियो कॉन्फ्रेंसिंग प्लेटफॉर्म
2. शैक्षिक मोबाइल ऐप्स
3. ओपन एजुकेशनल रिसोर्स (ओईआर)
4. डिजिटल लाइब्रेरी
5. ऑनलाइन क्विज व पोल टूल्स

डिजिटल शिक्षण में प्रयुक्त प्रमुख डिजिटल प्लेटफॉर्म्स –

1.	गूगल क्लासरूम	2.	माइक्रोसॉफ्ट टीम्स
3.	जूम	4.	दीक्षा
5.	स्वयम	6.	ई – पाठशाला
7.	यू ट्यूब	8.	मूडल
9.	अनएकैडमी		

डिजिटल पेडागॉजी से जुड़ी चुनौतियाँ – यद्यपि डिजिटल पेडागॉजी ने शिक्षा के क्षेत्र में अनेक संभावनाएँ प्रस्तुत की हैं, फिर भी इसके क्रियान्वयन में कई चुनौतियाँ सामने आती हैं। जैसे –

1. सभी वर्गों को समान रूप से तकनीकी संसाधन और इन्टरनेट सुविधा उपलब्ध न हो पाना।
2. चुनौतियों को समझे बिना डिजिटल पेडागॉजी का प्रभावी और समावेशी क्रियान्वयन संभव नहीं।
3. शिक्षकों की पर्याप्त डिजिटल दक्षता की कमी भी एक गंभीर चुनौती है।
4. डिजिटल शिक्षण में पाठ्यवस्तु की गुणवत्ता और प्रासंगिकता भी एक महत्वपूर्ण समस्या है।
5. सॉफ्टवेयर की त्रुटियाँ,प्लेटफॉर्म्स की अस्थिरता,तकनीकी सहायता की कमी और उपकरणों की ख़राबी शिक्षा प्रक्रिया को बाधित करती है।
6. डिजिटल शिक्षण के दौरान साइबर सुरक्षा, डेटा गोपनीयता और नैतिकता से जुड़े मुद्दे भी उभरकर सामने आते हैं।

डिजिटल पेडागॉजी हेतु समाधान एवं सुझाव – डिजिटल पेडागॉजी को प्रभावी ढंग से लागू करने के लिए सुनियोजित प्रयासों की आवश्यकता है। सर्वप्रथम डिजिटल विभाजन को कम करने हेतु सभी शिक्षण संस्थानों में आधारभूत तकनीकी सुविधाएँ और विश्वसनीय इंटरनेट उपलब्ध कराया जाना चाहिए। ग्रामीण और वंचित क्षेत्रों के विद्यार्थियों के लिए विशेष डिजिटल सहायता योजनाएँ लागू की जानी चाहिए।

शिक्षकों के लिए नियमित डिजिटल प्रशिक्षण और क्षमता–विकास कार्यक्रम अनिवार्य किए जाने चाहिए, ताकि वे आधुनिक शिक्षण उपकरणों का कुशल उपयोग कर सकें। पाठ्यक्रमों में डिजिटल कौशल और नैतिक डिजिटल व्यवहार को शामिल करना भी आवश्यक है।

निष्कर्ष – 21वीं शताब्दी की शिक्षा व्यवस्था में डिजिटल शिक्षण विधि (डिजिटल पेडागॉजी) एक अनिवार्य आवश्यकता के रूप में उभरकर सामने आई है। यह पद्धति न केवल शिक्षण–अधिगम प्रक्रिया को आधुनिक बनाती है, बल्कि विद्यार्थियों में आवश्यक कौशल और दक्षताओं के विकास में भी महत्वपूर्ण योगदान देती है। डिजिटल पेडागॉजी के माध्यम से आलोचनात्मक चिंतन, रचनात्मकता, समस्या–समाधान, सहयोग और डिजिटल साक्षरता जैसे कौशलों को प्रभावी रूप से विकसित किया जा सकता है।

डिजिटल पेडागॉजी और एआई के दिनोदिन परिष्कृत रूप को दर्शाते उपकरणों से स्पष्ट आभास हो रहा है कि त्रेता और द्वापर युग के ग्रंथों में मन्त्रों की चमत्कारिक शक्ति कोई अतिश्योक्ति नहीं, वरन् उत्कृष्ट वैज्ञानिक उपकरणों की परिचालन की कोडिंग – डिकोडिंग भाषा है ,जो मन्त्रों के रूप में प्रकाशित हुई है।

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डिजिटल शिक्षा और नैतिकता : मूल्यपरक शिक्षण एवं पर्यावरणीय चेतना की भूमिका (ग्वालियर क्षेत्र के विशेष संदर्भ में एक सांख्यिकीय अध्ययन)

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शोध सारांश – वर्तमान युग डिजिटल युग है, जहाँ शिक्षा प्रणाली में सूचना एवं संचार प्रौद्योगिकी की भूमिका निरंतर बढ़ती जा रही है। डिजिटल शिक्षा ने जहाँ शिक्षण–अधिगम को सरल, सुलभ और व्यापक बनाया है, वहीं इसके साथ नैतिक मूल्यों के क्षरण तथा पर्यावरणीय असंतुलन की चिंताएँ भी उभरकर सामने आई हैं। इस शोध का उद्देश्य डिजिटल शिक्षा के नैतिक प्रभावों, मूल्यपरक शिक्षण की प्रासंगिकता तथा पर्यावरणीय चेतना के विकास में डिजिटल माध्यमों की भूमिका का अध्ययन करना है। यह अध्ययन ग्वालियर क्षेत्र के माध्यमिक विद्यालयों के शिक्षकों एवं विद्यार्थियों पर आधारित है। सर्वेक्षण विधि द्वारा एकत्रित आँकड़ों का सांख्यिकीय विश्लेषण कर यह निष्कर्ष निकाला गया कि डिजिटल शिक्षा यदि मूल्यपरक एवं नैतिक दृष्टिकोण के साथ लागू की जाए तो यह न केवल शैक्षिक गुणवत्ता बढ़ाती है बल्कि विद्यार्थियों में पर्यावरण संरक्षण एवं सामाजिक उत्तरदायित्व की भावना भी विकसित करती है।

शब्द कुंजी –डिजिटल, प्रासंगिक, नैतिक मूल्य, शैक्षिक गुणवत्ता।

प्रस्तावना – इक्कीसवीं सदी में तकनीकी प्रगति ने मानव जीवन के सभी क्षेत्रों को प्रभावित किया है और शिक्षा इस परिवर्तन का केंद्र बिंदु बन चुकी है। डिजिटल शिक्षा ने पारंपरिक कक्षा–केंद्रित शिक्षण प्रणाली को एक लचीली, संवादात्मक और वैश्विक स्वरूप प्रदान किया है। आज ई–लर्निंग प्लेटफॉर्म, स्मार्ट कक्षाएँ, डिजिटल बोर्ड, ऑनलाइन मूल्यांकन प्रणाली और शैक्षिक ऐप्स शिक्षा का अभिन्न अंग बन चुके हैं।

हालाँकि डिजिटल शिक्षा ने ज्ञान की पहुँच को लोकतांत्रिक बनाया है, किंतु इसके साथ अनेक नैतिक प्रश्न भी उत्पन्न हुए हैं। जैसे–तकनीक पर अत्यधिक निर्भरता, विद्यार्थियों में अनुशासन की कमी, डिजिटल असमानता, डेटा गोपनीयता और नैतिक मूल्यों का क्षरण। यदि शिक्षा केवल तकनीकी दक्षता तक सीमित रह जाए और उसमें नैतिक एवं मानवीय मूल्यों का समावेश न हो, तो यह समाज के लिए दीर्घकालिक रूप से हानिकारक सिद्ध हो सकती है।

मूल्यपरक शिक्षा का उद्देश्य केवल बौद्धिक विकास नहीं, बल्कि चरित्र निर्माण, नैतिक चेतना और सामाजिक उत्तरदायित्व का विकास करना है। डिजिटल शिक्षा के माध्यम से मूल्यपरक शिक्षण को प्रभावी ढंग से प्रस्तुत किया जा सकता है, बशर्ते उसका उपयोग विवेकपूर्ण ढंग से किया जाए।

पर्यावरणीय चेतना आज की सबसे बड़ी आवश्यकता है। जलवायु परिवर्तन, प्रदूषण, प्राकृतिक संसाधनों का अंधाधुंध दोहन और जैव विविधता का ह्रास मानव अस्तित्व के लिए गंभीर संकट उत्पन्न कर रहा है। शिक्षा ही वह माध्यम है जो विद्यार्थियों में पर्यावरण संरक्षण की भावना जागृत कर सकती है। डिजिटल शिक्षा इस दिशा में एक सशक्त उपकरण बन सकती है क्योंकि यह कागज की बचत, संसाधनों के संतुलित उपयोग और पर्यावरणीय विषयों की प्रभावी प्रस्तुति को संभव बनाती है।

इस प्रकार डिजिटल शिक्षा, नैतिकता, मूल्यपरक शिक्षण और पर्यावरणीय चेतना एक–दूसरे से गहराई से जुड़े हुए हैं। वर्तमान शोध इन्हीं आयामों का समग्र एवं सांख्यिकीय अध्ययन प्रस्तुत करता है।

डिजिटल शिक्षा–डिजिटल शिक्षा वह शिक्षण व्यवस्था है जिसमें शिक्षण–अधिगम की प्रक्रिया सूचना एवं संचार प्रौद्योगिकी के माध्यम से संचालित होती है। इसमें कंप्यूटर, इंटरनेट, स्मार्टफोन, टैबलेट, डिजिटल बोर्ड, ऑनलाइन प्लेटफॉर्म और मल्टीमीडिया संसाधनों का उपयोग किया जाता है। डिजिटल शिक्षा का मुख्य उद्देश्य शिक्षा को सुलभ, लचीला और व्यापक बनाना है।

डिजिटल शिक्षा ने शिक्षण प्रक्रिया को विद्यार्थी–केंद्रित बनाया है। विद्यार्थी अपनी गति से अध्ययन कर सकते हैं, पुनरावृत्ति कर सकते हैं और वैश्विक संसाधनों से लाभ उठा सकते हैं। हालाँकि इसके साथ यह आवश्यक हो जाता है कि डिजिटल शिक्षा का उपयोग विवेकपूर्ण और नैतिक दृष्टिकोण से किया जाए।

परिभाषा : डिजिटल शिक्षा वह प्रक्रिया है जिसमें आधुनिक तकनीकी साधानों के माध्यम से ज्ञान का संप्रेषण एवं अधिगम किया जाता है।

नैतिकता–नैतिकता मानव व्यवहार से संबंधित उन सिद्धांतों का समूह है जो सही और गलत के बीच भेद करना सिखाते हैं। शिक्षा का उद्देश्य केवल ज्ञान प्रदान करना नहीं, बल्कि नैतिक नागरिक का निर्माण करना भी है। डिजिटल शिक्षा के संदर्भ में नैतिकता का महत्व और अधिक बढ़ जाता है, क्योंकि तकनीक का दुरुपयोग भी संभव है।

डिजिटल नैतिकता में ईमानदारी, जिम्मेदारी, आत्म–नियंत्रण, डिजिटल शिष्टाचार और गोपनीयता का सम्मान शामिल है। यदि विद्यार्थी डिजिटल माध्यमों का उपयोग नैतिक मूल्यों के साथ करें, तो वे समाज के लिए

सकारात्मक योगदान दे सकते हैं।

परिभाषा : नैतिकता वे मानदंड हैं जो मानव आचरण को उचित दिशा प्रदान करते हैं।

मूल्यपरक शिक्षण–मूल्यपरक शिक्षण वह शिक्षण प्रक्रिया है जिसके माध्यम से विद्यार्थियों में नैतिक, सामाजिक, सांस्कृतिक और मानवीय मूल्यों का विकास किया जाता है। यह शिक्षा को जीवनोपयोगी बनाती है और विद्यार्थियों में चरित्र निर्माण की भावना जागृत करती है।

डिजिटल शिक्षा के माध्यम से मूल्यपरक शिक्षण को प्रभावी ढंग से प्रस्तुत किया जा सकता है, जैसे–ऑनलाइन नैतिक कथाएँ, वीडियो, केस स्टडी और संवादात्मक गतिविधियाँ।

परिभाषा : मूल्यपरक शिक्षण वह शिक्षा है जो व्यक्ति के चरित्र और नैतिक चेतना का विकास करती है।

पर्यावरणीय चेतना–पर्यावरणीय चेतना का अर्थ है पर्यावरण के प्रति जागरूकता और संरक्षण की भावना। शिक्षा का उद्देश्य विद्यार्थियों में पर्यावरण के प्रति संवेदनशीलता विकसित करना है। डिजिटल शिक्षा पर्यावरणीय चेतना के विकास में सहायक सिद्ध हो सकती है क्योंकि इससे कागज की बचत होती है और पर्यावरणीय विषयों की प्रभावी प्रस्तुति संभव होती है।

परिभाषा :पर्यावरणीय चेतना वह समझ है जो व्यक्ति को पर्यावरण संरक्षण के लिए प्रेरित करती है।

प्रस्तुत शोध एक वर्णनात्मक सर्वेक्षण आधारित अध्ययन है, जिसका उद्देश्य डिजिटल शिक्षा के संदर्भ में नैतिकता, मूल्यपरक शिक्षण एवं पर्यावरणीय चेतना की भूमिका का विश्लेषण करना है। इस शोध में सर्वेक्षण विधि का प्रयोग किया गया, क्योंकि यह विधि शिक्षकों एवं विद्यार्थियों के दृष्टिकोण, अनुभव एवं विचारों को व्यवस्थित रूप से जानने के लिए सर्वाधिक उपयुक्त मानी जाती है।

शोध क्षेत्र–यह अध्ययन मध्य प्रदेश के ग्वालियर क्षेत्र के चयनित माध्यमिक विद्यालयों में संपन्न किया गया। ग्वालियर क्षेत्र का चयन इसलिए किया गया क्योंकि यहाँ शासकीय एवं अशासकीय दोनों प्रकार के विद्यालय उपलब्ध हैं, जहाँ डिजिटल शिक्षण संसाधनों का प्रयोग विभिन्न स्तरों पर किया जा रहा है। इससे अध्ययन के लिए संतुलित एवं प्रतिनिधिक नमूना प्राप्त हो सका।

न्यादर्श –शोध के लिए यादृच्छिक नमूना विधि का प्रयोग करते हुए कुल 100 उत्तरदाताओं का चयन किया गया। इनमें

- 40 माध्यमिक स्तर के शिक्षक तथा
- 60 माध्यमिक स्तर के विद्यार्थी

शामिल थे। चयन में यह ध्यान रखा गया कि सभी प्रतिभागी डिजिटल शिक्षण परिवेश से किसी न किसी रूप में जुड़े हों।

शोध उपकरण –इस अध्ययन में स्वनिर्मित प्रश्नावली को शोध उपकरण के रूप में प्रयोग किया गया। प्रश्नावली को दो भागों में विभाजित किया गया –

1. शिक्षकों के लिए प्रश्नावली

1. कुल 25 प्रश्न
2. जिनमें डिजिटल शिक्षा, नैतिक मूल्यों, मूल्यपरक शिक्षण तथा पर्यावरणीय चेतना से संबंधित कथन शामिल थे।
3. प्रश्न पाँच–बिंदु लाइकर्ट स्केल (पूर्णत: सहमत से पूर्णत: असहमत) पर आधारित थे।

2. विद्यार्थियों के लिए प्रश्नावली

- कुल 30 प्रश्न
- जिनमें डिजिटल माध्यमों के उपयोग, नैतिक व्यवहार, मूल्यबोध एवं पर्यावरणीय जागरूकता से संबंधित प्रश्न सम्मिलित थे।
- प्रश्न सरल, स्पष्ट एवं आयु–उपयुक्त भाषा में तैयार किए गए।

प्रश्नावली की वैधता एवं विश्वसनीयता सुनिश्चित करने हेतु विषय विशेषज्ञों से परामर्श लिया गया तथा पायलट अध्ययन के पश्चात आवश्यक संशोधान किए गए।

आँकड़ों का संकलन एवं विश्लेषण–प्रश्नावलियों के माध्यम से प्राप्त आँकड़ों का माध्य, मानक विचलन एवं t-test द्वारा विश्लेषण किया गया। सांख्यिकीय विश्लेषण के माध्यम से परिकल्पनाओं की जाँच की गई और निष्कर्ष निकाले गए।

इस प्रकार, यह शोध विधि एवं क्षेत्र अध्ययन को वैज्ञानिक, विश्वसनीय एवं उद्देश्यपरक बनाते हैं।

शोध के उद्देश्य –इस शोध के प्रमुख एवं विस्तृत उद्देश्य निम्नलिखित हैं–

1. डिजिटल शिक्षा के माध्यम से विद्यार्थियों में नैतिक मूल्यों के विकास की स्थिति का अध्ययन करना।
2. यह विश्लेषण करना कि डिजिटल शिक्षण प्रक्रिया मूल्यपरक शिक्षा को किस सीमा तक सुदृढ़ बनाती है।
3. डिजिटल माध्यमों के प्रयोग से विद्यार्थियों में पर्यावरणीय चेतना के स्तर का आकलन करना।
4. ग्वालियर क्षेत्र के शिक्षकों एवं विद्यार्थियों के दृष्टिकोण में डिजिटल नैतिकता संबंधी अंतर का अध्ययन करना।
5. डिजिटल शिक्षा के सकारात्मक एवं नकारात्मक नैतिक प्रभावों की पहचान करना।
6. यह अध्ययन करना कि डिजिटल शिक्षण संसाधन पर्यावरण संरक्षण के प्रति विद्यार्थियों की सोच को कैसे प्रभावित करते हैं।
7. डिजिटल शिक्षा को अधिक नैतिक, मूल्यपरक एवं पर्यावरण–संवेदनशील बनाने हेतु सुझाव प्रस्तुत करना।

परिकल्पनाएँ :

H_1 : डिजिटल शिक्षा और नैतिक मूल्यों के विकास में कोई सार्थक अंतर नहीं है।

H_2 : डिजिटल शिक्षा का मूल्यपरक शिक्षण पर कोई महत्वपूर्ण प्रभाव नहीं पड़ता।

H_3 : डिजिटल शिक्षा से विद्यार्थियों की पर्यावरणीय चेतना के स्तर में कोई उल्लेखनीय परिवर्तन नहीं होता।

H_4 : ग्वालियर क्षेत्र के शिक्षक एवं विद्यार्थियों के नैतिक दृष्टिकोण में कोई महत्वपूर्ण अंतर नहीं है।

सांख्यिकीय विश्लेषण –

तालिका : 1– डिजिटल शिक्षा एवं नैतिक मूल्य

समूह	N	माध्य	मानक विचलन
शिक्षक	40	80.1	6.1
विद्यार्थी	60	72.4	7.2

व्याख्या : तालिका से स्पष्ट होता है कि शिक्षकों का माध्य स्कोर विद्यार्थियों की तुलना में अधिक है। यह दर्शाता है कि शिक्षक डिजिटल शिक्षा को अधिक नैतिक दृष्टिकोण से देखते हैं। मानक विचलन में अंतर दृष्टिकोण की विविधता

को इंगित करता है। अत: H_1 परिकल्पना अस्वीकृत होती है।

तालिका : 2. डिजिटल शिक्षा एवं मूल्यपरक शिक्षण

समूह	N	माध्य	मानक विचलन
शिक्षक	40	78.6	5.8
विद्यार्थी	60	70.9	6.9

व्याख्या : तालिका से ज्ञात होता है कि शिक्षकों में मूल्यपरक शिक्षण के प्रति अधिक सकारात्मक दृष्टिकोण है। डिजिटल माध्यमों को शिक्षक नैतिक शिक्षा के लिए प्रभावी मानते हैं। विद्यार्थियों में अपेक्षाकृत कम माध्य स्कोर जागरूकता की कमी दर्शाता है। इससे H_2 परिकल्पना अस्वीकार होती है।

तालिका : 3- पर्यावरणीय चेतना पर डिजिटल शिक्षा का प्रभाव (t-test)

समूह	माध्य	टी-मूल्य	सार्थकता स्तर
शिक्षक	76.3	2.71	0.05
विद्यार्थी	69.5		

व्याख्या : प्राप्त t-मूल्य 0.05 स्तर पर सार्थक पाया गया है। इससे यह स्पष्ट होता है कि डिजिटल शिक्षा पर्यावरणीय चेतना को प्रभावित करती है। शिक्षकों में पर्यावरणीय दृष्टिकोण अधिक विकसित पाया गया। अत: H_3 परिकल्पना अस्वीकृत होती है।

तालिका : 4 - शिक्षक एवं विद्यार्थी दृष्टिकोण में अंतर

समूह	माध्य अंतर	टी-मूल्य
शिक्षक-विद्यार्थी	7.2	2.58

व्याख्या : माध्य अंतर यह दर्शाता है कि दोनों समूहों के दृष्टिकोण में स्पष्ट अंतर है। शिक्षकों का दृष्टिकोण अधिक परिपक्व एवं नैतिक पाया गया। विद्यार्थियों में डिजिटल नैतिकता की समझ अपेक्षाकृत कम है। अत: H_4 परिकल्पना भी अस्वीकृत होती है।

निष्कर्ष -प्रस्तुत शोध से यह स्पष्ट निष्कर्ष निकलता है कि डिजिटल शिक्षा आधुनिक शिक्षा प्रणाली का एक अनिवार्य एवं प्रभावशाली अंग बन चुकी है। डिजिटल माध्यमों ने शिक्षा को सुलभ, लचीला एवं व्यापक अवश्य बनाया है, किंतु इसके साथ नैतिक मूल्यों, मूल्यपरक शिक्षण तथा पर्यावरणीय चेतना का समावेश अत्यंत आवश्यक है। अध्ययन से यह तथ्य सामने आया कि ग्वालियर क्षेत्र के शिक्षक डिजिटल शिक्षा को नैतिक एवं मूल्यपरक दृष्टिकोण से अधिक गंभीरता से देखते हैं, जबकि विद्यार्थियों में इस विषय में जागरूकता अपेक्षाकृत कम पाई गई।

शोध निष्कर्ष यह भी दर्शाते हैं कि डिजिटल शिक्षा का मूल्यपरक शिक्षण एवं पर्यावरणीय चेतना पर सकारात्मक प्रभाव पड़ता है, बशर्ते उसका उपयोग संतुलित एवं उद्देश्यपूर्ण ढंग से किया जाए। तकनीक का अंधाधुंध प्रयोग नैतिक पतन और सामाजिक संवेदनहीनता को जन्म दे सकता है, जबकि विवेकपूर्ण उपयोग विद्यार्थियों में जिम्मेदारी, अनुशासन एवं पर्यावरण संरक्षण की भावना विकसित कर सकता है।

अत: यह कहा जा सकता है कि डिजिटल शिक्षा तभी सार्थक सिद्ध होगी जब वह नैतिक मूल्यों, मानवीय संवेदनाओं और पर्यावरणीय उत्तरदायित्व के साथ समन्वित हो। शिक्षा का अंतिम उद्देश्य केवल तकनीकी दक्षता नहीं, बल्कि एक जागरूक, नैतिक एवं पर्यावरण-संवेदनशील नागरिक का निर्माण होना चाहिए।

सुझाव:

1. डिजिटल पाठ्यक्रम में नैतिकता एवं मूल्यपरक शिक्षा से संबंधित विषय अनिवार्य किए जाएँ।
2. पर्यावरण संरक्षण से जुड़े डिजिटल प्रोजेक्ट एवं गतिविधियाँ विद्यार्थियों को दी जाएँ।
3. शिक्षकों के लिए डिजिटल नैतिकता एवं पर्यावरणीय शिक्षा पर नियमित प्रशिक्षण कार्यक्रम आयोजित किए जाएँ।
4. विद्यालयों में डिजिटल संसाधनों के संतुलित उपयोग हेतु स्पष्ट दिशा-निर्देश बनाए जाएँ।
5. विद्यार्थियों में डिजिटल अनुशासन, जिम्मेदारी और आत्म-नियंत्रण विकसित करने पर विशेष ध्यान दिया जाए।
6. डिजिटल शिक्षा को सतत विकास एवं पर्यावरण संरक्षण के लक्ष्यों से जोड़ा जाए।

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डिजिटल शिक्षण परिवेश में नवीन शिक्षण तकनीकों की भूमिका : एक सांख्यिकीय अध्ययन

डॉ. निरुपमा दुबे *

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शोध सारांश – प्रस्तुत शोध-पत्र डिजिटल शिक्षण परिवेश में नवीन शिक्षण तकनीकों की भूमिका का गहन एवं सांख्यिकीय अध्ययन प्रस्तुत करता है। सूचना एवं संचार प्रौद्योगिकी के तीव्र विकास ने शिक्षा प्रणाली के स्वरूप, शिक्षण विधियों तथा अधिगम की प्रक्रिया में मौलिक परिवर्तन किया है। इस अध्ययन का उद्देश्य यह ज्ञात करना है कि नवीन शिक्षण तकनीकें विद्यार्थियों की शैक्षिक उपलब्धि, रुचि एवं सहभागिता को किस सीमा तक प्रभावित करती हैं। शोध के लिए ग्वालियर (मध्य प्रदेश) क्षेत्र के शिक्षकों एवं विद्यार्थियों को न्यादर्श के रूप में चुना गया। मात्रात्मक शोध-विधि अपनाते हुए ज-जमेज एवं सहसंबंध विश्लेषण का प्रयोग किया गया। प्राप्त परिणामों से यह स्पष्ट हुआ कि डिजिटल शिक्षण तकनीकों का शैक्षिक उपलब्धि एवं रुचि पर सकारात्मक एवं सार्थक प्रभाव पड़ता है। निष्कर्षत: यह अध्ययन डिजिटल शिक्षण को आधुनिक शिक्षा व्यवस्था का अनिवार्य घटक सिद्ध करता है।
शब्द कुंजी – डिजिटल शिक्षण, सूचना एवं संचार प्रौद्योगिकी।

प्रस्तावना – शिक्षा सदैव से किसी भी समाज के बौद्धिक, सामाजिक, सांस्कृतिक तथा नैतिक विकास का मूल आधार रही है। किसी राष्ट्र की प्रगति, उसकी सामाजिक संरचना तथा मानवीय मूल्यों की स्थापना प्रत्यक्ष रूप से उसकी शिक्षा व्यवस्था पर निर्भर करती है। भारतीय संदर्भ में शिक्षा को केवल सूचना अथवा ज्ञान के संप्रेषण तक सीमित नहीं माना गया है, बल्कि इसे व्यक्ति के सर्वांगीण विकास का सशक्त माध्यम स्वीकार किया गया है। भारतीय शिक्षा दर्शन में शिक्षा का उद्देश्य व्यक्ति के शारीरिक, मानसिक, बौद्धिक, नैतिक एवं आध्यात्मिक पक्षों का संतुलित विकास करना रहा है। इसी कारण शिक्षा को जीवनोपयोगी, मूल्यपरक एवं समाजोपयोगी बनाने पर विशेष बल दिया गया है।

प्राचीन भारतीय शिक्षा व्यवस्था गुरु-शिष्य परंपरा पर आधारित थी, जिसमें शिक्षण-अधिगम की प्रक्रिया अत्यंत सजीव, संवादात्मक एवं अनुभवात्मक होती थी। गुरुकुल व्यवस्था में शिक्षक न केवल विषयवस्तु का ज्ञाता होता था, बल्कि वह शिष्य के चरित्र निर्माण, नैतिक विकास एवं जीवन मूल्यों के संवाहक की भूमिका भी निभाता था। उस समय शिक्षा का केंद्र शिक्षक था और ज्ञान का स्रोत भी वही माना जाता था। शिक्षण की यह प्रक्रिया सीमित संसाधनों के बावजूद प्रभावशाली थी, क्योंकि इसमें व्यक्तिगत संपर्क, अनुशासन एवं आचरण पर विशेष ध्यान दिया जाता था।

कालांतर में सामाजिक संरचना, जनसंख्या वृद्धि, औद्योगीकरण एवं वैश्वीकरण के प्रभाव से शिक्षा व्यवस्था में व्यापक परिवर्तन हुए। औपचारिक विद्यालय प्रणाली, विश्वविद्यालय, पाठ्यक्रम आधारित शिक्षा तथा परीक्षा-केंद्रित ढाँचे का विकास हुआ। इस परिवर्तन के साथ-साथ शिक्षा अधिक संस्थागत एवं संरचित होती गई। किंतु बीसवीं शताब्दी के उत्तरार्द्ध में विज्ञान एवं प्रौद्योगिकी के तीव्र विकास ने शिक्षा के स्वरूप को एक नई दिशा प्रदान की। विशेष रूप से सूचना एवं संचार प्रौद्योगिकी (ICT) के आगमन ने शिक्षण-अधिगम प्रक्रिया को अधिक गतिशील, लचीला एवं बहुआयामी बना दिया।

इक्कीसवीं शताब्दी को प्राय: 'डिजिटल युग' कहा जाता है। इस युग में कंप्यूटर, इंटरनेट, स्मार्टफोन, टैबलेट एवं विभिन्न डिजिटल उपकरणों ने मानव जीवन के प्रत्येक क्षेत्र को प्रभावित किया है और शिक्षा भी इससे अछूती नहीं रही है। डिजिटल शिक्षण परिवेश के उद्भव ने शिक्षा को समय एवं स्थान की सीमाओं से मुक्त कर दिया है। अब शिक्षा केवल कक्षा की चार दीवारों तक सीमित नहीं रही, बल्कि यह ऑनलाइन प्लेटफॉर्म, ई-लर्निंग पोर्टल, डिजिटल पुस्तकालय, शैक्षिक ऐप्स, वीडियो लेक्चर, वेबिनार एवं वर्चुअल कक्षाओं के माध्यम से कहीं भी और कभी भी उपलब्ध हो गई है।

डिजिटल शिक्षण ने शिक्षण-अधिगम की प्रक्रिया को अधिक सुलभ एवं समावेशी बनाया है। ग्रामीण एवं दूरस्थ क्षेत्रों के विद्यार्थी भी अब गुणवत्तापूर्ण शैक्षिक सामग्री तक पहुँच बना पा रहे हैं। ऑनलाइन पाठ्यक्रमों, ओपन एजुकेशनल रिसोर्सेज (OER) तथा Massive Open Online Courses (MOOCs) के माध्यम से विद्यार्थी अपनी रुचि एवं आवश्यकता के अनुसार सीखने में सक्षम हुए हैं। इस प्रकार डिजिटल शिक्षण ने 'सीखने के अवसरों के लोकतंत्रीकरण' को बढ़ावा दिया है।

विशेष रूप से कोविड-19 महामारी के पश्चात डिजिटल शिक्षण की आवश्यकता एवं उपयोगिता अत्यंत स्पष्ट रूप से सामने आई। महामारी के कारण जब विद्यालय, महाविद्यालय एवं विश्वविद्यालय लंबे समय तक बंद रहे, तब डिजिटल माध्यम ही शिक्षा की निरंतरता बनाए रखने का एकमात्र साधन सिद्ध हुआ। ऑनलाइन कक्षाओं, वीडियो कॉन्फ्रेंसिंग टूल्स, लर्निंग मैनेजमेंट सिस्टम (LMS) एवं डिजिटल असाइनमेंट के माध्यम से शिक्षण कार्य संचालित किया गया। इस अवधि में यह अनुभव किया गया कि डिजिटल शिक्षण के बिना शैक्षिक प्रक्रिया को आगे बढ़ाना लगभग असंभव हो जाता।

डिजिटल शिक्षण परिवेश के साथ-साथ नवीन शिक्षण तकनीकों का विकास भी हुआ है। ये तकनीकें शिक्षण को केवल सूचना-केंद्रित न रखकर

कौशल-केंद्रित एवं विद्यार्थी-केंद्रित बनाती हैं। स्मार्ट कक्षा, मल्टीमीडिया प्रस्तुतीकरण, ऑडियो-विजुअल सामग्री, एनिमेशन, सिमुलेशन, वर्चुअल लैब, गेम-आधारित अधिगम तथा इंटरएक्टिव टूल्स विद्यार्थियों की रुचि, जिज्ञासा एवं सक्रिय सहभागिता को बढ़ाते हैं। ऐसी तकनीकें विद्यार्थियों को केवल निष्क्रिय श्रोता न बनाकर सक्रिय सहभागी के रूप में स्थापित करती हैं।

नवीन शिक्षण तकनीकों के प्रयोग से आत्म-अधिगम (Self-learning), सहयोगात्मक अधिगम (Collaborative learning) एवं अनुभवात्मक अधिगम (Experiential learning) को प्रोत्साहन मिलता है। विद्यार्थी अपनी गति एवं क्षमता के अनुसार सीख सकते हैं, पुनरावृत्ति कर सकते हैं तथा अपनी शंकाओं का समाधान विभिन्न डिजिटल संसाधनों के माध्यम से कर सकते हैं। इससे उनकी आत्मनिर्भरता, समस्या-समाधान क्षमता एवं आलोचनात्मक चिंतन कौशल का विकास होता है।

इस परिवर्तित शिक्षण परिवेश में शिक्षक की भूमिका में भी महत्वपूर्ण बदलाव आया है। अब शिक्षक केवल ज्ञानदाता नहीं रहा, बल्कि वह एक मार्गदर्शक, सहायक एवं सुविधा प्रदाता (Facilitator) के रूप में कार्य कर रहा है। शिक्षक विद्यार्थियों को सीखने के अवसर प्रदान करता है, उन्हें उचित दिशा देता है तथा उनकी व्यक्तिगत आवश्यकताओं के अनुसार मार्गदर्शन करता है। इस प्रकार शिक्षण-अधिगम की प्रक्रिया अधिक संवादात्मक, लचीली एवं प्रभावी बनती जा रही है।

हालाँकि डिजिटल शिक्षण एवं नवीन शिक्षण तकनीकों के अनेक लाभ हैं, फिर भी इनके कुछ व्यावहारिक एवं सामाजिक पक्षों पर ध्यान देना आवश्यक है। डिजिटल विभाजन (Digital Divide), तकनीकी संसाधनों की कमी, इंटरनेट कनेक्टिविटी की समस्या, शिक्षकों एवं विद्यार्थियों की डिजिटल दक्षता तथा अत्यधिक स्क्रीन-समय जैसी चुनौतियाँ इसके प्रभावी क्रियान्वयन में बाधक बनती हैं। इसके अतिरिक्त यह भी आवश्यक है कि यह जाँचा जाए कि क्या डिजिटल शिक्षण वास्तव में सभी विद्यार्थियों के लिए समान रूप से लाभकारी है या नहीं।

इसी संदर्भ में डिजिटल शिक्षण की वास्तविक प्रभावशीलता का वैज्ञानिक एवं सांख्यिकीय मूल्यांकन अत्यंत आवश्यक हो जाता है। केवल तकनीक का प्रयोग कर लेना ही पर्याप्त नहीं है, बल्कि यह जानना भी आवश्यक है कि नवीन शिक्षण तकनीकें विद्यार्थियों की शैक्षिक उपलब्धि, सीखने की रुचि, अभिप्रेरणा एवं अधिगम स्तर को किस सीमा तक प्रभावित करती हैं। इसके लिए तथ्यात्मक आँकड़ों, सांख्यिकीय विश्लेषण एवं शोध-आधारित निष्कर्षों की आवश्यकता होती है।

इन सभी तथ्यों को ध्यान में रखते हुए प्रस्तुत शोध-पत्र में ग्वालियर क्षेत्र को अध्ययन-स्थल के रूप में चयनित किया गया है। इस शोध का उद्देश्य डिजिटल शिक्षण परिवेश में नवीन शिक्षण तकनीकों की भूमिका का सांख्यिकीय अध्ययन करना है, ताकि यह स्पष्ट किया जा सके कि इन तकनीकों का विद्यार्थियों की शैक्षिक उपलब्धि एवं सीखने की रुचि पर क्या प्रभाव पड़ता है। यह अध्ययन न केवल शैक्षिक योजनाकारों, शिक्षकों एवं नीति-निर्माताओं के लिए उपयोगी सिद्ध होगा, बल्कि डिजिटल शिक्षण के भविष्य को अधिक प्रभावी एवं समावेशी बनाने की दिशा में भी सार्थक योगदान प्रदान करेगा।

डिजिटल शिक्षण परिवेश- डिजिटल शिक्षण परिवेश वह आधुनिक शैक्षिक वातावरण है जिसमें सूचना एवं संचार प्रौद्योगिकी (ICT) की सहायता से शिक्षण-अधिगम की प्रक्रिया संचालित होती है। इस परिवेश में कंप्यूटर, इंटरनेट, स्मार्ट डिवाइस, शैक्षिक सॉफ्टवेयर तथा ऑनलाइन प्लेटफॉर्म का समन्वित उपयोग किया जाता है। शर्मा (2018) के अनुसार डिजिटल शिक्षण परिवेश ऐसी व्यवस्था है जिसमें तकनीकी संसाधनों के माध्यम से ज्ञान का संप्रेषण, अधिगम एवं मूल्यांकन संभव होता है। इसमें ऑनलाइन कक्षाएँ, ई-सामग्री, डिजिटल असाइनमेंट, वीडियो कॉन्फ्रेंसिंग तथा वर्चुअल संवाद जैसे घटक सम्मिलित होते हैं।

डिजिटल शिक्षण परिवेश की प्रमुख विशेषता यह है कि यह शिक्षार्थी को समय एवं स्थान की सीमाओं से मुक्त करता है। विद्यार्थी अपनी सुविधा, क्षमता एवं गति के अनुसार सीख सकते हैं, जिससे आत्म-गति (Self-paced) एवं आत्म-नियंत्रित (Self-regulated) अधिगम को प्रोत्साहन मिलता है। इसके अतिरिक्त यह परिवेश शिक्षण को अधिक संवादात्मक, लचीला एवं बहुआयामी बनाता है। डिजिटल शिक्षण परिवेश में शिक्षक की भूमिका भी पारंपरिक ज्ञानदाता से बदलकर मार्गदर्शक एवं सहायक की हो जाती है, जो विद्यार्थियों को सीखने के लिए उपयुक्त संसाधन एवं दिशा प्रदान करता है। इस प्रकार डिजिटल शिक्षण परिवेश आधुनिक शिक्षा प्रणाली का एक महत्वपूर्ण आधार बन गया है।

नवीन शिक्षण तकनीकें- नवीन शिक्षण तकनीकें वे आधुनिक एवं वैज्ञानिक विधियाँ हैं जिनका उद्देश्य शिक्षण-अधिगम की प्रक्रिया को अधिक प्रभावी, रोचक एवं सहभागी बनाना है। ये तकनीकें पारंपरिक शिक्षण विधियों से भिन्न होती हैं, क्योंकि इनमें विद्यार्थी को निष्क्रिय श्रोता के बजाय सक्रिय सहभागी के रूप में देखा जाता है। कुमार (2020) के अनुसार स्मार्ट बोर्ड, मल्टीमीडिया प्रस्तुतीकरण, वर्चुअल लैब, ई-लर्निंग मॉड्यूल तथा लर्निंग मैनेजमेंट सिस्टम (LMS) नवीन शिक्षण तकनीकों के प्रमुख उदाहरण हैं।

इन तकनीकों के माध्यम से विषयवस्तु को दृश्य-श्रव्य रूप में प्रस्तुत किया जाता है, जिससे जटिल अवधारणाएँ भी सरल एवं बोधागम्य बन जाती हैं। नवीन शिक्षण तकनीकें समस्या-समाधान, आलोचनात्मक चिंतन एवं रचनात्मकता को विकसित करने में सहायक होती हैं। इसके अतिरिक्त ये तकनीकें सहयोगात्मक अधिगम (Collaborative Learning) को भी बढ़ावा देती हैं, जहाँ विद्यार्थी समूह में कार्य करते हुए सीखते हैं। इस प्रकार नवीन शिक्षण तकनीकें न केवल ज्ञान के अधिगम को सुदृढ़ बनाती हैं, बल्कि विद्यार्थियों में आवश्यक जीवन-कौशलों के विकास में भी महत्वपूर्ण भूमिका निभाती हैं।

शैक्षिक उपलब्धि- शैक्षिक उपलब्धि से आशय उस स्तर से है, जिसे कोई विद्यार्थी शिक्षण-अधिगम की प्रक्रिया के माध्यम से अर्जित करता है। इसमें विद्यार्थी का ज्ञान, बौद्धिक समझ, कौशल, अभिवृत्ति एवं व्यावहारिक दक्षता सम्मिलित होती है। मिश्रा (2015) के अनुसार शैक्षिक उपलब्धि का परिलक्षण परीक्षा परिणामों, विषय-समझ, अनुप्रयोग क्षमता तथा शैक्षिक प्रदर्शन के माध्यम से किया जा सकता है।

डिजिटल शिक्षण परिवेश एवं नवीन शिक्षण तकनीकें शैक्षिक उपलब्धि को सकारात्मक रूप से प्रभावित करती हैं। ई-सामग्री, वीडियो लेक्चर एवं इंटरएक्टिव टूल्स विद्यार्थियों को विषय को गहराई से समझने में सहायता प्रदान करते हैं। डिजिटल माध्यमों के प्रयोग से विद्यार्थी बार-बार अभ्यास कर सकते हैं, अपनी त्रुटियों को सुधार सकते हैं तथा त्वरित प्रतिपुष्टि (Feedback) प्राप्त कर सकते हैं। परिणामस्वरूप उनकी शैक्षिक उपलब्धि में निरंतर सुधार होता है। इस प्रकार यह माना जा सकता है कि डिजिटल

शिक्षण तकनीकें विद्यार्थियों की शैक्षिक उपलब्धि को बढ़ाने में सहायक सिद्ध होती हैं।

विद्यार्थियों की रुचि– विद्यार्थियों की रुचि एक महत्वपूर्ण मनोवैज्ञानिक तत्व है, जो अधिगम की प्रक्रिया को प्रत्यक्ष रूप से प्रभावित करता है। रुचि वह अवस्था है जिसमें विद्यार्थी किसी विषय या गतिविधि के प्रति आकर्षण, जिज्ञासा एवं उत्साह का अनुभव करता है। पाण्डेय (2016) के अनुसार जब विद्यार्थी में रुचि उत्पन्न होती है, तब अधिगम अधिक स्थायी, प्रभावी एवं आनंददायक बन जाता है।

डिजिटल शिक्षण परिवेश में प्रयुक्त दृश्य–श्रव्य माध्यम, एनिमेशन, इंटरएक्टिव गतिविधियाँ एवं शैक्षिक गेम विद्यार्थियों की रुचि को बढ़ाने में महत्वपूर्ण भूमिका निभाते हैं। ये माध्यम शिक्षण को नीरस होने से बचाते हैं तथा विद्यार्थियों को सक्रिय सहभागिता के लिए प्रेरित करते हैं। रुचि बढ़ने से न केवल ध्यान अवधि में वृद्धि होती है, बल्कि विद्यार्थी स्वयं सीखने के लिए प्रेरित होता है। इस प्रकार डिजिटल एवं नवीन शिक्षण तकनीकें विद्यार्थियों की सीखने की रुचि को विकसित कर अधिगम प्रक्रिया को अधिक प्रभावशाली बनाती हैं।

शोध के उद्देश्य:

1. डिजिटल शिक्षण परिवेश में नवीन शिक्षण तकनीकों की भूमिका का अध्ययन करना।
2. नवीन शिक्षण तकनीकों का विद्यार्थियों की शैक्षिक उपलब्धि पर प्रभाव ज्ञात करना।
3. डिजिटल शिक्षण तकनीकों एवं विद्यार्थियों की रुचि के मध्य संबंध का विश्लेषण करना।

परिकल्पनाएँ :

1. नवीन शिक्षण तकनीकों का विद्यार्थियों की शैक्षिक उपलब्धि पर सार्थक प्रभाव पड़ता है।
2. डिजिटल शिक्षण तकनीकों और विद्यार्थियों की रुचि के मध्य सकारात्मक संबंध पाया जाता है।

शोध विधि एवं न्यादर्श– प्रस्तुत अध्ययन में मात्रात्मक शोध–विधि अपनाई गई। आँकड़ों का संकलन प्रश्नावली के माध्यम से किया गया। न्यादर्श के रूप में 60 उत्तरदाताओं (30 शिक्षक एवं 30 विद्यार्थी) का चयन किया गया। शोध–स्थल के रूप में ग्वालियर (मध्य प्रदेश) को चुना गया।

परिकल्पना–1 से संबंधित सांख्यिकीय तालिका

नवीन शिक्षण तकनीकें एवं शैक्षिक उपलब्धि (t-test)

समूह	N	Mean	SD	t- मूल्य	सार्थकता
डिजिटल शिक्षण तकनीक	30	41.8	5.1	**3.12**	0.01
पारंपरिक शिक्षण	30	36.2	4.9		

व्याख्या – तालिका से स्पष्ट है कि डिजिटल शिक्षण तकनीकों का उपयोग करने वाले विद्यार्थियों का औसत अंक पारंपरिक शिक्षण वाले विद्यार्थियों से अधिक है। प्राप्त t-मूल्य 3.12 है, जो 0.05 स्तर पर सार्थक है। इससे यह सिद्ध होता है कि नवीन शिक्षण तकनीकों का शैक्षिक उपलब्धि पर महत्वपूर्ण प्रभाव पड़ता है। अत: प्रथम परिकल्पना स्वीकार की जाती है।

परिकल्पना–2 डिजिटल शिक्षण तकनीकें एवं विद्यार्थियों की रुचि (Correlation Test)

चर	N	r– मूल्य
डिजिटल शिक्षण तकनीकें	60	**0.65**
विद्यार्थियों की रुचि	60	

व्याख्या – तालिका में सहसंबंध गुणांक 0.65 पाया गया, जो उच्च सकारात्मक संबंध को दर्शाता है। इसका अर्थ है कि डिजिटल शिक्षण तकनीकों के प्रयोग से विद्यार्थियों की रुचि में वृद्धि होती है। यह परिणाम सांख्यिकीय रूप से सार्थक है, अत: द्वितीय परिकल्पना स्वीकार की जाती है।

निष्कर्ष– प्रस्तुत अध्ययन से यह निष्कर्ष निकलता है कि डिजिटल शिक्षण परिवेश में नवीन शिक्षण तकनीकें शिक्षण–अधिगम प्रक्रिया को अधिक प्रभावी, रोचक एवं परिणामोन्मुख बनाती हैं। ये तकनीकें विद्यार्थियों की शैक्षिक उपलब्धि एवं सीखने की रुचि को सकारात्मक रूप से प्रभावित करती हैं। आधुनिक शिक्षा व्यवस्था में डिजिटल शिक्षण एक आवश्यक एवं अपरिहार्य घटक बन चुका है।

सुझाव:

1. शिक्षकों को डिजिटल शिक्षण तकनीकों का सतत प्रशिक्षण दिया जाए।
2. विद्यालयों एवं महाविद्यालयों में पर्याप्त डिजिटल संसाधन उपलब्ध कराए जाएँ।
3. डिजिटल शिक्षण को पारंपरिक शिक्षण के साथ समन्वित किया जाए।
4. भारतीय शैक्षिक दर्शन के अनुरूप डिजिटल सामग्री विकसित की जाए।

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भारत देश के वस्त्र उद्योग में मजदूरों की कार्य स्थितियों और चुनौतियों का विश्लेषणात्मक अध्ययन (शोध के विशेष संदर्भ में)

रणजीत सिंह सविता* डॉ. प्रशान्त साहू**

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शोध सारांश – वस्त्र उद्योग भारत की अर्थव्यवस्था का एक महत्वपूर्ण क्षेत्र है, जो रोजगार सृजन और निर्यात में महत्वपूर्ण भूमिका निभाता है। इस उद्योग में करोड़ों मजदूर कार्यरत हैं, जिनमें बड़ी संख्या में महिलाएँ और प्रवासी श्रमिक शामिल हैं। हालाँकि, वस्त्र उद्योग के विकास के वावजूद मजदूरों की कार्य स्थितियाँ अक्सर कठिन होती हैं। कम वेतन, लंबे कार्य घंटे, असुरक्षित कार्य परिस्थितियाँ, सामाजिक सुरक्षा का अभाव और श्रम अधिकारों का उल्लंघन जैसी समस्याएँ आम हैं। इस शोध पत्र का उद्देश्य वस्त्र उद्योग में मजदूरों की कार्य स्थितयों का विश्लेषण करना, प्रमुख चुनौतियों की पहचान करना तथा उनके समाधान के लिए सुझाव प्रस्तुत करना है। अध्ययन में विभिन्न सरकारी रिपोर्टों, अंतर्राष्ट्रीय संगठनों के आंकड़ों तथा पूर्व शोधों का उपयोग किया गया है।

शब्द कुंजी – वस्त्र उद्योग, श्रमिक, कार्यस्थितियाँ, कार्य घंटे, वेतन, सामाजिक सुरक्षा।

प्रस्तावना – वस्त्र उद्योग भारत के सबसे पुराने और महत्वपूर्ण उद्योगों में से एक है। यह उद्योग न केवल घरेलू बाजार की आवश्यकताओं को पूरा करता है बल्कि निर्यात के माध्यम से विदेशी मुद्रा अर्जित करने में भी महत्वपूर्ण योगदान देता है।

भारत में वस्त्र उद्योग का योगदान :

- भारत के कुल औद्योगिक उत्पादन का लगभग 14%
- सकल घरेलू उत्पाद में लगभग 2–3% योगदान
- कुल निर्यात में लगभग 11% योगदान
- लगभग 4.5 करोड़ लोगों को प्रत्यक्ष रोजगार

इन आँकड़ो से स्पष्ट है कि वस्त्र उद्योग रोजगार का एक प्रमुख स्त्रोत है। लेकिन इसके बावजूद इस उद्योग में काम करने वाले श्रमिकों को अनेक कठिनाईयों का सामना करना पड़ता है।

अध्ययन का उद्देश्य:

1. वस्त्र उद्योग में मजदूरों की कार्य–स्थितियों का अध्ययन करना।
2. मजदूरों के सामने आने वाली प्रमुख समस्याओं की पहचान करना।
3. मजदूरों की सामाजिक और आर्थिक स्थिति का विश्लेषण करना।
4. सुधार के लिए नीतिगत सुझाव देना।

अध्ययन की परिकल्पनाएँ:

1. वस्त्र उद्योग में कार्यरत मजदूरों की कार्य–स्थितियाँ अन्य औद्योगिक क्षेत्रों की तुलना में अधिक कठिन होती हैं।
2. वस्त्र उद्योग में मजदूरों को मिलने वाला वेतन उनके कार्य–घंटो और श्रम के अनुपात में कम होता है।
3. वस्त्र उद्योग महिला मजदूरों को पुरूष मजदूरों की तुलना में कम वेतन और अधिक सामाजिक चुनौतियों का सामना करना पड़ता है।
4. वस्त्र उद्योग में असंगठित क्षेत्र के मजदूरों को सामाजिक सुरक्षा सुविधाएँ पर्याप्त रूप से उपलब्ध नहीं होती है।
5. प्रवासी मजदूरों की कार्य–स्थितियाँ स्थानीय मजदूरों की तुलना में अधिक अस्थिर और कठिन होती हैं।
6. वस्त्र उद्योग में लंबे कार्य–घंटे मजदूरों के स्वास्थ्य और उत्पादकता पर नकारात्मक प्रभाव डालते हैं।
7. वस्त्र उद्योग में श्रम कानूनों का प्रभावी क्रियान्वयन न होने के कारण मजदूरों का शोषण बढ़ता है।
8. बेहतर कार्य–परिस्थितियाँ और उचित वेतन मिलने से मजदूरों की उत्पादकता में वृद्धि होती है।

शून्य परिकल्पना:

1. वस्त्र उद्योग में मजदूरों की कार्य–स्थितियों और उनके कार्य–संतोष के बीच कोई महत्वपूर्ण संबंध नहीं है।
2. पुरूष और महिला मजदूरों के वेतन में कोई महत्वपूर्ण अंतर नहीं है।
3. सामाजिक सुरक्षा सुविधाओं का मजदूरों की कार्य–संतुष्टि पर कोई प्रभाव नहीं पड़ता।

वैकल्पिक परिकल्पना:

1. वस्त्र उद्योग में मजदूरों की कार्य–स्थितियों और उनके कार्य–संतोष के बीच महत्वपूर्ण संबंध है।
2. पुरूष और महिला मजदूरों के वेतन में महत्वपूर्ण अंतर है।

सामाजिक सुरक्षा सुविधाएँ, मजदूरों की कार्य–संतुष्टि को प्रभावित करती हैं।

अध्ययन का परिसीमन– शोधर्थी ने 100 मजदूरों का सर्वे किया। उनके जबाबों के अधार पर प्रमुख समस्याओं और कार्य–स्थितियों का प्रतिशत इस प्रकार है :

श्रेणी	प्रतिशत (%)
कम वेतन	65 %
लंबे कार्य घंटे	70 %

असुरक्षित कार्य वातावरण	60 %
स्वास्थ्य समस्याएं	55 %
समाजिक सुरक्षा अभाव	60 %
महिला मजदूरों की विशेष समस्याएं	50 %
प्रवासी मजदूरों की समस्याएं	40 %

ग्राफ 1– मजदूरों की मुख्य समस्याएँ –

यह ग्राफ बार चार्ट के रूप में तैयार किया गया है :

लंबे कम असुरक्षित स्वास्थ्य महिला प्रवासी कार्य वेतन कार्य समस्याएँ समस्याएँ घंटे वातावरण

व्याख्या :

- सबसे बड़ी समस्या लंबे कार्य घंटे (70 %) हैं।
- उसके बाद कम वेतन (65 %) और असुरक्षित कार्य वातावरण/ सामाजिक सुरक्षा अभाव (60 %) आते हैं।
- महिला मजदूरों की विशेष समस्याएं (50 %) और प्रवासी मजदूरों की समस्याएं (40 %) भी महत्वपूर्ण हैं।

ग्राफ 2– लिंग और समस्या अनुपात (पाई चार्ट) – 100 मजदूरों में 60 महिला और 40 पुरूष हैं। उनकी समस्याओं का वितरण इस प्रकार है :

श्रेणी	महिला प्रतिशत (%)	पुरूष प्रतिशत (%)
कम वेतन	35 %	30 %
लंबे कार्य घंटे	40 %	30 %
स्वास्थ्य समस्याएँ	30 %	25 %
समाजिक सुरक्षा का अभाव	35 %	25 %

पाई चार्ट विवरण (महिला मजदूरों की समस्याएँ) :

- लंबे कार्य घंटे – 40 %
- कम वेतन – 35 %
- सामाजिक सुरक्षा का अभाव – 35 %
- स्वास्थ्य समस्याएं– 30 %

व्याख्या :

- **महिला मजदूरों को लंबे कार्य घंटे और कम वेतन की सबसे अधिक समस्या है।**

ग्राफ 3– प्रवासी बनाम स्थानीय मजदूरों की समस्याएं –

समस्या	प्रवासी (%)	स्थानीय (%)
आवास की कमी	50 %	10 %
सामाजिक सुरक्षा	45 %	20 %
स्वास्थ्य समस्याएँ	35 %	25 %

अनुसंधान पद्धति– इस शोध में द्वितीयक आँकड़ों का उपयोग किया गया है। आँकडे निम्न स्त्रोतों से लिये गये हैं :

1. श्रम एवं रोजगार मंत्रालय की रिपोर्ट
2. राष्ट्रीय सांख्यिकी कार्यालय
3. अंतर्राष्ट्रीय श्रम संगठन
4. विभिन्न शोध पत्र और पुस्तकें।

साहित्य समीक्षा–कई शोधकर्ताओं ने वस्त्र उद्योग में मजदूरों की स्थिति का अध्ययन किया है।

1. अंतर्राष्ट्रीय श्रम संगठन के अनुसार विकासशील देशों में वस्त्र उद्योग में काम करने वाले मजदूरों को कम वेतन और असुरक्षित परिस्थितियों का सामना करना पड़ता है।
2. मेजाद्री (2017) के अध्ययन के अनुसार भारत के वस्त्र उद्योग में असंगठित क्षेत्र का प्रभुत्व है, जहाँ श्रमिकों को स्थायी रोजगार और सामाजिक सुरक्षा नहीं मिलती।
3. कबीर (2019) ने अपने अध्ययन में बताया कि वस्त्र उद्योग में महिलाओं की भागीदारी अधिक है, लेकिन उन्हें पुरूषों की तुलना में कम वेतन मिलता है।
4. नीति आयोग रिपोर्ट (2022) के अनुसार भारत के वस्त्र उद्योग में श्रमिकों की उत्पादकता बढ़ाने के लिए बेहतर कार्य–परिस्थितियों की आवश्यकता है।

साहित्य समीक्षा से यह स्पष्ट होता है कि वस्त्र उद्योग में मजदूरों की स्थिति एक महत्वपूर्ण सामाजिक–आर्थिक मुद्दा है।

भारत में वस्त्र उद्योग का विकास–भारत में वस्त्र उद्योग का इतिहास प्राचीनकाल से जुड़ा हुआ है।

- **प्रमुख चरण**

1. प्राचीन काल – हथकरघा उद्योग का विकास
2. औपनिवेशक काल – ब्रिटिश शासन के दौरान कपड़ा मिलों की स्थापना
3. स्वतंत्रता के बाद– औद्योगिक विकास और मशीनों का उपयोग
4. उदारीकरण के बाद (1991)– निर्यात में वृद्धि

- **भारत के प्रमुख वस्त्र उद्योग केन्द्र**

1. सूरत
2. अहमदाबाद
3. मुंबई
4. तिरूपुर
5. लुधियाना

इन शहरों में लाखों मजदूर काम करते हैं।वस्त्र उद्योग में मजदूरों की सामाजिक–आर्थिक स्थितिवस्त्र उद्योग में कार्यरत श्रमिकों की सामाजिक–आर्थिक स्थिति अक्सर कमजोर होती है।

- **मजदूरों की श्रेणियाँ**

1. स्थायी मजदूर
2. अस्थायी मजदूर
3. ठेका मजदूर
4. प्रवासी मजदूर

- **लिंग अनुपात**

1. लगभग 60 प्रतिशत महिला मजदूर
2. 40 प्रतिशत पुरूष मजदूर

- **शैक्षणिक स्तर –** राष्ट्रीय निदर्श सर्वेक्षण के अनुसार

1. 35 प्रतिशत मजदूर प्राथमिक शिक्षा तक
2. 40 प्रतिशत माध्यमिक स्तर
3. 25 प्रतिशत अशिक्षित

यह दीर्शता है कि इस उद्योग में कम शिक्षित मजदूर अधिक होते हैं।कार्य-स्थितियां वस्त्र उद्योग में कार्य-स्थितियां कई बार कठिन होती हैं।

1. लंबे कार्य घटे अधिकांश मजदूरों को प्रतिदिन 10-12 घंटे काम करना पड़ता है।
2. कम वेतन

औसत मासिक वेतन :

श्रेणी	औसत वेतन
पुरूष मजदूर	रू. 12000-रू. 15000
महिला मजदूर	रू. 9000-रू. 12000

3. असुरक्षित वातावरण मशीनों के कारण दुर्घटनाओं का खतरा रहता है।

4. स्वास्थ्य समस्याएं:

1. सांस की बीमारी
2. त्वचा रोग
3. आंखो की समस्या

प्रमुख चुनौतियाँ:

1. **कम वेतन-** अंतर्राष्ट्रीय श्रम संगठन के अनुसार वस्त्र उद्योग में मजदूरों का वेतन कई बार न्यूनतम मजदूरी से भी कम होता है।
2. **सामाजिक सुरक्षा का अभाव-** कई मजदूरों को निम्न सुविधाएं नहीं मिलती :

1. पेंशन
2. स्वास्थ्य बीमा
3. दुर्घटना बीमा

3. महिला मजदूरों की समस्याएं- महिलाओं को निम्न समस्याओं का सामना करना पड़ता है :

1. वेतन असमानता
2. मातृत्व अवकाश का अभाव
3. कार्यस्थल पर उत्पीड़न
4. प्रवासी मजदूरों की समस्याएँ

प्रवासी मजदूरों की समस्याएँ निम्न है :

1. आवास की कमी
2. भाषा की समस्या
3. समाजिक सुरक्षा का प्रभाव

कोविड-19 का प्रभाव - कोविड-19 महामारी का वस्त्र उद्योग पर गंभीर प्रभाव पड़ा।

1. लगभग 40 प्रतिशत कारखाने अस्थायी रूप से बंद हुए।
2. लाखों मजदूर बेरोजगार हुए।
3. प्रवासी मजदूर अपने गांव लौट गए।

यह संकट मजदूरों की असुरक्षित स्थिति को उजागर करता है।

अध्ययन का क्षेत्र:

1. तिरूपुर (तमिलनाडू) - तिरूपुर भारत का प्रमुख वस्त्र निर्यात केन्द्र है। यहाँ लगभग 6 लाख मजदूर कार्यरत हैं।

समस्याऐं:

1. लंबे कार्य घंटे
2. कम वेतन
3. महिला मजदूरों का शोषण

2. सूरत (गुजरात) - सूरत का कपड़ा उद्योग देश में सबसे बड़ा माना जाता है। यहाँ 7-8 लाख मजदूर कार्य करते हैं।

समस्याऐं:

1. प्रवासी मजदूरों की अधिकता
2. अस्थायी रोजगार

सरकारी नीतियाँ - सरकार ने मजदूरों की स्थिति सुधारने के लिये कई योजनाएं लागू की हैं।

प्रमुख कानून:

1. न्यूनतम मजदूरी अधिनियम
2. श्रम संहिता
3. कर्मचारी भविष्य निधि

सरकारी योजनाऐं:

1. प्रधानमंत्री श्रम योगी मानधन योजना
2. आयुष्मान भारत

सुधार के सुझाव - वस्त्र उद्योग में मजदूरों की स्थिति सुधारने के लिये निम्न कदम उठाए जा सकते हैं।

1. न्यूनतम मजदूरी का सख्ती से पालन ।
2. कार्यस्थल पर सुरक्षा बढ़ाना।
3. महिला मजदूरों के लिये विशेष सुविधाऐं।
4. सामाजिक सुरक्षा योजनाओं का विस्तार।
5. श्रमिक प्रशिक्षण कार्यक्रम।

निष्कर्ष- वस्त्र उद्योग भारत की अर्थव्यवस्था में महत्वपूर्ण भूमिका निभाता है, लेकिन इस उद्योग में काम करने वाले मजदूरों की स्थिति अभी भी संतोषजनक नहीं है। कम वेतन, लंबे कार्य घंटे, असुरक्षित वातावरण और सामाजिक सुरक्षा का अभाव जैसी समस्याऐं व्यापक हैं। इन समस्याओं के समाधान के लिये सरकार, उद्योग और समाज को मिलकर कार्य करना होगा।

यदि उचित नीतियाँ लागू की जायें और मजदूरों के अधिकारों की रक्षा की जाय, तो वस्त्र उद्योग न केवल आर्थिक विकास में बल्कि सामाजिक न्याय में भी महत्वपूर्ण भूमिका निभा सकता है।

संदर्भ ग्रन्थ सूची :-

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2. इंटरनेशनल लेबर ऑर्गेनाईजेशन, डिसेन्ट वर्क इन द गारमेंट सेक्टर 2019
3. वर्ल्ड बैन्क वर्ल्ड, डेवलपमेंट रिपोर्ट, 2020
4. मिनिस्ट्री ऑफ टेक्सटाईल्स एन्यूअल रिपोर्ट 2022-23
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10. ग्लोबल प्रोडक्शन नेटवर्क्स एण्ड लेबर - लेखक : स्टेफनी बेरियन्टॉस
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प्रौद्योगिकी आधारित समावेशी शिक्षा एवं सार्वभौमिक पहुँच

शबीना शेख़*

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शोध सारांश – प्रौद्योगिकी के तीव्र विकास ने शिक्षा व्यवस्था को एक नया आयाम प्रदान किया है, विशेष रूप से समावेशी शिक्षा और सार्वभौमिक पहुँच के क्षेत्र में। प्रौद्योगिकी समर्थित समावेशी शिक्षा का उद्देश्य ऐसे शैक्षिक वातावरण का निर्माण करना है जिसमें सामाजिक, आर्थिक, भौगोलिक, शारीरिक अथवा मानसिक किसी भी प्रकार की बाधा के बिना प्रत्येक शिक्षार्थी को गुणवत्तापूर्ण शिक्षा प्राप्त हो सके। डिजिटल उपकरणों, ऑनलाइन शिक्षण मंचों, सहायक तकनीकों तथा सूचना एवं संचार प्रौद्योगिकी ने शिक्षा को अधिक सुलभ, लचीला और व्यक्तिगत बनाया है।

यह शोध-पत्र यह विश्लेषण करता है कि किस प्रकार तकनीक शिक्षा में समान अवसर उपलब्ध कराकर वंचित एवं विशेष आवश्यकता वाले शिक्षार्थियों को मुख्यधारा से जोड़ने में सहायक सिद्ध हो रही है। इसमें ई-लर्निंग, मोबाइल लर्निंग, ओपन एजुकेशनल रिसोर्सेज, ब्रेल-समर्थित सॉफ्टवेयर, स्क्रीन रीडर तथा ऑडियो-विजुअल सामग्री की भूमिका पर विशेष ध्यान दिया गया है। साथ ही, भारत में तकनीक-आधारित समावेशी शिक्षा से संबंधित नीतिगत पहलों और कार्यक्रमों का भी संक्षिप्त विवेचन किया गया है।

अंततः यह अध्ययन निष्कर्ष निकालता है कि यदि तकनीकी संसाधनों का समुचित, समान और सतत उपयोग किया जाए, तो शिक्षा के क्षेत्र में सार्वभौमिक पहुँच को वास्तविकता में परिवर्तित किया जा सकता है।

कुंजी शब्द –समावेशी शिक्षा, प्रौद्योगिकी आधारित शिक्षा, सार्वभौमिक पहुँच, डिजिटल शिक्षण, सूचना एवं संचार प्रौद्योगिकी, विशेष आवश्यकता वाले शिक्षार्थी, सहायक तकनीकें, ऑनलाइन शिक्षा प्रणाली।

प्रस्तावना – शिक्षा किसी भी समाज के सामाजिक, आर्थिक एवं सांस्कृतिक विकास का आधार होती है। आधुनिक समय में शिक्षा का उद्देश्य केवल ज्ञान का संप्रेषण न होकर प्रत्येक व्यक्ति को समान अवसर प्रदान करना भी है। इसी संदर्भ में समावेशी शिक्षा की अवधारणा सामने आती है, जिसका मूल लक्ष्य यह सुनिश्चित करना है कि सभी शिक्षार्थी, चाहे वे किसी भी सामाजिक वर्ग, आर्थिक स्थिति, लिंग, क्षेत्र या शारीरिक-मानसिक क्षमता से संबंधित हों, शिक्षा की मुख्यधारा से जुड़ सकें। परंतु पारंपरिक शिक्षा प्रणाली में संसाधनों की कमी, भौगोलिक दूरी, दिव्यांगता तथा सामाजिक असमानताएँ शिक्षा की सार्वभौमिक पहुँच में बाधा बनती रही हैं।

21वीं शताब्दी में सूचना एवं संचार प्रौद्योगिकी ने इन बाधाओं को कम करने की दिशा में महत्वपूर्ण भूमिका निभाई है। डिजिटल तकनीकों ने शिक्षा को कक्षा-केंद्रित व्यवस्था से निकालकर एक व्यापक और लचीले स्वरूप में परिवर्तित किया है। ऑनलाइन प्लेटफॉर्म, ई-लर्निंग संसाधन, मोबाइल एप्लिकेशन तथा सहायक तकनीकें ऐसे शिक्षार्थियों तक शिक्षा पहुँचाने में सहायक सिद्ध हुई हैं जो पहले इससे वंचित थे।

प्रौद्योगिकी समर्थित समावेशी शिक्षा न केवल शिक्षा तक पहुँच बढ़ाती है, बल्कि शिक्षण-अधिगम प्रक्रिया को अधिक सहभागी, व्यक्तिगत और प्रभावी भी बनाती है। इस शोध-पत्र में यह विश्लेषण करने का प्रयास किया गया है कि किस प्रकार तकनीक समावेशी शिक्षा को सशक्त बनाकर सार्वभौमिक पहुँच के लक्ष्य को प्राप्त करने में सहायक हो सकती है तथा इसके सामाजिक-शैक्षिक प्रभाव क्या हैं।

समावेशी शिक्षा की अवधारणा –समावेशी शिक्षा एक ऐसी शैक्षिक अवधारणा है जिसका उद्देश्य सभी शिक्षार्थियों को समान, न्यायसंगत और गुणवत्तापूर्ण शिक्षा प्रदान करना है, चाहे उनकी सामाजिक, आर्थिक, शारीरिक, मानसिक या सांस्कृतिक पृष्ठभूमि कुछ भी हो। यह अवधारणा शिक्षा में भेदभाव को समाप्त कर विविधताओं को स्वीकार करने पर आधारित है। समावेशी शिक्षा का मूल दर्शन यह मानता है कि प्रत्येक शिक्षार्थी में सीखने की क्षमता होती है और शिक्षा प्रणाली को उनकी आवश्यकताओं के अनुरूप ढलना चाहिए, न कि शिक्षार्थियों को व्यवस्था के अनुरूप।

परंपरागत शिक्षा प्रणाली प्रायः औसत शिक्षार्थी को केंद्र में रखकर विकसित की गई थी, जिसके परिणामस्वरूप विशेष आवश्यकता वाले, वंचित वर्गों से आने वाले तथा ग्रामीण क्षेत्रों के शिक्षार्थी शिक्षा से पीछे रह जाते थे। समावेशी शिक्षा इस सोच को चुनौती देती है और ऐसे शैक्षिक वातावरण के निर्माण पर बल देती है जहाँ सभी शिक्षार्थी एक साथ सीख सकें। इसमें दिव्यांग शिक्षार्थियों, अल्पसंख्यकों, सामाजिक-आर्थिक रूप से पिछड़े वर्गों तथा भाषाई विविधता वाले विद्यार्थियों की सहभागिता सुनिश्चित की जाती है।

समावेशी शिक्षा केवल विद्यालयों में नामांकन तक सीमित नहीं है, बल्कि यह पाठ्यक्रम, शिक्षण विधियों, मूल्यांकन प्रक्रियाओं तथा शैक्षिक संसाधनों में भी समावेशन की माँग करती है। इस दृष्टिकोण से समावेशी शिक्षा सामाजिक न्याय, समानता और मानवाधिकारों की भावना को शिक्षा के माध्यम से सुदृढ़ करती है तथा लोकतांत्रिक समाज के निर्माण में महत्वपूर्ण योगदान देती है।

प्रौद्योगिकी एवं शिक्षा : सैद्धांतिक पृष्ठभूमि –प्रौद्योगिकी और शिक्षा

के अंतर्संबंध को समझने के लिए विभिन्न शैक्षिक सिद्धांतों का अध्ययन आवश्यक है। व्यवहारवाद, संज्ञानवाद और निर्माणवाद जैसे शिक्षण सिद्धांतों ने यह स्पष्ट किया है कि सीखना केवल सूचना ग्रहण की प्रक्रिया नहीं है, बल्कि अनुभव, सहभागिता और आत्मनिर्माण से जुड़ा हुआ है। आधुनिक शैक्षिक प्रौद्योगिकी इन सिद्धांतों को व्यवहार में लाने का सशक्त माध्यम प्रदान करती है।

निर्माणवादी सिद्धांत के अनुसार शिक्षार्थी सक्रिय रूप से ज्ञान का निर्माण करता है, और डिजिटल उपकरण इस प्रक्रिया को सहयोगात्मक तथा अनुभवात्मक बनाते हैं। ऑनलाइन मंच, वर्चुअल कक्षाएँ और मल्टीमीडिया संसाधन शिक्षार्थियों को अपनी गति और क्षमता के अनुसार सीखने का अवसर देते हैं। इसी प्रकार, सार्वभौमिक अधिगम डिज़ाइन का सिद्धांत यह मानता है कि शिक्षण सामग्री और विधियाँ प्रारंभ से ही विविध शिक्षार्थियों की आवश्यकताओं को ध्यान में रखकर विकसित की जानी चाहिए।

सूचना एवं संचार प्रौद्योगिकी शिक्षा में पहुँच, सहभागिता और लचीलापन बढ़ाने में सहायक होती है। यह शिक्षण को शिक्षक-केंद्रित से शिक्षार्थी-केंद्रित बनाती है तथा समावेशी शिक्षा के लक्ष्यों को सैद्धांतिक आधार प्रदान करती है। इस प्रकार, प्रौद्योगिकी केवल एक उपकरण नहीं, बल्कि समावेशी और समान शिक्षा व्यवस्था की आधारशिला बनकर उभरती है।

तकनीक-आधारित समावेशी शिक्षा के प्रमुख साधन –तकनीक-आधारित समावेशी शिक्षा में विभिन्न डिजिटल साधनों की महत्वपूर्ण भूमिका होती है, जो विविध पृष्ठभूमि और क्षमताओं वाले शिक्षार्थियों के लिए सीखने की प्रक्रिया को सुलभ और प्रभावी बनाते हैं। ई-लर्निंग प्लेटफॉर्म, लर्निंग मैनेजमेंट सिस्टम, मोबाइल लर्निंग एप्लिकेशन तथा ओपन एजुकेशनल रिसोर्सेज ऐसे प्रमुख साधन हैं, जो शिक्षा तक पहुँच को व्यापक बनाते हैं। इन साधनों के माध्यम से शिक्षार्थी समय, स्थान और गति की सीमाओं से मुक्त होकर सीख सकते हैं।

मल्टीमीडिया आधारित शिक्षण सामग्री, जैसे वीडियो, ऑडियो, एनिमेशन और इंटरेक्टिव कंटेंट, विभिन्न सीखने की शैलियों को ध्यान में रखकर तैयार की जाती हैं। इससे दृश्य, श्रवण और क्रियात्मक शिक्षार्थियों को समान रूप से लाभ मिलता है। इसके अतिरिक्त, क्लाउड-आधारित प्लेटफॉर्म और वर्चुअल कक्षाएँ दूरस्थ एवं ग्रामीण क्षेत्रों में रहने वाले विद्यार्थियों के लिए गुणवत्तापूर्ण शिक्षा उपलब्ध कराने में सहायक सिद्ध हुई हैं। समावेशी शिक्षा के संदर्भ में सहायक तकनीकें भी अत्यंत महत्वपूर्ण हैं। स्क्रीन रीडर, टेक्स्ट-टू-स्पीच सॉफ्टवेयर, स्पीच-टू-टेक्स्ट टूल्स, ब्रेल डिस्प्ले और सबटाइटल युक्त वीडियो विशेष आवश्यकता वाले शिक्षार्थियों को स्वतंत्र रूप से सीखने में सक्षम बनाते हैं। इस प्रकार, डिजिटल साधन न केवल शिक्षण-अधिगम को सशक्त बनाते हैं, बल्कि शिक्षा में समानता और सहभागिता को भी सुनिश्चित करते हैं।

सार्वभौमिक पहुँच में तकनीक की भूमिका –सार्वभौमिक पहुँच का अर्थ है कि समाज का प्रत्येक व्यक्ति बिना किसी भेदभाव के गुणवत्तापूर्ण शिक्षा प्राप्त कर सके। इस लक्ष्य की प्राप्ति में प्रौद्योगिकी की भूमिका अत्यंत महत्वपूर्ण है। डिजिटल तकनीकों ने शिक्षा को भौगोलिक सीमाओं से मुक्त कर दिया है, जिससे दूरस्थ, ग्रामीण और पिछड़े क्षेत्रों के शिक्षार्थी भी समान शैक्षिक अवसर प्राप्त कर पा रहे हैं। ऑनलाइन शिक्षण मंच, मोबाइल लर्निंग और डिजिटल पुस्तकालयों ने शिक्षा संसाधनों को व्यापक रूप से उपलब्ध कराया है।

सूचना एवं संचार प्रौद्योगिकी के माध्यम से शिक्षा अब केवल औपचारिक कक्षाओं तक सीमित नहीं रही है। ओपन और डिस्टेंस लर्निंग कार्यक्रमों ने कार्यरत व्यक्तियों, महिलाओं तथा सामाजिक रूप से वंचित वर्गों को भी शिक्षा से जोड़ने का मार्ग प्रशस्त किया है। कम लागत वाले स्मार्टफोन और इंटरनेट कनेक्टिविटी ने डिजिटल विभाजन को कम करने में योगदान दिया है, यद्यपि यह पूरी तरह समाप्त नहीं हुआ है। सार्वभौमिक पहुँच के संदर्भ में तकनीक शिक्षण सामग्री के बहुभाषी रूपांतरण, ऑडियो-विजुअल समर्थन तथा अनुकूलनशील लर्निंग के माध्यम से विविध शिक्षार्थियों की आवश्यकताओं को पूरा करती है। इस प्रकार, प्रौद्योगिकी शिक्षा में समानता, पहुँच और निरंतरता सुनिश्चित कर सार्वभौमिक शिक्षा के लक्ष्य को साकार करने में एक प्रभावी माध्यम के रूप में उभरती है।

विशेष आवश्यकता वाले शिक्षार्थियों हेतु तकनीकी नवाचार –विशेष आवश्यकता वाले शिक्षार्थियों के लिए शिक्षा तक समान पहुँच सुनिश्चित करना समावेशी शिक्षा का एक प्रमुख उद्देश्य है। इस दिशा में तकनीकी नवाचारों ने महत्वपूर्ण भूमिका निभाई है। सहायक तकनीकें उन उपकरणों और सॉफ्टवेयर को संदर्भित करती हैं, जो दिव्यांग शिक्षार्थियों को सीखने, संप्रेषण और सहभागिता में सहायता प्रदान करते हैं।दृष्टिबाधित शिक्षार्थियों के लिए स्क्रीन रीडर, ब्रेल-समर्थित उपकरण, टेक्स्ट-टू-स्पीच सॉफ्टवेयर तथा ऑडियो बुक्स अत्यंत उपयोगी सिद्ध हुई हैं। वहीं श्रवण बाधित शिक्षार्थियों के लिए सबटाइटल युक्त वीडियो, साइन लैंग्वेज आधारित सामग्री और स्पीच-टू-टेक्स्ट तकनीक शिक्षा को अधिक सुलभ बनाती है। सीखने में कठिनाई वाले विद्यार्थियों के लिए अनुकूलनशील लर्निंग सॉफ्टवेयर, इंटरैक्टिव गेम्स और वैयक्तिकृत शिक्षण ऐप्स सीखने की प्रक्रिया को सरल और रोचक बनाते हैं।इन तकनीकी नवाचारों के माध्यम से विशेष आवश्यकता वाले शिक्षार्थी आत्मनिर्भर बनते हैं और मुख्यधारा की शिक्षा प्रणाली में प्रभावी रूप से सम्मिलित हो पाते हैं। इस प्रकार, सहायक तकनीकें न केवल शैक्षिक बाधाओं को कम करती हैं, बल्कि शिक्षा में समान अवसर और सम्मानजनक सहभागिता को भी सुनिश्चित करती हैं।

भारत में तकनीक-समर्थित समावेशी शिक्षा पहल एवं नीतियाँ –भारत में समावेशी शिक्षा को सुदृढ़ करने हेतु सरकार ने तकनीक-आधारित अनेक नीतिगत पहलें की हैं। राष्ट्रीय शिक्षा नीति 2020 में डिजिटल शिक्षा, समावेशन और समान अवसरों पर विशेष बल दिया गया है। इसके अंतर्गत ई-लर्निंग, ऑनलाइन प्लेटफॉर्म और डिजिटल सामग्री के माध्यम से शिक्षा को सभी वर्गों तक पहुँचाने का लक्ष्य निर्धारित किया गया है।दीक्षा, स्वयम और ई-पाठशाला जैसे डिजिटल मंच शिक्षकों और विद्यार्थियों को नि:शुल्क, गुणवत्तापूर्ण और सुलभ शैक्षिक संसाधन उपलब्ध कराते हैं। इसके अतिरिक्त, दिव्यांग शिक्षार्थियों के लिए समावेशी आईसीटी ढाँचे, स्क्रीन-रीडर-समर्थित सामग्री और डिजिटल ब्रेल संसाधनों को बढ़ावा दिया गया है।

डिजिटल इंडिया और भारतनेट जैसी योजनाओं ने ग्रामीण एवं दूरस्थ क्षेत्रों में इंटरनेट पहुँच को सशक्त किया है। इन पहलों के माध्यम से भारत में तकनीक-समर्थित समावेशी शिक्षा को संस्थागत आधार मिला है, जो सार्वभौमिक पहुँच की दिशा में एक महत्वपूर्ण कदम है।

चुनौतियाँ एवं सीमाएँ –यद्यपि तकनीक-समर्थित समावेशी शिक्षा ने शिक्षा

के क्षेत्र में अनेक संभावनाएँ उत्पन्न की हैं, फिर भी इसके समक्ष कई चुनौतियाँ एवं सीमाएँ विद्यमान हैं। डिजिटल विभाजन एक प्रमुख समस्या है, जिसके कारण ग्रामीण एवं आर्थिक रूप से कमजोर वर्गों तक तकनीकी संसाधनों की समान पहुँच नहीं हो पाती। इंटरनेट कनेक्टिविटी, उपकरणों की उपलब्धता और डिजिटल साक्षरता की कमी भी प्रभावी क्रियान्वयन में बाधा बनती है। इसके अतिरिक्त, शिक्षकों का अपर्याप्त तकनीकी प्रशिक्षण, सहायक तकनीकों की उच्च लागत तथा बहुभाषी डिजिटल सामग्री की कमी समावेशी शिक्षा के लक्ष्यों को सीमित करती है। इन चुनौतियों के समाधान हेतु सतत नीति समर्थन, प्रशिक्षण और निवेश आवश्यक है।

निष्कर्ष एवं सुझाव –प्रौद्योगिकी समर्थित समावेशी शिक्षा ने शिक्षा व्यवस्था को अधिक सुलभ, समान और लचीला बनाने में महत्वपूर्ण भूमिका निभाई है। डिजिटल तकनीकों के माध्यम से वंचित, दूरस्थ तथा विशेष आवश्यकता वाले शिक्षार्थियों को मुख्यधारा की शिक्षा से जोड़ना संभव हुआ है। इससे शिक्षा में सार्वभौमिक पहुँच के लक्ष्य को प्राप्त करने की दिशा में ठोस प्रगति हुई है।

हालाँकि, इस लक्ष्य की पूर्ण प्राप्ति के लिए डिजिटल विभाजन को कम करना, शिक्षकों का सतत तकनीकी प्रशिक्षण सुनिश्चित करना तथा कम लागत वाली सहायक तकनीकों का विकास आवश्यक है। साथ ही, बहुभाषी और समावेशी डिजिटल सामग्री के निर्माण पर भी विशेष ध्यान दिया जाना चाहिए। इन प्रयासों के माध्यम से तकनीक-आधारित समावेशी शिक्षा को अधिक प्रभावी और सतत बनाया जा सकता है।

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महामारी कोविड-19के दौरान बेरोजगारी और इसका कमजोर वर्गों पर प्रभाव का अध्ययन

राहुल शाक्य *

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शोध सारांश – कोविड -19 महामारी ने ग्वालियर क्षेत्र के कमजोर सामाजिक-आर्थिक वर्गों पर गहरा प्रभाव डाला, विशेषत: रोजगार और आजीविका के संदर्भ में। इस अध्ययन में 392 उत्तरदाताओं से प्राप्त आंकड़ों के आधार पर बेरोजगारी, आय में गिरावट, भोजन-सुरक्षा, मानसिक तनाव तथा सरकारी सहायता के प्रभाव का विश्लेषण किया गया। परिणामों से पता चलता है कि महामारी के दौरान बेरोजगारी 11.2% से बढ़कर 62.7% हो गई तथा अधिकांश परिवारों की आय 5,000 से कम रह गई। मानसिक तनाव में वृद्धि, प्रवासी श्रमिकों की कठिनाइयाँ, और परिवारिक संबंधों पर प्रतिकूल प्रभाव भी स्पष्ट रूप से सामने आए। सरकारी राहत योजनाएँ समय पर और पर्याप्त रूप से उपलब्ध नहीं हो सकीं। अध्ययन निष्कर्षों के अनुसार बेरोजगारी ने कमजोर वर्गों की सामाजिक-आर्थिक स्थिरता, जीवन-यापन और मनोवैज्ञानिक स्वास्थ्य को गंभीर रूप से प्रभावित किया। यह शोध नीति-निर्माताओं एवं सामाजिक कल्याण संस्थाओं के लिए उपयोगी दिशा प्रदान करता है।

शब्द कुंजी – कोविड -19, बेरोजगारी, कमजोर वर्ग, सामाजिक प्रभाव, भोजन-सुरक्षा, मानसिक तनाव, राहत योजनाएँ।

प्रस्तावना – कोविड -19महामारी आधुनिक विश्व की उन घटनाओं में से एक है जिसने सामाजिक, आर्थिक और सांस्कृतिक संरचनाओं पर गहरा प्रभाव डाला, विशेषकर उन कमजोर वर्गों पर जो पहले से ही सीमित संसाधनों, असंगठित रोजगार और सामाजिक सुरक्षा की कमी के साथ संघर्ष कर रहे थे। भारत के संदर्भ में, मार्च 2020 में घोषित राष्ट्रीय लॉकडाउन ने लाखों श्रमिकों, दिहाड़ी मजदूरों, घरेलू कामगारों और प्रवासी श्रमिकों की आजीविका छीन ली, जिससे समाज के निम्न आय समूहों के बीच बेरोजगारी, भोजन-सुरक्षा संकट और मानसिक तनाव की अभूतपूर्व स्थिति उत्पन्न हुई। विभिन्न सरकारी और अंतरराष्ट्रीय रिपोर्टों ने इस बात को रेखांकित किया है कि कोविड -19ने भारत की श्रम प्रणाली, विशेषकर असंगठित क्षेत्र, पर असमान रूप से प्रभाव डाला। WHO की क्षेत्रीय रिपोर्ट के अनुसार महामारी ने न केवल स्वास्थ्य व्यवस्था को चुनौती दी बल्कि इसके सामाजिक-आर्थिक प्रभाव कहीं अधिक गहरे और दीर्घकालिक रहे। इसी प्रकार ILO ने दक्षिण एशिया में कार्यरत श्रमिकों के बीच रोजगार हानि, आय में गिरावट और सामाजिक सुरक्षा में कमजोरी को महामारी के मुख्य परिणामों के रूप में प्रस्तुत किया है। अनेक शोधों ने यह स्पष्ट किया है कि महामारी ने श्रमिकों की आर्थिक स्थिरता को बुरी तरह प्रभावित किया, जिससे परिवारों में भोजन-सुरक्षा, बच्चों की शिक्षा, स्वास्थ्य खर्च पर भारी दबाव पड़ा। यह अध्ययन न केवल वर्तमान स्थिति की वास्तविक तस्वीर प्रस्तुत करेगा, बल्कि भविष्य की नीतियों, सामाजिक सुरक्षा तंत्र और श्रमिक कल्याण योजनाओं के लिए साक्ष्य-आधारित सुझाव भी प्रदान करेगा, जिससे सामाजिक न्याय एवं समान अवसर सुनिश्चित किए जा सकें।

साहित्य समीक्षा

कोविड -19और श्रमिक वर्ग पर प्रभाव – कोविड -19महामारी पर उपलब्ध साहित्य इस बात पर एकमत है कि महामारी ने विश्वभर में असंगठित और कमजोर वर्गों के सामने गहरा रोजगार संकट उत्पन्न किया। नीति आयोग की रिपोर्ट के अनुसार भारत में लॉकडाउन के कारण लाखों श्रमिकों का रोजगार एक झटके में समाप्त हो गया और असंगठित क्षेत्र के परिवारों में आय का प्रमुख स्रोत बाधित हो गया।

आर्थिक संकट, भोजन-सुरक्षा और आजीविका– शोधकर्ता कुमार और सिंह (2021) ने महामारी के दौरान भारत के कमजोर वर्गों की आजीविका पर एक विस्तृत अध्ययन किया, जिसके अनुसार श्रमिकों की आय में अचानक गिरावट आई और परिवारों को भोजन, किराया और स्वास्थ्य व्यय के लिए संघर्ष करना पड़ा।

प्रवासन, सामाजिक चिंता और मानसिक तनाव–गुप्ता (2022) के अध्ययन में प्रवासी श्रमिकों की परिस्थिति को महामारी की सबसे 'त्रासदीपूर्ण सामाजिक घटना' बताया गया है, जिसमें श्रमिकों को बिना भोजन, सुविधा और परिवहन के लंबी दूरी तय करनी पड़ी, और वापस लौटने पर सामाजिक दूरी तथा कलंक का सामना भी करना पड़ा। मानसिक स्वास्थ्य पर महामारी के प्रभावों पर तिवारी और मिश्र (2021) के अध्ययन में पाया गया कि बेरोजगारी ने चिंता, अवसाद और आत्मविश्वास में कमी जैसे मनोवैज्ञानिक परिणाम उत्पन्न किए।

सरकारी राहत योजनाएँ और उनकी सीमाएँ– राहत योजनाओं की प्रभावशीलता पर खान (2022) के मूल्यांकन अध्ययन में पाया गया कि सरकारी सहायता कमजोर वर्गों तक समय पर और पर्याप्त मात्रा में नहीं पहुँच सकी, विशेषकर असंगठित क्षेत्र के श्रमिकों तक।

शोध-पद्धति– यह शोध के उद्देश्य, डिजाइन, नमूना चयन, डेटा संग्रहण प्रक्रिया, शोध उपकरण तथा सांख्यिकीय विश्लेषण की संपूर्ण रूपरेखा प्रस्तुत

करता है। इस शोध का मुख्य उद्देश्य कोविड – 19महामारी के दौरान ग्वालियर क्षेत्र के कमजोर वर्गों में उत्पन्न बेरोजगारी की प्रकृति तथा उसके सामाजिक–आर्थिक, मानसिक एवं पारिवारिक प्रभावों का समाजशास्त्रीय अध्ययन करना है।

शोध की प्रकृति–यह अध्ययन वर्णनात्मक एवं विश्लेषणात्मक दोनों प्रकार का है।

1. वर्णनात्मक पहलू महामारी के दौरान रोजगार, आय, भोजन–सुरक्षा, प्रवासन एवं सरकारी सहायता जैसे तथ्यों का वर्णन करता है।
2. विश्लेषणात्मक पहलू बेरोजगारी और सामाजिक–आर्थिक प्रभावों के बीच संबंध (correlation), अंतर (t-test, ANOVA) तथा भविष्यवाणी संबंध (Regression) का परीक्षण करता है।

यह अध्ययन मात्रात्मक पद्धति पर आधारित है।

अध्ययन क्षेत्र–शोध कार्य मध्य प्रदेश के ग्वालियर शहर और इसके आसपास के अर्ध–शहरी एवं श्रमिक बहुल क्षेत्रों में संचालित किया गया।

इस क्षेत्र को चुनने के प्रमुख कारण:

1. ग्वालियर में असंगठित क्षेत्र के श्रमिकों की संख्या अधिक है।
2. महामारी के दौरान यहाँ बड़े स्तर पर रोजगार संकट सामने आया।
3. प्रवासी श्रमिकों का आवागमन भी इस क्षेत्र में अधिक देखा गया।

लक्षित जनसंख्या–इस अध्ययन की जनसंख्या में शामिल हैं:

1. दिहाड़ी मजदूर
2. प्रवासी श्रमिक
3. घरेलू कार्यकर्ता
4. रिक्शा/ठेला चालक
5. असंगठित क्षेत्र के अन्य श्रमिक

ये सभी कोविड – 19महामारी से प्रत्यक्ष रूप से प्रभावित हुए।

नमूना आकार–इस अध्ययन के लिए कुल 392 उत्तरदाताओं का नमूना चुना गया।

नमूना आकार निम्न को ध्यान में रखकर निर्धारित किया गया–

1. अध्ययन क्षेत्र की आबादी
2. कोविड – 19के प्रभाव से प्रभावित श्रमिकों का अनुपात
3. सांख्यिकीय परीक्षणों की उपयुक्तता

नमूना चयन तकनीक–शोध में बहु–स्तरीय नमूना चयन (Multistage Sampling) अपनाया गया।

चरण 1: क्षेत्र चयन

ग्वालियर के श्रमिक–बहुल क्षेत्रों (लक्ष्मीगंज, हजीरामंडी, कम्पू, मुरार, बहोड़ापुर आदि) का चयन किया गया।

चरण 2: श्रमिक श्रेणियों का चयन

चार प्रमुख समूहों का चयन :

1. दिहाड़ी मजदूर
2. प्रवासी श्रमिक
3. घरेलू कामगार
4. छोटे स्वरोजगार/रिक्शा चालक

परिणाम एवं विश्लेषण– महामारी कोविड – 19के दौरान बेरोजगारी और उसके कारण ग्वालियर क्षेत्र के कमजोर वर्गों पर पड़े सामाजिक– आर्थिक, मनोवैज्ञानिक और पारिवारिक प्रभावों का विस्तृत विश्लेषण प्रस्तुत करता है।

ग्वालियर क्षेत्र का संक्षिप्त विवरण।

ग्वालियर मध्य प्रदेश का एक प्रमुख शहरी–अर्धशहरी केंद्र है जहाँ बड़ी संख्या में असंगठित क्षेत्र के श्रमिक, दिहाड़ी मजदूर, प्रवासी श्रमिक, घरेलू कामगार तथा छोटे स्वरोजगार करने वाले लोग निवास करते हैं। महामारी के दौरान इस शहर में लॉकडाउन, गतिशीलता प्रतिबंध और बाजार बंदी के कारण रोजगार का गहरा संकट उत्पन्न हुआ।

उत्तरदाताओं की जनसांख्यिकीय प्रोफाइल–

तालिका–1 : जनसांख्यिकीय विवरण (N = 392)

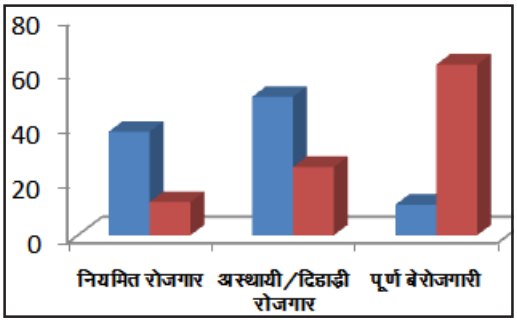
क्र.	विशेषता	श्रेणी	आवृत्ति	प्रतिशत
1	लिंग	पुरुष	252	64.3
		महिला	140	35.7
2	आयु समूह	18–30 वर्ष	118	30.1
		31–45 वर्ष	184	46.9
		46 वर्ष से अधिक	90	22.9
3	शिक्षा स्तर	अनपढ़	138	35.2
		प्राथमिक	152	38.8
		माध्यमिक एवं उच्चतर	102	26.0
4	मुख्य पेशा	दिहाड़ी मजदूर	152	38.8
		प्रवासी श्रमिक	104	26.5
		घरेलू कार्यकर्ता	60	15.3
		रिक्शा/ठेला चालक	76	19.4

46.9% उत्तरदाता 31–45 वर्ष के हैं, जो श्रम–प्रधान आयु वर्ग है। शिक्षा का स्तर निम्न होने से रोजगार अवसर सीमित थे, इसलिए महामारी के असर का अनुपात अधिक रहा। अधिकांश उत्तरदाताओं का रोजगार असंगठित क्षेत्र में है, जो कोविड – 19से सर्वाधिक प्रभावित हुआ।

महामारी से पहले और महामारी के दौरान रोजगार की स्थिति

तालिका–2 : रोजगार स्थिति में परिवर्तन

रोजगार स्थिति	महामारी पूर्व (%)	महामारी के दौरान (%)
नियमित रोजगार	38.0	12.2
अस्थायी/दिहाड़ी रोजगार	50.8	25.1
पूर्ण बेरोजगारी	11.2	62.7

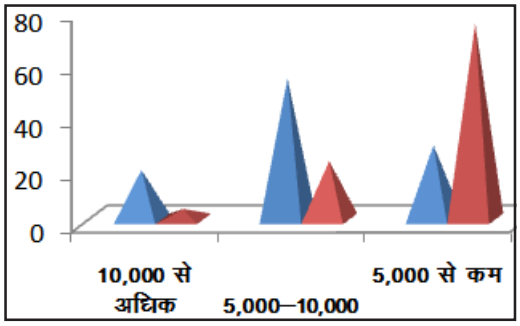


महामारी के दौरान बेरोजगारी 11.2% से बढ़कर 62.7% हो गई यह अत्यधिक गंभीर सामाजिक संकट को दर्शाता है। ग्वालियर में छोटे व्यवसाय, बाजार, परिवहन और निर्माण कार्य ठप होने से श्रमिक वर्ग पूरी तरह प्रभावित हुआ।

मासिक आय में गिरावट

तालिका–3 : मासिक आय में महामारी पूर्व और दौरान अंतर

आय समूह	महामारी पूर्व (%)	महामारी के दौरान (%)
रू10,000 से अधिक	18.6	3.8
रू5,000–10,000	53.4	22.0
रू 5,000 से कम	28.0	74.2

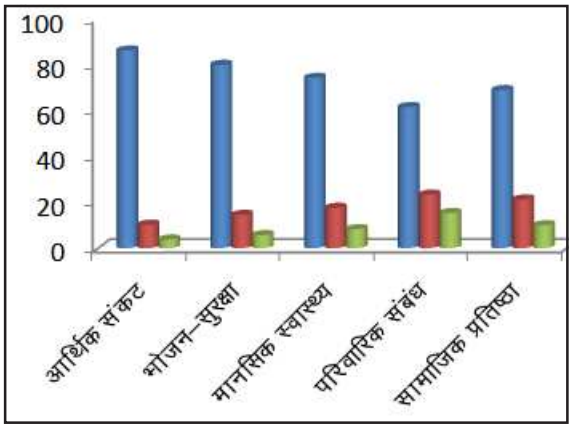


ग्वालियर के कमजोर वर्गों में आय में तीव्र गिरावट आई। महामारी से पहले 28% लोग ही रू5,000 से कम आय वाले थे, जबकि महामारी के दौरान यह बढ़कर 74.2% हो गया।

समाजशास्त्रीय प्रभावों का समेकित अवलोकन

तालिका–4 : सामाजिक प्रभावों की तीव्रता

प्रभाव क्षेत्र	उच्च प्रभाव (%)	मध्यम (%)	निम्न (%)
आर्थिक संकट	86.0	10.2	3.8
भोजन–सुरक्षा	79.8	14.5	5.7
मानसिक स्वास्थ्य	74.1	17.6	8.3
परिवारिक संबंध	61.4	23.3	15.3
सामाजिक प्रतिष्ठा	68.8	21.2	10.0



व्याख्या – सबसे गंभीर प्रभाव आर्थिक और भोजन–सुरक्षा पर देखा गया, जिसके कारण मानसिक तनाव और पारिवारिक समस्याएँ भी बढ़ीं।

तालिका–5 (अगले पृष्ठ पर देखे)

निष्कर्ष – यह अध्ययन स्पष्ट रूप से दर्शाता है कि कोविड – 19महामारी ने ग्वालियर क्षेत्र के कमजोर सामाजिक–आर्थिक वर्गों के जीवन पर गहरा और बहुआयामी प्रभाव डाला, जिसमें बेरोजगारी सर्वाधिक विनाशकारी तत्व के रूप में उभरी। रोजगार अवसरों के अचानक समाप्त हो जाने से न केवल आय में तीव्र गिरावट आई, बल्कि भोजन–सुरक्षा, स्वास्थ्य–सुविधाओं की उपलब्धता और आवास जैसी बुनियादी आवश्यकताएँ भी गंभीर रूप से प्रभावित हुईं। मानसिक तनाव, चिंता, भविष्य की अनिश्चितता तथा परिवारिक विवादों में वृद्धि महामारी के सामाजिक–मनोवैज्ञानिक प्रभावों को स्पष्ट रूप से रेखांकित करती है। प्रवासी श्रमिकों ने नौकरी छूटने, लंबी यात्रा, संसाधनों के अभाव और सामाजिक दूरी जैसे अतिरिक्त संघर्ष झेले। सरकारी राहत योजनाएँ अपेक्षाकृत कमजोर साबित हुईं और अधिकांश जरूरतमंद समूहों तक पर्याप्त रूप से नहीं पहुँच सकीं। कुल मिलाकर, शोध के निष्कर्ष बताते हैं कि महामारी ने कमजोर वर्गों की सामाजिक स्थिरता, आर्थिक सुरक्षा और मानसिक स्वास्थ्य को गहराई से प्रभावित किया तथा यह आवश्यकता उजागर की कि भविष्य में ऐसी परिस्थितियों से निपटने हेतु अधिक सुदृढ़ सामाजिक सुरक्षा तंत्र विकसित किए जाएँ।

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तालिका–5 : संयुक्त परिकल्पना परीक्षण सारणी

क्र.	परिकल्पना	प्रयुक्त परीक्षण	प्रमुख सांख्यकीय मान	p-value	निर्णय	अर्थ
H1	महामारी कोविड – 19के दौरान बेरोजगारी का कमजोर वर्गों की सामाजिक–आर्थिक स्थिति पर प्रतिकूल प्रभाव पड़ा।	स्वतंत्र t–परीक्षण (Independent t-test)	t = 11–84, Mean Difference = उच्च	0.000 (<0.05)	स्वीकृत	महामारी के दौरान आय में भारी गिरावट दर्ज हुई, जिससे सामाजिक–आर्थिक स्थिति अत्यधिक प्रभावित हुई।
H2	दिहाड़ी एवं प्रवासी श्रमिकों पर बेरोजगारी का प्रभाव अन्य श्रमिकों की तुलना में अधिक गंभीर रहा।	ANOVA (One-way)	F = 9.73	0.000 (<0.05)	स्वीकृत	विभिन्न पेशागत श्रेणियों में प्रभाव का अंतर बहुत स्पष्ट पाया गया, दिहाड़ी और प्रवासी श्रमिक सबसे अधिक प्रभावित।
H3	बेरोजगारी के कारण मानसिक तनाव में वृद्धि हुई।	सहसंबंध विश्लेषण (Correlation)	r = 0.71 (मजबूत सकारात्मक)	0.000 (<0.05)	स्वीकृत	बेरोजगारी बढ़ने के साथ मानसिक तनाव भी समानुपाती रूप से बढ़ा।
H4	सरकारी राहत योजनाओं का वितरण कमजोर वर्गों तक प्रभावी रूप से नहीं पहुँच पाया।	Mean Score Analysis	Mean= 2.62 (कम)	0.05 से कम	स्वीकृत	राहत योजनाएँ न समय पर पहुँचीं, न ही पर्याप्त थीं असंगठित क्षेत्र में पहुँच और भी कमजोर रही।
H5	महामारी के बाद रोजगार पाने में कमजोर वर्गों को अधिक कठिनाइयों का सामना करना पड़ा।	Regression Analysis	β = 0.63	0.000 (<0.05)	स्वीकृत	बेरोजगारी की अवधि जितनी लंबी रही, पुन: रोजगार पाना उतना ही कठिन हुआ।

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प्राथमिक और माध्यमिक विद्यालयों में कक्षा प्रबंधन तकनीकों की प्रभावशीलता

भारती शुक्ला*

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शोध सारांश – शिक्षाव्यवस्था में कक्षा संचालन एक अत्यंत महत्वपूर्ण भूमिका निभाता है। यह केवल शिक्षण प्रक्रिया का सहायक उपकरण नहीं है, बल्कि यह सम्पूर्ण अधिगम व्यवस्था की रीढ़ की हड्डी के समान है। कक्षा संचालन शिक्षक की कार्यकुशलता, निर्णय क्षमता, तथा संप्रेषण शैली को दर्शाता है। जब कक्षा में अनुशासन होता है, समय का समुचित उपयोग होता है, संसाधनों का सही प्रयोग होता है और विद्यार्थी प्रेरित रहते हैं, तब शैक्षणिक प्रक्रिया अधिक प्रभावी और उद्देश्यपूर्ण हो जाती है।

यह अध्ययन ग्वालियर संभाग के अंतर्गत आने वाले पाँच प्रमुख जिलों– ग्वालियर, मुरैना, भिंड, शिवपुरी और दतिया में स्थित प्राथमिक तथा माध्यमिक विद्यालयों पर केंद्रित है। इन विद्यालयों में शिक्षकों द्वारा अपनाई जा रही कक्षा संचालन की तकनीकी की व्यावहारिकता और उनकी प्रभावशीलता का गहन मूल्यांकन इस अध्ययन का मूल उद्देश्य है।

अध्ययन में यह जानने का प्रयास किया गया है कि शिक्षकों द्वारा कौन–कौन सी रणनीतियों अपनाई जाती हैं ताकि कक्षा में अनुशासन बना रहे, विद्यार्थी सक्रिय रूप से भाग लें, और शिक्षण प्रक्रिया व्यवस्थित रूप से आगे बढ़ सके। इसके अंतर्गत व्यवहार नियंत्रण की विधियाँ संसाधनों के प्रयोग की विविध तकनीकें, समय प्रबंधन की कुशलता और विद्यार्थियों को प्रेरित करने के लिए प्रयुक्त उपायों का विस्तुत रूप में विश्लेषण किया गया है। यह भी देखा गया है कि इन रणनीतियों का विद्यार्थियों की सीखने की गति, उपस्थिति, सहभागिता तथा अनुशासन पर क्या प्रभाव पड़ता है।

शब्द कुंजी –कार्यकुशलता, निर्णय क्षमता, तथा संप्रेषण शैली।

प्रस्तावना – शिक्षा का उद्देश्य केवल तथ्यों और जानकारी को विद्यार्थियों तक पहुँचाता नहीं है, बल्कि उसका मूल उद्देश्य विद्यार्थियों में नैतिक मूल्यों का विकास करना, सोचने–समझने की क्षमता का विस्तार करना, संवाद की कुशलता को बढ़ावा देना, तथा उन्हें जीवन के विविध पक्षों के लिए तैयार करता है। इस उद्देश्य की पूर्ति के लिए आवश्यक है कि कक्षा एक ऐसा स्थान बने जहाँ विद्यार्थी सुरक्षित, सक्रिय, जिज्ञासु और आत्मनिर्भर अनुभव करें।

अध्ययन के उद्देश्य:

1. ग्वालियर संभाग के प्राथमिक एवं माध्यमिक विद्यालयों में अपनाई जा रही कक्षा प्रबंधन तकनीकों की पहचान करना।
2. विभिन्न विद्यालयों में कक्षा प्रबंधन की प्रभावशीलता का तुलनात्मक मूल्यांकन करना।
3. यह समझना कि शिक्षक किन सामाजिक और शैक्षणिक संदर्भों में कौन–सी तकनीक अधिक प्रभावशाली पाते है।

अध्ययन का महत्व–कक्षा संचालन एक ऐसी प्रक्रिया है जो विद्यालयी शिक्षा की गुणवत्ता और प्रभावशीलता को प्रत्यक्ष रूप से प्रभावित करती है। यह अध्ययन ग्वालियर संभाग के प्राथमिक एवं माध्यमिक विद्यालयों में कक्षा संचालन की व्यवहारिक तकनीकों, शिक्षकों की कार्यशैली, तथा विद्यार्थियों की सहभागिता के बीच के संबंधों को स्पष्ट करता है। इसका महत्व निम्नलिखित बिंदुओं के माध्यम से समझा जा सकता है :

शिक्षकों के लिए मार्गदर्शक– यह अध्ययन शिक्षकों को यह समझने में सहायता करेगा कि वे जिन कक्षा संचालन तकनीकों का प्रयोग कर रहे हैं, वे कितनी प्रभावी हैं और किन क्षेत्रों में सुधार की आवश्यकता है। साथ ही यह भी स्पष्ट होगा कि कौन–सी विधियाँ विद्यार्थियों की सहभागिता बढ़ाने, अनुशासन बनाए रखने और अधिगम को प्रेरक बनाने में सहायक सिद्ध हो रही हैं। इससे शिक्षक स्वयं अपनी कार्यशैली का आत्ममूल्यांकन कर सकेंगे।

नीति निर्माताओं के लिए सहायक– ग्वालियर संभाग की सामाजिक, सांस्कृतिक एवं शैक्षणिक विविधताओं को ध्यान में रखते हुए यह अध्ययन नीति निर्माताओं को विद्यालय शिक्षा में सुधार हेतु महत्वपूर्ण सुझाव प्रदान करेगा। अध्ययन से प्राप्त आँकड़े और निष्कर्ष विभिन्न शैक्षणिक योजनाओं, कार्यक्रमों और संसाधनों के समुचित वितरण की दिशा में नीतिगत हस्तक्षेप की भूमिका निभा सकते हैं। विशेषकर ग्रामीण क्षेत्रों में कक्षा संचालन की जमीनी हकीकत को जानने में यह अध्ययन उपयोगी रहेगा।

शिक्षक प्रशिक्षण संस्थानों के लिए दिशा निर्देश– यह अध्ययन उन प्रशिक्षण संस्थानों के लिए अत्यंत उपयोगी सिद्ध होगा जो वर्तमान और भावी शिक्षकों के लिए प्रशिक्षण पाठ्यक्रम विकसित करते है इसमें स्पष्ट रूप से यह संकेत मिलेगा कि शिक्षकों को किन व्यवहारिक कौशलों, संवाद कौशल, समय प्रबंधन और प्रेरणादायक पद्धतियों में दक्षता विकसित करने की आवश्यकता है इस प्रकार, अध्ययन की सहायता से प्रशिक्षण पाठ्यक्रम अधिक व्यावहारिक, संदर्भ आधारित और परिणामोन्मुखी बनाया जा सकता

है।

शैक्षणिक अनुसंधान के लिए आधार– यह अध्ययन शैक्षणिक शोध के क्षेत्र में एक महत्त्वपूर्ण योगदान प्रदान करता है। इससे आगे आने वाले शोधार्थियों को कक्षा संचालन के विविध पहलुओं पर गहराई से अध्ययन करने के लिए एक सुदृढ़ आधार प्राप्त होगा। साथ ही यह शोध, शैक्षणिक नीति, शिक्षक व्यावसायिकता तथा विद्यालय प्रबंधन के संबंध में और अधिक सूक्ष्म अध्ययन की प्रेरणा देगा।

विद्यार्थी केंद्रित शिक्षण की दिशा में योगदान– चूँकि अध्ययन का प्रत्यक्ष संबंध कक्षा संचालन से है, अत: इसका अंतिम लाभ विद्यार्थियों को प्राप्त होगा। जब शिक्षक प्रभावी पद्धतियाँ अपनाएंगे, संवाद और अनुशासन का समुचित वातावरण बनेगा, तब विद्यार्थियों का अधिगम स्वत: बेहतर होगा। इस प्रकार यह अध्ययन विद्यार्थी केंद्रित शिक्षा प्रणाली को और अधिक सुदृढ़ बनाने में सहायक सिद्ध होगा।

क्षेत्रीय सीमा–यह अध्ययन केवल ग्वालियर संभाग तक सीमित है, जिसमें पाँच जिले ग्वालियर, मुरैना, भिंड, शिवपुरी एवं दतिया सम्मिलित हैं। इस क्षेत्र के बाहर के विद्यालय, शैक्षणिक संस्थान या शिक्षक इस अध्ययन का भाग नहीं हैं। अत: अध्ययन के निष्कर्षों को सम्पूर्ण प्रदेश या देश पर समान रूप से लागू करना सीमित दृष्टिकोण हो सकता है।

शैक्षणिक स्तर की सीमा–यह शोध केवल प्राथमिक 'कक्षा 1 से 5 तक' और माध्यमिक स्तर 'कक्षा 6 से 10 तक' के विद्यालयों तक ही सीमित है। उच्च माध्यमिक विद्यालय 'कक्षा 11 और 12' तथा महाविद्यालय अथवा अन्य शिक्षण संस्थानों को अध्ययन के अंतर्गत नहीं लिया गया है।

विद्यालयों के प्रकार–इस अध्ययन में सरकारी और निजी– दोनों प्रकार के विद्यालयों को सम्मिलित किया गया है, जिससे तुलनात्मक अध्ययन संभव हो सका। तथापि सहायता प्राप्त विद्यालय, अल्पसंख्यक संस्थान अथवा विशेष आवश्यकता वाले विद्यालयों (विशेष बच्चों हेतु को इसमें शामिल नहीं किया गया।

प्रतिभागियों की सीमा–अध्ययन में केवल शिक्षकों और विद्यार्थियों के दृष्टिकोण, अनुभव और विचारों को सम्मिलित किया गया है अभिभावकों, विद्यालय प्रबंधन समिति, शिक्षा, अधिकारियों, तथा समुदाय प्रतिनिधियों की राय या भूमिका को इस अध्ययन के दायरे में नहीं लिया गया है। जबकि यह वर्ग भी कक्षा संचालन की गुणवत्ता को प्रभावित करता है।

सीमित विद्यालयों की सहभागिता–समय, संसाधन और मानवबल की सीमाओं के कारण अध्ययन में केवल दस विद्यालयों को ही चयनित किया गया। प्रत्येक जिले से केवल दो विद्यालय लिए गए, जिससे विद्यालयों की संख्या सीमित रह गई। इस कारण से अध्ययन का क्षेत्रीय प्रतिनिधित्व सीमित हो गया और व्यापक निष्कर्ष निकालना चुनौतीपूर्ण हो गया।

प्रतिक्रियाओं की आत्म–स्वीकृति आधारित प्रवृत्ति–शिक्षकों से प्राप्त प्रतिक्रियाएँ मुख्यत: उनकी स्वयं की स्वीकृति (आत्म–रिपोर्टिंग) पर आधारित थी। इस प्रकार की जानकारी में स्वाभाविक रूप से यह संभावना बनी रहती है कि प्रतिभागी अपने उत्तरों को अतिशयोक्तिपूर्ण या सकारात्मक रूप में प्रस्तुत करें। इससे तथ्यात्मक निष्पक्षता प्रभावित हो सकती है।

महामारी जनित अवरोध – अध्ययन के दौरान कोरोना महामारी (वर्ष 2020–22 के दौरान) का प्रभाव शिक्षण संस्थानों पर गहरा रहा। कई विद्यालय लंबे समय तक बंद रहे, जिससे नियमित कक्षा अवलोकन करना संभव नहीं हो पाया। इससे शोधकर्ता को व्यवहारिक कक्षा स्थितियों को प्रत्यक्ष देखने और मूल्यांकन करने का पर्याप्त अवसर नहीं मिल सका।

साहित्य समीक्षा का परिचय–कक्षा प्रबंधन शिक्षा की प्रक्रिया में एक केंद्रीय तत्व के रूप में उभरा है, जो न केवल शिक्षण की गुणवत्ता को प्रभावित करता है, बल्कि छात्र व्यवहार, अनुशासन, सहभागिता और सीखने के वातावरण को भी आकार देता है। प्रभावी कक्षा प्रबंधन शिक्षक को न केवल पाठयक्रम संचालित करने में सहायता करता है, बल्कि छात्र–शिक्षक संबंधों को भी सुदृढ़ करता है।

कुशवाहा, एस (2015)–कुशवाहा के अनुसार कक्षा प्रबंधन न केवल अनुशासन बनाए रखने का साधन है, बल्कि यह शिक्षक की प्रभावशीलता का एक प्रमुख संकेतक भी है। उन्होने प्राथमिक स्तर पर देखा कि जहाँ शिक्षक छात्रों के व्यवहार, गतिविधियों और कक्षा संरचना को संतुलित रूप से नियंत्रित करते हैं, वहाँ छात्रों की सीखने की रुचि और संलग्नता अधिक देखी गई। उनका मानना है कि शिक्षक की रणनीतियाँ जैसे समूह क्रियाएँ, सकारात्मक पनर्बलन और व्यक्तिगत संवाद कक्षा में सकारात्मक वातावरण निर्माण में सहायक होती हैं।

शर्मा, रेखा (2018)–शर्मा ने अपने अध्ययन में माध्यमिक विद्यालयों में समय प्रबंधन को कक्षा प्रबंधन की एक आधारभूत तकनीक माना। उन्होंने यह पाया कि जिन शिक्षकों ने कक्षा समय का संरचित उपयोग किया, उन्होने छात्रों की एकाग्रता, होमवर्क पूर्णता, और कक्षा अनुशासन में आश्चर्यजनक सुधार दर्ज किए। समय प्रबंधन को उन्होने न केवल संगठनात्मक दक्षता, बल्कि छात्रों के आत्म–नियंत्रण और जिम्मेदारी से भी जोड़ा।

मिरा, अरुण (2020)–मिश्रा का निष्कर्ष था कि शिक्षक छात्र संवाद की गुणवत्ता ही कक्षा नियंत्रण की कुंजी है उनके अनुसार, जब शिक्षक छात्रों से खुले और समानतापूर्ण संवाद करते हैं, तो छात्र न केवल अधिक अनुशासित रहते हैं, बल्कि आत्मविश्वास से भरपूर होकर विचार भी व्यक्त करते हैं। इस संवादशीलता से सीखने का वातावरण उन्नत होता है और छात्र भावनात्मक रूप से भी विद्यालय से जुड़ते हैं।

शोध विधि–विद्यालयी शिक्षा में कक्षा संचालन की प्रभावशीलता का मूल्यांकन करने के लिए एक सुस्पष्ट और सुव्यवस्थित शोध पद्धति की आवश्यकता होती है, ताकि तथ्यात्मक जानकारी के आधार पर निष्कर्ष निकाले जा सके। प्रस्तुत अध्ययन के अंतर्गत ग्वालियर संभाग के प्राथमिक एवं माध्यमिक विद्यालयों में अपनाई जा रही कक्षा संचालन तकनीकी का निरीक्षण, मूल्यांकन तथा विश्लेषण किया गया है। इसके लिए निम्न शोध विधियाँ अपनाई गई।

कक्षा संचालन तकनीकों का तुलनात्मक विश्लेषण

व्यवहार नियंत्रण तकनीक – शिक्षकों ने कक्षा में अनुशासन बनाए रखने हेतु समय पर उपस्थिति, शांत वातावरण बनाए रखना, स्पष्ट नियम निर्धारण तथा सकारात्मक व्यवहार को प्रोत्साहन देने जैसी रणनीतियाँ अपनाई। इसके परिणामस्वरूप विद्यार्थियों में आत्मनियंत्रण और उत्तरदायित्व की भावना विकसित हुई।

शहरी और ग्रामीण विद्यालयों के बीच तुलना

1. **संसाधन उपलब्धता –** शहरी विद्यालयों में भौतिक सुविधाएँ जैसे पुस्तकालय, स्मार्ट बोर्ड, बैठने की उचित व्यवस्था, पंखे आदि पर्याप्त मात्रा में उपलब्ध थे, जबकि ग्रामीण विद्यालयों में ये सुविधाएँ सीमित थी।
2. **शिक्षकों की प्रशिक्षण स्थिति –** शहरी विद्यालयों के अधिकतर शिक्षक अद्यतन प्रशिक्षण प्राप्त कर चुके थे, जबकि ग्रामीण विद्यालयों के

शिक्षक प्रशिक्षण से वंचित थे, परन्तु उन्होने नवाचारात्मक तकनीकी का प्रयोग किया।

कक्षा संचालन तकनीकों का विद्यार्थियों पर प्रभाव:

1. **सक्रिय सहभागिता में वृद्धि –** संवादात्मक और गतिविधि आधारित शिक्षण अपनाने वाले विद्यालयों में विद्यार्थी अधिक सक्रिय रूप से भाग लेते देखे गए।
2. **अनुशासन में सुधार –** स्पष्ट नियमों और व्यवहार नियंत्रण तकनीकों के प्रयोग से कक्षा में अनुशासन की स्थिति बेहतर रही।

शहरी विद्यालयों की विशेषताएँ :

1. **संसाधनो की प्रचुरता –** शहरी विद्यालयों में शैक्षणिक, तकनीकी और अधोसंरचनात्मक संसाधन उपलब्ध है, जिससे शिक्षकों को नवाचारी तरीके अपनाने में सुविधा होती है।
2. **प्रशिक्षित शिक्षक –** शहरी क्षेत्रों के शिक्षक नियमित कार्यशालाओं और प्रशिक्षणों में भाग लेकर अपने शिक्षण कौशल को निरंतर अद्यतन रखते है।

ग्रामीण विद्यालयों की स्थिति और नवाचार :

संसाधन विहीनता की चुनौती – यद्यपि संसाधनों की कमी थी, फिर भी ग्रामीण शिक्षक स्थानीय सामग्री, कहानियों, खेल, विधि, चित्रात्मक शिक्षक आदि का प्रयोग करके प्रभावशाली शिक्षण कर रहे थे।

सिफारिशें –शोध निष्कर्षो के आधार पर निम्नलिखित सिफारिशें प्रस्तुत की जा रही है:

1. शिक्षक प्रशिक्षण को व्यवहारपरक बनाया जाए।
2. कक्षा प्रबंधन, संवाद कौशल, समय नियोजन और प्रेरणा तकनीकी को प्रशिक्षण पाठयक्रम में अनिवार्य रूप से शामिल किया जाए।
3. प्रशिक्षण कार्यशालाओं को केवल औपचारिक न रखते हुए, शिक्षकों को प्रयोगात्मक अभ्यास कराए जाए।

निष्कर्ष –ग्वालियर संभाग के प्राथमिक और माध्यमिक विद्यालयों में कक्षा प्रबंधन तकनीकों की प्रभावशीलता अनेक कारकों पर आधारित पाई गई, जिनमें प्रमुख है – संसाधनों की उपलब्धता, शिक्षकों का प्रशिक्षण, कक्षा का आकार, तथा विद्यालय की भौगोलिक स्थिति। अध्ययन से स्पष्ट होता है कि जिन विद्यालयों में पठन–पाठन से संबंधित पर्याप्त सामग्री, दृश्य श्रव्य उपकरण और संरचनात्मक सुविधाएं उपलब्ध थी, वहाँ शिक्षण प्रक्रिया अधिक व्यवस्थित और प्रभावशाली रही। वहीं प्रशिक्षित शिक्षकों ने संवाद आधारित एवं गतिविधि आधारित शिक्षण पद्धतियों को अपनाकर विद्यार्थियों की सहभागिता और अनुशासन में उल्लेखनीय सुधार लिया। छोटी कक्षाओं में शिक्षक प्रत्येक विद्यार्थी पर व्यक्तिगत ध्यान दे सके जिससे शिक्षण अधिक प्रभावशाली बना, जबकि अधिक विद्यार्थियों वाली कक्षाओं में यह चुनौतीपूर्ण रहा। शहरी विद्यालयों में सुविधाए अधिक थी, परन्तु ग्रामीण विद्यालयों के शिक्षक सीमित संसाधनों के बावजूद नवाचार एवं समर्पण द्वारा सफल कक्षा संचालन कर रहे थे।

संदर्भ ग्रंथ सूची :–

1. सुरेश कुमार शर्मा (2018) शिक्षा मनोविज्ञान दिल्ली वाणी प्रकाशन पृ. 102–114

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हिन्दी साहित्य में भारत विभाजन के बाद की पीढ़ी के योगदान के सन्दर्भ में अध्ययन

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शोध सारांश – भारत का विभाजन केवल एक राजनीतिक घटना नहीं था, बल्कि यह भारतीय उपमद्धीप के सामाजिक सांस्कृतिक और साहित्यिक इतिहास में एक गहरा एवं अविस्मरणीय अध्याय भी है। 1947 में हुए इस विभाजन ने करोड़ों लोगों के जीवन को प्रभावित किया और असंख्य मानव त्रासदियों को जन्म दिया। इस त्रासदी ने न केवल तत्कालीन समाज को झकझोरा, बल्कि साहित्यिक चेतना को भी गहरे स्तर पर आंदोलित किया। हिन्दी साहित्य में विभाजन के पश्चात जिस पीढ़ी का उद्धव हुआ, उसने न केवल इस ऐतिहासिक घटना की स्मृतियों को संरक्षित किया, बल्कि उसकी मानवीय, सामाजिक और सांस्कृतिक परिणतियों को भी साहित्य के माध्यम से अभिव्यक्त किया।

इस शोधपत्र में भारत विभाजन के पश्चात उभरी हिन्दी साहित्य की पीढ़ी के योगदान का विश्लेषणात्मक अध्ययन किया गया है। विशेष रूप से भीष्म साहनी, कृष्णा सोबती, कमलेश्वर, अमृता प्रीतम, उषा प्रियंवदा, मन्नू भंडारी जैसे साहित्यकारों की रचनाओं में विभाजन की पीड़ा, विस्थापन, शरणार्थी जीवन, स्त्री अस्मिता, साम्प्रदायिकता, मानवीय मूल्यों के क्षरण और सामाजिक विघटन की अनुभूतियों को केन्द्र में रखकर गहन विवेचन किया गया है इस पीढ़ी ने न केवल साहित्य को यथार्थवादी अभिव्यक्ति दी, बल्कि मानवीय संवेदाओं, स्मृतियों और सामाजिक सरोकारों को साहित्यिक विमर्श का महत्वपूर्ण हिस्सा भी बनाया।शोध मे गुणात्मक पद्धति अपनाते हुए हिन्दी उपन्यास, कहानी, आत्मकथा, संस्मरण एवं डायरी साहित्य का पाठ विश्लेषण किया गया है। अध्ययन में यह स्पष्ट हुआ कि विभाजन के बाद की साहित्यिक पीढ़ी ने अनुभव सत्य को प्राथमिकता दी और वाणीहीन वर्गो की पीड़ा, विस्थापन की यातना तथा स्त्रियों के जीवन संघर्ष को अपने साहित्य में प्रमुखता में स्थान दिया।

यह शोध न केवल विभाजनकालीन साहित्य की पड़ताल करता है, बल्कि वर्तमान सामाजिक–सांस्कृतिक परिप्रेक्ष्य में भी उस साहित्य की प्रासंगिकता को रेखांकित करता है। साथ ही यह विभाजन की स्मृतियों के पुनर्पाठ द्वारा समकालीन समाज के अंतर्विरोधों, साम्प्रदायिक तनाव और मानवीय मूल्य संकट की पहचान कर उनके समाधान की साहित्यिक संभावनाओं की भी चर्चा करता है।

शब्द कुंजी–भारत विभाजन, हिन्दी साहित्य, समकालीन लेखन, विस्थापन, साम्प्रदायिकता, स्त्री अस्मिता, मानवीय पीड़ा, कथा साहित्य, स्मृति विमर्श, साहित्यिक प्रतिरोध।

प्रस्तावना – भारत का स्वतंत्रता संग्राम जितना गौरवशाली और प्रेरणादायक रहा, उसकी परिणति उतनी ही त्रासद और पीड़ादायक रही। 15 अगस्त 1947 को भारत ने जहाँ एक ओर औपनिवेशिक दासता से मुक्ति पाई, वहीं दूसरी ओर उसी दिन देश का विभाजन हुआ, जिसने भारतीय उपमहाद्धीप की सामाजिक, सांस्कृतिक, धार्मिक और राजनीतिक संरचना को गहराई से प्रभावित किया। यह विभाजन न केवल एक भौगोलिक विभाजन था, बलिक करोड़ों लोगों की अस्मिता, पहचान, संस्कृति, परिवार और इतिहास का भी विभाजन था। लगभग एक करोड से अधिक लोगों का विस्थापन, लाखों लोगों की हत्या, साम्प्रदायिक दंगे और स्त्रियों के साथ हुए अत्याचार ने भारतीय इतिहास को ऐसी अमिट पीड़ा दी, जिसकी स्मृति आज भी समाज और साहित्य में जीवित है।

भारत विभाजन की यह त्रासदी केवल इतिहास की पुस्तकों तक सीमित नहीं रही, बल्कि इसका प्रभाव साहित्य, कला, संस्कृति और समाजशास्त्र तक व्यास हुआ। विशेषत: हिन्दी साहित्य में इस ऐतिहासिक दुर्घटना ने एक नई सृजनात्मक चेतना का संचार किया। विभाजन के बाद की पीढ़ी के साहित्यकारों ने इस त्रासदी को मात्र एक ऐतिहासिक घटना के रूप में न देखकर मानवीय संवेदना, विस्थापन की पीड़ा, अस्तित्व संकट, स्मृति और सांप्रदायिक तनाव के रूप में देखा और साहित्य के माध्यम से उसे अभिव्यक्त किया।

भीष्म साहनी का उपन्यास तमम, कृष्णा सोबत्ती की जिंदगीनामा, अमृता प्रीतम की पिंजर, कमलेश्वर का कितने पाकिस्तान, यशपाल का झूठा सच, मन्नू भंडारी, उषा प्रियंवदा और अलका सराबगी जैसी लेखिकाओं की रचनाएँ इस त्रासदी का यथार्थपरक चित्रण करने वाली रचनाएँ हैं। इन साहित्यकारों ने न केवल विभाजन की भयाभहता का चित्रण किया, बल्कि उस समय की स्त्री अस्मिता, विस्थापित जीवन, पारिवारिक विघटन, सामाजिक विखंडन और साम्प्रदायिक उत्माद को भी अपनी रचनाओ में सशक्त रूप से स्थान दिया।

विभाजन के प्रभाव ने हिन्दी साहित्य को न केवल विषयवस्तु की दृष्टि से समृद्ध किया, बल्कि भाषा, शैली, शिल्प और संवेदनात्मक अभिव्यक्ति में भी विविधता और गहराई प्रदान की। विभाजनकालीन एवं

विभाजनोत्तर पीढ़ी के साहित्य में न केवल इतिहास का दस्तावेजीकरण हुआ, बल्कि उसमें मानवीय पक्ष, सांस्कृतिक अस्मिता और सामाजिक सरोकारों का भी विस्तार हुआ। इस साहित्य ने न केवल तत्कालीन परिस्थितियों को चित्रित किया, बल्कि आने वाली पीढ़ियों के लिए एक चेतावनी और स्मृति स्वरूप साहित्यिक धरोहर भी सृजित की।

प्रस्तुत शोधपत्र में भारत विभाजन के बाद हिन्दी साहित्य में उभरी पीढ़ी के साहित्यकारों के योगदान का समीक्षात्मक अध्ययन किया गया है। इसमें उन रचनाओं का गहन विश्लेषण किया गया है, जो विभाजन की त्रासदी, विस्थापन, साम्प्रदायिक तनाव, स्त्री विमर्श, विस्थापित जीवन और मानवीय पीड़ा को केन्द्र में रखकर लिखी गई है। साथ ही, यह शोध समकालीन सामाजिक-सांस्कृतिक परिप्रेक्ष्य में भी उन रचनाओं की प्रासंगिकता की पड़ताल करता है।

इस अध्ययन का उद्देश्य विभाजन के बाद की साहित्यिक पीढ़ी द्वारा हिन्दी साहित्य में किए गए उस रचनात्मक योगदान को उजागर करना है, जिसने न केवल साहित्य को नई संवेदनशीलता दी, बल्कि सामाजिक विघटन और सांस्कृतिक संकट की अनुभूति को भी यथार्थ के धरातल पर प्रस्तुत किया। इस शोध के माध्यम से हिन्दी साहित्य में विभाजन और उसके प्रभाव को एक ऐतिहासिक साक्ष्य के रूप में देखने के साथ-साथ, उसे वर्तमान समय की समस्याओं से जोड़कर भी समझने का प्रयास किया गया है। अत: यह शोध केवल अतीत की त्रासदियों का दस्तावेज नहीं, बल्कि वर्तमान और भविष्य की सामाजिक संरचना के लिए भी एक चेतावनी और मानवीय संवेदनाओं के संरक्षण का साहित्यिक प्रयास है।

समीक्षात्मक साहित्य-भारत विभाजन भारतीय इतिहास की सबसे हृदय विदारक घटनाओं में एक रही है, जिसका प्रभाव भारतीय समाज, राजनीतिक और साहित्य पर गहराई से पड़ा। इस त्रासदी को हिन्दी साहित्य ने जितनी गहराई, संवेदनशीलता और विविध दृष्टियों से प्रस्तुत किया है, वह किसी भी भाषा साहित्य के लिए अनुकरणीय है। डॉ. नलिनी मिश्रा 2014' हिन्दी साहित्य में विभाजन विमर्श: एक पुनर्पाठ शीर्षक अपने शोध में विभाजन पर केन्द्रित साहित्य की विचारधारा और समय सापेक्षता का अध्ययन करने हुए समकालीन दृष्टि से उसके प्रभाव को रेखांकित किया।

इस शोध का उद्देश्य हिन्दी साहित्य में भारत विभाजन के पश्चात उत्पन्न साहित्यिक प्रवृत्तियों, रचनाकारों की सृजनात्मक चेतना और विभाजनोत्तर पीढ़ी के साहित्यिक योगदान का गहन अध्ययन करना है। इसके लिए शोध में गुणात्मक एवं विवेचनात्मक पद्धति का प्रयोग किया गया है। विभाजन सम्बन्धी हिन्दी कथा साहित्य की प्रमुख रचनाओं, उपन्यासों, कहानियों, संस्मरणों एवं आलोचनात्मक लेखों का पाठ विश्लेषण कर उनमें निहित विषय-वस्तु, सामजिक यर्थाथ, मानवीय पीड़ा, स्त्री संवेदना, साम्प्रदायिक तनाव तथा सांस्कृतिक विखंडन का विस्तृत विश्लेषण किया गया है।

शोध का सवरूप-प्रस्तुत शोध ऐतिहासिक साहित्यिक एवं समीक्षात्मक स्वरूप का है। इसमें विभाजन जैसी ऐतिहासिक घटना के सामाजिक-सांस्कृतिक प्रभावों का अध्ययन साहित्य के माध्यम से करने का प्रयास किया गया है। इस शोध में साहित्य को केवल रचनात्मक कला के रूप में न देकर एक ऐतिहासिक साक्ष्य और सामाजिक दस्तावेज के रूप में भी ग्रहण किया गया है। साहित्यकारों द्वारा विभाजन की पीड़ा, विस्थापन की त्रासदी, स्त्रियों के यौन उत्पीड़न, साम्प्रदायिकता के उन्माद और विस्थापित जीवन के संघर्ष को जिस गहराई और संवेदनशीलता से व्यक्त किया गया, उसका ऐतिहासिक और सामाजिक सन्दर्भो में मूल्यांकन करना इस शोध का प्रमुख लक्ष्य रहा है।

डेटा संकलन की विधि-शोध के लिए द्वितीयक स्त्रोतों का सहारा लिया गया। अध्ययन के लिए सामग्री विभिन्न विश्वविद्यालयों के पुस्तकालयों, ई-लाइब्रेरी, शोध-पत्रिकाओं, साहित्यिक जर्नल्स, आलोचनात्मक ग्रंथों, तथा शोध आलेखों से एकत्रित की गई। विशेष रूप से हिन्दी कथा साहित्य की प्रमुख रचनाएँ, जैसे के यशपाल का 'झूठा सच' भीष्म साहनी का 'तमस' कमलेश्वर का 'कितने पाकिस्तान' अमृता प्रीतम का 'पिंजर' मननू भंडारी की 'महाभोज' कुश्न चंदर, राजिंदर सिंह बेदी और कृष्णा सोबती की कहानियाँ, संस्मरण तथा विभाजन पर आधारित स्त्री लेखन को प्रमुखता से सम्मिलित किया गया।

साथ ही, शोध आधारित समीक्षातमक साहित्य का भी अध्ययन किया गया इसके अतिरिक्त विभाजन संकेतक ऐतिहासिक दस्तावेज, पत्र-पत्रिकाओं में प्रकाशित उल्लेख एवं शोध-पत्र, साहित्य अकादमी पत्रिकाएँ, और समकालीन विमर्शों से सम्बन्धित साहित्यिक सामग्री का संकलन कर शोध के लिए उपयुक्त डाटा एकत्रित किया गया।

डाटा विश्लेषण की विधि-संकलित साहित्यिक सामग्री का विश्लेषण गुणात्मक और विवेचनात्मक पद्धति के अन्तर्गत किया गया। पाठ विश्लेषण के माध्यम से उपन्यासों, कहानियों और संस्मरणों में चित्रित घटनाओं, पात्रों, सामाजिक परिस्थितियों स्त्री पात्रों की मनोदशा, साम्प्रदायिक तनाव तथा विस्थापन की स्थिति का गहराई से अध्ययन किया गया। साथ ही तुलनात्मक दृष्टि अपनाते हुए विभिन्न साहित्यकारों की रचनाओं में विभाजन के प्रभावों और अभिव्यक्ति के अंतर को भी चिन्हित किया गया। इसमें यह देखा गया कि विभाजन की समान ऐतिहासिक पृष्ठभूमि होते हुए भी भिन्न साहित्याकारों ने किस दृष्टिकोण से इस त्रासदी को अपने साहित्य में रूपायित किया है।

अध्ययन की सीमाएँ-प्रस्तुत शोध का क्षेत्र विशेष रूप से हिन्दी कथा साहित्य तक सीमित है। इसमें केवल विभाजन विषयक उपन्यासों, कहानियों, संस्मरणों और आलोचनात्मक लेखों का चयन कर अध्ययन किया गया है। अन्प्य भारतीय भाषाओं के साहित्य, अंग्रेजी अथवा उर्दू साहित्य एवं समीक्षाओं तक सीमित है। चूँकि विभाजन साहित्य एक अत्यन्त व्यापक और बहुआयामी विषय है, अत: इस शोध में केवल प्रतिनिधि रचनाओं एवं समीक्षाओं का चयन कर अध्ययन किया गया। शोध का उद्देश्य उम्पूर्ण विभाजन साहित्य का सर्वेक्षण करना न होकर, विभाजन के प्रभाव और विभाजनोत्तर पीढ़ी के साहित्यिक योगदान को चिन्हित कर उसका विश्लेषण प्रस्तुत करना है।

शोध अवधि-इस शोध में सन् 2010 से 2024 तक प्रकाशित हिन्दी कथा साहित्य और आलोचनात्मक लेखों को प्राथमिकता दी गई है। समकालीन संदभों में विभाजन साहित्य के नवीन विमर्श, स्त्री, स्मृति विमर्श, सांप्रदायिकता, विस्थापन और सांस्कृतिक विखंडन जैसे विषयों को विशेष रूप से ध्यान में रखते हुए साहित्य और समीक्षाओं का चयन किया गया।

सत्यापन एवं प्रामाणिकता-संकलित समस्त साहित्यिक सामग्री और समीक्षात्मक लेखों की प्रामाणिकता सुनिश्चित करने हेतु प्रतिष्ठित विश्वविद्यालयों के पुस्तकालयों, साहित्य अकादमी द्वारा प्रकाशित पत्रिकाओं तथा सूचिबद्ध शोध पत्रिकाओं से सामग्री का संकलन किया गया। प्रत्येक संदर्भ का समुचित स्त्रोत एवं प्रकाशन वर्ष का उल्लेख किया

गया है।

प्रस्तुत शोध में विभाजनकालीन और विभाजनोतर हिन्दी साहित्य का गहन अध्ययन एवं विश्लेषण करने के पश्चात निम्नलिखित महत्वपूर्ण निष्कर्ष प्राप्त हुए हैं, जो हिन्दी साहित्य में भारत विभाजन के बाद की पीढ़ी के योगदान को रेखांकित करते है।

1. **हिन्दी साहित्य में विभाजन का व्यापक प्रभाव**–शोध के परिणामस्वरूप यह स्पष्ट हुआ कि भारत विभाजन ने हिन्दी साहित्य की विषयवस्तु, संवेदना और अभिव्यक्ति शैली पर गहरा प्रभाव डाला। विभाजन की त्रासदी को हिन्दी साहित्यकारों ने केवल ऐतिहासिक घटना न मानकर, मानवीय संवेदना, सामाजिक विघटन और सांस्कृतिक संकट के रूप में प्रस्तुत किया। विशेष रूप से भीष्म साहनी, यशपाल, कमलेश्वर, अमृता प्रीतम, कृश्न चंदर, राजिंदर सिंह वेदी और मन्नू भंडारी जैसे रचनाकारों ने विभाजन की पीड़ा को रचनात्मक अभिव्यक्ति दी।

2. **विभाजनोत्तर पीढ़ी का सृजनात्मक योगदान**–शोध में यह तथ्य उभरकर आया कि विभाजन के बाद की साहित्यिक पीढ़ी ने हिन्दी साहित्य में न केवल त्रासदी और विस्थापन का यथार्थ चित्रण किया, बल्कि सांप्रदायिकता, धर्मांधता, स्त्री अस्मिता, विस्थापित जीवन की पीड़ा, और स्मृति विमर्श को भी प्रमुखता से स्थान दिया। इस पीढ़ी ने साहित्य के माध्यम से मानवीय मूल्यों की पुनर्स्थापना तथा सामाजिक सौहार्द का संदेश देने का प्रयास किया।

3. **स्त्री विमर्श का सशक्त स्वरूप** –परिणामों के अनुसार विभाजन साहित्य में स्त्रियों की यातना, यौन हिंसा, सामाजिक उपेक्षा तथा उनके प्रतिरोध को सशक्त स्वर में उकेरा गया। अमृता प्रीतम के पिंजर, कृष्णा सोबती की कहानियों और मन्नू भंडारी के साहित्य में स्त्री पात्र न केवल पीड़िया के रूप में चित्रित हुई, बल्कि वे प्रतिरोध और स्वावलंबन का भी प्रतीक बनी।

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स्मार्ट कक्षाएं, ब्लेंडेड एवं हाइब्रिड लर्निंग मॉडल – उच्च शिक्षा में नवाचार और प्रभाव

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शोध सारांश – वर्तमान समय में उच्च शिक्षा प्रणाली तीव्र गति से डिजिटल परिवर्तन की ओर बढ़ रही है। स्मार्ट कक्षाएं, ब्लेंडेड एवं हाइब्रिड लर्निंग मॉडल इस परिवर्तन के प्रमुख घटक के रूप में उभरकर सामने आए हैं। स्मार्ट कक्षाएं तकनीकी संसाधनों के माध्यम से शिक्षण को अधिक प्रभावी, रोचक एवं सहभागितापूर्ण बनाती हैं, जबकि ब्लेंडेड लर्निंग ऑनलाइन एवं ऑफलाइन शिक्षण विधियों का संतुलित संयोजन प्रस्तुत करती है। हाइब्रिड लर्निंग मॉडल भौतिक कक्षा और वर्चुअल कक्षा के समन्वय द्वारा शिक्षार्थियों को लचीलापन एवं सतत अधिगम के अवसर प्रदान करता है। कोविड–19 के पश्चात इन शिक्षण मॉडलों की उपयोगिता और अधिक स्पष्ट हुई है। यह शोध–पत्र उच्च शिक्षा में स्मार्ट कक्षाओं, ब्लेंडेड एवं हाइब्रिड लर्निंग मॉडल की अवधारणा, उनकी प्रासंगिकता तथा शिक्षण–अधिगम प्रक्रिया पर पड़ने वाले प्रभावों का विश्लेषण प्रस्तुत करता है।

शब्द कुंजी– अध्ययन का औचित्य एवं उद्देश्य, ब्लेंडेड लर्निंग मॉडल, हाइब्रिड लर्निंग मॉडल, स्मार्ट कक्षाएं एवं 21 वीं सदी के कौशल, चुनौतियाँ एवं सीमाएं, समाधान एवं भविष्य की संभावनाएं, सुझाव।

प्रस्तावना – 21वीं सदी में उच्च शिक्षा व्यवस्था तीव्र गति से परिवर्तन के दौर से गुजर रही है। सूचना एवं संचार प्रौद्योगिकी के विकास ने पारंपरिक शिक्षण पद्धतियों को चुनौती देते हुए शिक्षण–अधिगम प्रक्रिया को अधिक लचीला, संवादात्मक और प्रभावी बनाया है। स्मार्ट कक्षाएं डिजिटल बोर्ड, इंटरनेट, मल्टीमीडिया तथा लर्निंग मैनेजमेंट सिस्टम जैसे आधुनिक संसाधनों के माध्यम से ज्ञान के प्रस्तुतीकरण को सशक्त बनाती हैं। इसके साथ ही ब्लेंडेड एवं हाइब्रिड लर्निंग मॉडल ने ऑनलाइन और ऑफलाइन शिक्षण के संतुलित समन्वय द्वारा विद्यार्थियों को आत्मनिर्देशित अधिगम के अवसर प्रदान किए हैं। विशेष रूप से कोविड–19 महामारी के बाद इन नवाचारों की प्रासंगिकता और अधिक बढ़ी है। वर्तमान शोध–पत्र उच्च शिक्षा में स्मार्ट कक्षाओं, ब्लेंडेड तथा हाइब्रिड लर्निंग मॉडल की अवधारणा, आवश्यकता एवं प्रभावों का विश्लेषण प्रस्तुत करने का प्रयास करता है।

अध्ययन का औचित्य –वर्तमान समय में उच्च शिक्षा संस्थान तीव्र तकनीकी परिवर्तनों का सामना कर रहे हैं। पारंपरिक शिक्षण पद्धतियाँ आज के डिजिटल युग के शिक्षार्थियों की आवश्यकताओं को पूर्ण रूप से संतुष्ट नहीं कर पा रही हैं। स्मार्ट कक्षाएं, ब्लेंडेड एवं हाइब्रिड लर्निंग मॉडल शिक्षण प्रक्रिया को अधिक प्रभावी, लचीला एवं विद्यार्थी–केंद्रित बनाने में सहायक सिद्ध हो रहे हैं। इन शिक्षण मॉडलों के माध्यम से न केवल ज्ञान की गुणवत्ता में वृद्धि होती है, बल्कि विद्यार्थियों की सहभागिता, रुचि तथा आत्मनिर्भरता भी बढ़ती है। इसके अतिरिक्त, कोविड–19 महामारी के पश्चात शिक्षा में डिजिटल साधनों की अनिवार्यता स्पष्ट हो गई है। ऐसी स्थिति में इन नवाचारों का वैज्ञानिक एवं अकादमिक अध्ययन अत्यंत आवश्यक हो जाता है, ताकि उच्च शिक्षा में उनकी उपयोगिता, प्रभावशीलता एवं सीमाओं को समझा जा सके।

अध्ययन के उद्देश्य –प्रस्तुत शोध–पत्र का मुख्य उद्देश्य उच्च शिक्षा में स्मार्ट कक्षाओं, ब्लेंडेड एवं हाइब्रिड लर्निंग मॉडल की अवधारणा को स्पष्ट करना है। इसके साथ ही इन शिक्षण मॉडलों के माध्यम से शिक्षण–अधिगम प्रक्रिया में आए परिवर्तनों का विश्लेषण करना तथा विद्यार्थियों और शिक्षकों पर पड़ने वाले प्रभावों को समझना भी अध्ययन का महत्वपूर्ण उद्देश्य है। यह शोध उच्च शिक्षा के संदर्भ में तकनीक आधारित शिक्षण के भविष्य की दिशा को रेखांकित करने का प्रयास करता है।

स्मार्ट कक्षाओं की अवधारणा –स्मार्ट कक्षाएं आधुनिक तकनीक पर आधारित ऐसी शिक्षण व्यवस्था हैं, जो पारंपरिक कक्षा शिक्षण को डिजिटल संसाधनों के माध्यम से अधिक प्रभावी एवं रोचक बनाती हैं। इन कक्षाओं में डिजिटल बोर्ड, प्रोजेक्टर, कंप्यूटर, इंटरनेट, मल्टीमीडिया सामग्री तथा लर्निंग मैनेजमेंट सिस्टम जैसे उपकरणों का उपयोग किया जाता है, जिससे विषयवस्तु का प्रस्तुतीकरण सरल और स्पष्ट हो जाता है। स्मार्ट कक्षाएं विद्यार्थियों को दृश्य, श्रव्य और अंत:क्रियात्मक अनुभव प्रदान करती हैं, जिससे उनकी समझ और स्मरण शक्ति में वृद्धि होती है।

स्मार्ट कक्षा व्यवस्था में शिक्षक की भूमिका केवल ज्ञान प्रदाता तक सीमित न रहकर मार्गदर्शक एवं सहयोगी की हो जाती है, जबकि विद्यार्थी सक्रिय सहभागी के रूप में अधिगम प्रक्रिया से जुड़ते हैं। इस प्रकार की कक्षाएं व्यक्तिगत अधिगम को बढ़ावा देती हैं तथा विद्यार्थियों की सीखने की गति और क्षमता के अनुसार सामग्री उपलब्ध कराने में सहायक होती हैं। उच्च शिक्षा संस्थानों में स्मार्ट कक्षाओं का उपयोग शिक्षण की गुणवत्ता में सुधार, शैक्षिक नवाचार को प्रोत्साहन तथा वैश्विक स्तर पर प्रतिस्पर्धात्मक क्षमता विकसित करने में महत्वपूर्ण भूमिका निभाता है।

ब्लेंडेड लर्निंग मॉडल –ब्लेंडेड लर्निंग मॉडल शिक्षण की ऐसी आधुनिक पद्धति है, जिसमें पारंपरिक कक्षा शिक्षण और ऑनलाइन शिक्षण का संतुलित संयोजन किया जाता है। इस मॉडल के अंतर्गत विद्यार्थी प्रत्यक्ष

कक्षा में शिक्षक के मार्गदर्शन में अध्ययन करते हैं, साथ ही डिजिटल प्लेटफॉर्म के माध्यम से ऑनलाइन सामग्री, वीडियो लेक्चर, असाइनमेंट तथा मूल्यांकन गतिविधियों में भी भाग लेते हैं। ब्लेंडेड लर्निंग विद्यार्थियों को समय और स्थान का लचीलापन प्रदान करती है, जिससे वे अपनी सुविधा और क्षमता के अनुसार सीखने की प्रक्रिया को आगे बढ़ा सकते हैं।

इस मॉडल के प्रमुख स्वरूपों में रोटेशन मॉडल विशेष रूप से उल्लेखनीय है, जिसमें विद्यार्थी निर्धारित समय के अनुसार ऑफलाइन और ऑनलाइन गतिविधियों के बीच स्थानांतरित होते हैं। ब्लेंडेड लर्निंग से शिक्षण अधिक विद्यार्थी-केंद्रित बनता है तथा आत्मनिर्देशित अधिगम को बढ़ावा मिलता है। उच्च शिक्षा में यह मॉडल शिक्षण की गुणवत्ता सुधारने, डिजिटल दक्षताओं के विकास और सीखने के परिणामों को सुदृढ़ बनाने में महत्वपूर्ण भूमिका निभाता है।

हाइब्रिड लर्निंग मॉडल –हाइब्रिड लर्निंग मॉडल शिक्षा की वह आधुनिक व्यवस्था है, जिसमें भौतिक कक्षा शिक्षण और वर्चुअल शिक्षण को एक साथ एकीकृत किया जाता है। इस मॉडल के अंतर्गत कुछ विद्यार्थी कक्षा में प्रत्यक्ष रूप से उपस्थित रहते हैं, जबकि अन्य विद्यार्थी उसी समय ऑनलाइन माध्यम से शिक्षण प्रक्रिया से जुड़ते हैं। हाइब्रिड लर्निंग तकनीकी साधनों की सहायता से दोनों प्रकार के शिक्षार्थियों को समान शैक्षिक अनुभव प्रदान करने का प्रयास करती है।

यह मॉडल उच्च शिक्षा में लचीलापन, समावेशन और सतत अधिगम को बढ़ावा देता है। विशेष रूप से कोविड-19 महामारी के पश्चात हाइब्रिड लर्निंग की उपयोगिता और अधिक स्पष्ट हुई है, क्योंकि इसने शैक्षणिक गतिविधियों को बिना बाधा के निरंतर बनाए रखने में सहायता की। हाइब्रिड लर्निंग के माध्यम से शिक्षण अधिक अनुकूल, सुलभ और तकनीक-संवेदनशील बनता है। यह मॉडल न केवल शैक्षणिक निरंतरता सुनिश्चित करता है, बल्कि उच्च शिक्षा संस्थानों को भविष्य की चुनौतियों के लिए तैयार करने में भी महत्वपूर्ण भूमिका निभाता है।

शिक्षण-अधिगम प्रक्रिया पर प्रभाव –स्मार्ट कक्षाएं, ब्लेंडेड एवं हाइब्रिड लर्निंग मॉडल ने शिक्षण-अधिगम प्रक्रिया को बहुआयामी रूप से प्रभावित किया है। इन नवाचारी शिक्षण व्यवस्थाओं के माध्यम से विद्यार्थियों की सहभागिता में उल्लेखनीय वृद्धि हुई है, क्योंकि तकनीकी उपकरण शिक्षण को अधिक रोचक, संवादात्मक और अनुभवात्मक बनाते हैं। डिजिटल सामग्री, मल्टीमीडिया संसाधन तथा ऑनलाइन गतिविधियाँ विद्यार्थियों को सक्रिय रूप से सीखने की प्रक्रिया से जोड़ती हैं। इसके परिणामस्वरूप अधिगम अधिक प्रभावी एवं दीर्घकालिक बनता है।

इन मॉडलों के प्रयोग से व्यक्तिगत अधिगम को भी प्रोत्साहन मिलता है, क्योंकि विद्यार्थी अपनी क्षमता, रुचि और गति के अनुसार अध्ययन कर सकते हैं। शिक्षण-अधिगम प्रक्रिया में शिक्षक की भूमिका पारंपरिक व्याख्याता से बदलकर मार्गदर्शक और सहायक की हो गई है, जो विद्यार्थियों को सही दिशा में सीखने हेतु प्रेरित करता है। साथ ही, मूल्यांकन प्रक्रिया में भी परिवर्तन देखने को मिलता है, जहाँ निरंतर आकलन, ऑनलाइन परीक्षण और फीडबैक आधारित मूल्यांकन को महत्व दिया जा रहा है। इस प्रकार तकनीक आधारित शिक्षण मॉडल उच्च शिक्षा में गुणवत्ता, प्रभावशीलता और सीखने के परिणामों को सुदृढ़ बनाने में महत्वपूर्ण योगदान देते हैं।

स्मार्ट कक्षाएं एवं 21वीं सदी के कौशल-स्मार्ट कक्षाएं और तकनीक आधारित शिक्षण मॉडल विद्यार्थियों में 21वीं सदी के आवश्यक कौशलों के विकास में महत्वपूर्ण भूमिका निभाते हैं। डिजिटल शिक्षण वातावरण विद्यार्थियों को केवल विषयवस्तु तक सीमित न रखकर आलोचनात्मक सोच, समस्या समाधान और निर्णय लेने की क्षमता विकसित करने के लिए प्रेरित करता है। स्मार्ट कक्षाओं में प्रयोग होने वाली इंटरएक्टिव तकनीकें विद्यार्थियों को प्रश्न पूछने, विचार साझा करने और तर्कपूर्ण विश्लेषण करने के अवसर प्रदान करती हैं।

इसके अतिरिक्त, डिजिटल प्लेटफॉर्म और ऑनलाइन गतिविधियाँ रचनात्मकता को प्रोत्साहित करती हैं, जहाँ विद्यार्थी परियोजना कार्य, प्रस्तुतीकरण और सहयोगात्मक अधिगम के माध्यम से नए विचार विकसित करते हैं। स्मार्ट कक्षाएं डिजिटल साक्षरता को भी सुदृढ़ करती हैं, जिससे विद्यार्थी तकनीकी उपकरणों का सुरक्षित और प्रभावी उपयोग सीखते हैं। सहयोग एवं संचार कौशल का विकास भी इन शिक्षण मॉडलों का प्रमुख परिणाम है, क्योंकि समूह कार्य, ऑनलाइन चर्चा और आभासी सहभागिता विद्यार्थियों को टीम वर्क के लिए तैयार करती है। इस प्रकार स्मार्ट कक्षाएं उच्च शिक्षा में विद्यार्थियों को वैश्विक स्तर पर सक्षम और प्रतिस्पर्धी बनाने में सहायक सिद्ध होती हैं।

चुनौतियाँ एवं सीमाएँ-स्मार्ट कक्षाएं, ब्लेंडेड एवं हाइब्रिड लर्निंग मॉडल के व्यापक उपयोग के बावजूद इनके समक्ष अनेक चुनौतियाँ एवं सीमाएं विद्यमान हैं। सबसे प्रमुख चुनौती तकनीकी अवसंरचना की कमी है, विशेषकर ग्रामीण और संसाधन-वंचित क्षेत्रों में, जहाँ पर्याप्त इंटरनेट सुविधा, डिजिटल उपकरण तथा तकनीकी समर्थन उपलब्ध नहीं हो पाता। इसके कारण सभी विद्यार्थियों को समान शैक्षिक अवसर प्राप्त नहीं हो पाते, जिससे डिजिटल डिवाईस की समस्या उत्पन्न होती है।

इसके अतिरिक्त, शिक्षकों में तकनीकी दक्षता का अभाव भी एक महत्वपूर्ण सीमा के रूप में सामने आता है। प्रभावी तकनीक आधारित शिक्षण के लिए प्रशिक्षित एवं दक्ष शिक्षकों की आवश्यकता होती है, किंतु पर्याप्त प्रशिक्षण कार्यक्रमों के अभाव में शिक्षण की गुणवत्ता प्रभावित हो सकती है। साथ ही, साइबर सुरक्षा एवं डेटा गोपनीयता से संबंधित जोखिम भी बढ़ जाते हैं, जिससे विद्यार्थियों की व्यक्तिगत जानकारी की सुरक्षा एक गंभीर चिंता का विषय बनती है। इन चुनौतियों के कारण स्मार्ट कक्षाओं और तकनीक आधारित शिक्षण मॉडलों के सफल क्रियान्वयन में बाधाएँ उत्पन्न होती हैं।

समाधान एवं भविष्य की संभावनाएं-स्मार्ट कक्षाओं, ब्लेंडेड एवं हाइब्रिड लर्निंग मॉडल से संबंधित चुनौतियों के समाधान हेतु समन्वित एवं दीर्घकालिक प्रयासों की आवश्यकता है। सर्वप्रथम, तकनीकी अवसंरचना को सुदृढ़ करना आवश्यक है, जिसके अंतर्गत उच्च गति इंटरनेट, आधुनिक डिजिटल उपकरण तथा तकनीकी सहायता प्रणाली का विस्तार किया जाना चाहिए। इससे सभी विद्यार्थियों को समान शैक्षिक अवसर उपलब्ध कराए जा सकते हैं।

शिक्षकों की तकनीकी दक्षता बढ़ाने के लिए नियमित एवं प्रभावी प्रशिक्षण कार्यक्रमों का आयोजन किया जाना चाहिए, ताकि वे तकनीक आधारित शिक्षण विधियों का कुशलतापूर्वक उपयोग कर सकें। इसके साथ ही, नीति स्तर पर सरकार और शैक्षणिक संस्थानों के बीच सहयोग को प्रोत्साहित करना आवश्यक है, जिससे स्मार्ट शिक्षा से संबंधित योजनाओं का सफल क्रियान्वयन हो सके। भविष्य में आर्टिफिशियल इंटेलिजेंस, वर्चुअल रियलिटी और डेटा एनालिटिक्स जैसी उन्नत तकनीकों के समावेशन

से शिक्षण–अधिगम प्रक्रिया और अधिक प्रभावी बन सकती है। इस प्रकार तकनीक आधारित शिक्षण मॉडल उच्च शिक्षा को अधिक समावेशी, सुलभ और गुणवत्तापूर्ण बनाने की दिशा में महत्वपूर्ण संभावनाएं प्रस्तुत करते हैं।

सुझाव एवं निष्कर्ष–इस अध्ययन से यह निष्कर्ष प्राप्त होता है कि स्मार्ट कक्षाएं, ब्लेंडेड एवं हाइब्रिड लर्निंग मॉडल उच्च शिक्षा में शिक्षण–अधिगम प्रक्रिया को अधिक प्रभावी, लचीला एवं छात्र–केंद्रित बनाने में महत्वपूर्ण भूमिका निभाते हैं। इन शिक्षण मॉडलों के माध्यम से विद्यार्थियों की सहभागिता, व्यक्तिगत अधिगम तथा 21वीं सदी के आवश्यक कौशलों का विकास संभव हो पाता है। अध्ययन यह भी दर्शाता है कि तकनीक के समुचित उपयोग से शिक्षण की गुणवत्ता में वृद्धि होती है और शिक्षा अधिक सुलभ बनती है।

सुझाव के रूप में यह आवश्यक है कि उच्च शिक्षा संस्थान तकनीकी अवसंरचना को सुदृढ़ करने के साथ–साथ शिक्षकों के लिए सतत प्रशिक्षण कार्यक्रम विकसित करें। डिजिटल डिवाइड को कम करने हेतु वंचित वर्गों के विद्यार्थियों को आवश्यक संसाधन उपलब्ध कराए जाने चाहिए। इसके अतिरिक्त, नीति–निर्माण स्तर पर डिजिटल शिक्षा को बढ़ावा देने वाली दीर्घकालिक रणनीतियाँ अपनाई जानी चाहिए। इस प्रकार उपयुक्त योजनाओं एवं नवाचारों के माध्यम से स्मार्ट कक्षाएं तथा ब्लेंडेड–हाइब्रिड लर्निंग मॉडल उच्च शिक्षा को भविष्य उन्मुख एवं गुणवत्तापूर्ण बनाने में सहायक सिद्ध हो सकते हैं।

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