Chapter : 28

Mother Tongue-Based Education in NEP 2020: Opportunities and Challenges

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Abstract

The National Education Policy (NEP) 2020 introduces a transformative framework aimed at overhauling India's education system, with a significant focus on promoting mother tongue-based education in the foundational years. This paper explores the policy's emphasis on holistic learning, multilingualism, and equitable access to education, particularly through instruction in a child's home language. Drawing on national and international research, the paper reviews the pedagogical benefits of mother tongue instruction, such as improved cognitive development, higher academic achievement, and enhanced inclusivity. However, the paper also examines the challenges in implementation, including shortages of trained teachers, inadequate teaching resources in regional languages, and societal preference for English-medium education. The literature review highlights both the historical context and current discourse surrounding language policy in Indian education. The paper concludes that while mother tongue-based education under NEP 2020 holds great promise for improving learning outcomes and preserving linguistic diversity, its success will depend on sustained policy support, adequate funding, and collaborative efforts among educators, policymakers, and communities.

Keywords: NEP 2020, mother tongue education, multilingualism, India, early childhood education, language policy, inclusive education

Introduction

The **National Education Policy (NEP) 2020** proposes transformative changes in the Indian education system. It aims to ensure universal education from **pre-school to secondary school**, emphasizing **holistic development** and making education **inclusive, equitable, and accessible** to all.

A key reform in NEP 2020 is the promotion of **mother tongue or regional language** as the medium of instruction in early childhood education. This approach aligns with the policy's vision of developing morally grounded, creative, and thoughtful individuals. However, implementing this vision comes with its own set of challenges.

Objectives

- To emphasize the value of early childhood mother tongue training as suggested by NEP 2020.
- To investigate the cultural, cognitive, and educational advantages of learning in one's native tongue.
- To determine the main obstacles to implementing mother tongue instruction in various linguistic regions.
- To make useful recommendations for the inclusive and successful use of NEP 2020's language policy.

Literature Review

The execution of education based on the mother tongue has been a focal point of considerable academic inquiry, both in India and on a global scale. Numerous investigations have emphasized its teaching advantages, in addition to the challenges it encounters in multilingual and resource-challenged settings such as India.

Numerous national and international educational studies have examined and endorsed the use of the mother tongue as a teaching medium. Early instruction in a child's first language improves comprehension, critical thinking, and overall learning results, according to academics (UNESCO, 2003). In its position paper, UNESCO promotes mother tongue teaching as a way to foster educational equity and diversity, especially in the foundational years.

Cummins (2000) proposed in his theory of language interdependence that a strong foundation in a person's first language can enhance the acquisition of additional languages, including English. This idea supports India's three-language policy, which promotes multilingualism while preserving cultural and linguistic identities.

According to Mohanty (2009), a prominent Indian linguist and educator, mother tongue-based multilingual education (MTB-MLE) is essential in multilingual settings like India, where it is vital to uphold linguistic diversity while ensuring academic achievement. His findings indicate that children from tribal and minority language backgrounds perform better when taught in their native languages.

Moreover, the National Curriculum Framework (NCF) of 2005 and 2023 emphasizes the significance of the mother tongue in early education, associating it with enhanced engagement and participation among learners. The National Education Policy (NEP) 2020 builds upon these principles, advocating for mother tongue instruction until Grade 5, and ideally extending to Grade 8, while accommodating regional and parental preferences. Numerous studies also identify obstacles to implementation, including a shortage of qualified teachers, insufficient educational resources, and a parental inclination towards English due to its perceived economic benefits. These issues are addressed in the research of Annamalai (2005) and Jhingran (2009), both of whom advocate for increased state support and public awareness to facilitate the success of language-focused educational reforms.

A study conducted by NCERT (2011) regarding tribal education in India found that students achieve better academic outcomes when instructed in their native languages. The Multilingual Education (MLE) programs implemented in Odisha and Andhra Pradesh have shown

encouraging results in enhancing literacy, retention rates, and community involvement, particularly among tribal youth.

A more recent investigation by Patil and Shinde (2020) indicates that first-generation learners in rural Maharashtra displayed greater engagement and a clearer understanding of concepts when taught in Marathi, in contrast to their counterparts in English-medium classrooms. Nevertheless, the research also noted that parents tend to favor English due to its perceived socio-economic advantages.

A recurring issue identified in the literature is the insufficient training of teachers and the lack of teaching resources in local languages. As stated by Mohanty (2019), the effectiveness of mother tongue education in India is hindered by a deficit of qualified bilingual educators, especially for tribal and minority languages.

Furthermore, Kumar and Panda (2021) emphasize the lack of standardized curricula and educational materials, which restricts the expansion of mother tongue instruction within government schools.

Research indicates a strong pedagogical rationale for mother tongue-based education, with substantiated benefits in early learning and equity. However, systemic issues, including teacher shortages, the development of educational resources, and sociocultural resistance, present significant challenges. The NEP 2020 endeavors to address these issues through a gradual integration of multilingual education. However, successful implementation requires ongoing policy support, adequate funding, and community participation.

A list of approaches can be summarized for NEP 2020's endeavors for integrated education.

1. **Holistic Development and Educational Experience**
   This approach promotes, Critical thinking, Creativity, Ethics, Lifelong learning skills. It ensures that students all rounded development as well as capable to adapt changes in the world

2. **Promotion of Regional and Mother Tongue Languages**
   The Kothari Commission (1964–1966) in India made the strong recommendation that the mother tongue be the main method of instruction during the early school years. This viewpoint is further supported by Section 29(f) of the Right to Education Act (2009), which states that "the medium of instruction, as far as practicable, shall be in the child's mother tongue."
   It mainly focused on the legitimacy and continuity of mother tongue education in India.
3. **Instruction in a student's mother tongue offers key advantages.**

It improves comprehension, which strengthens cognitive skills and critical thinking. This approach creates a more inclusive classroom, boosts student participation, and encourages family involvement. Ultimately, it is vital for preserving unique languages and their associated cultural heritage

4. **Multilingualism and the Three-Language Formula**

Through the Three-Language Formula, which is reaffirmed in the National Curriculum Framework (NCF) 2023, NEP 2020 encourages multilingualism. Important objectives include:

• Learning more than one language

• A respect for India's rich literary and cultural legacy

• Assistance for underprivileged and disabled pupils

• Fostering global citizenship while maintaining cultural roots

5. Prioritize mother tongue instruction during the formative years.

Using the mother tongue or vernacular language during the first eight years of education is emphasized under NEP 2020. This offers a suitable ambient setting for learning. Alongwith

• Promotes freedom of expression

• Improves educational results, particularly for children aged 3 to 8

Advantages and Prolonged Effects

- ❖ Improved Learning Outcomes: Students gain a deeper understanding of subjects in their home tongue.
    - Academic achievement is greater and dropout rates are lower during foundation years.
- ❖ Enhanced Mental Abilities
    - Boosts critical thinking, creativity, and problem-solving skills.
    - Enhances the linguistic basis for acquiring new languages.
- ❖ Inclusive and Equitable Education: Helps low-income families and first-generation students overcome the language barrier.
    - Encourages equal access to education for people from all sociocultural backgrounds.
- ❖ Improved Home-School Relationship: Parents are able to take an active role in their children's education.
    - Promotes community-based learning, particularly in early childhood education.
- ❖ Easy Transition to Multilingualism Multilingual competency is developed through the gradual introduction of new languages.
    - Preserves cultural identity while promoting global literacy.

Examination of Implementation Difficulties

Notwithstanding the numerous advantages, there are important challenges that need to be overcome:

A) Availability and Training of Teachers

• Issue: There is a lack of trained teachers who speak a variety of regional and tribal languages.

• Impact: Language minority and tribal communities are particularly impacted.

• Funding is required for local speaker recruitment and teacher training.

B) Inadequate Resources for Teaching and Learning

• Issue: There are not enough textbooks or educational resources available in the native languages.

• Impact: Regional variations in educational quality.

• Requirement: Funding for curriculum development and multilingual educational resources.

C) Higher Education's Shift to English as the Medium

• Issue: When moving from regional language-based elementary school to English-medium higher education, students may encounter challenges.

• Fear: Parents' opposition because they think learning English improves one's chances for a successful profession.

Conclusion

India's educational system is undergoing a paradigm transformation with the National Education Policy 2020. Its emphasis on mother tongue-based instruction is in line with both India's multilingual reality and global best practices. The long-term benefits, such as enhanced learning results, cultural preservation, and equal access, outweigh the legitimate worries about teacher preparation, curriculum creation, and social acceptance.

For implementation to be successful, the following will be needed:

- ❖ Government backing;
- ❖ Community engagement;
- ❖ Institutional cooperation;
- ❖ Sufficient financial resources;
- ❖ Awareness-raising initiatives

NEP 2020 has the potential to completely transform India's educational system by making it more accessible, culturally diverse, and competitive on a global scale.

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INTERNATIONAL RESEARCH JOURNAL OF MULTIDISCIPLINARY STUDIES
***SPECIAL ISSUE ON* "International Multidisciplinary Conference Vietnam"**
Vol. 11, Special Issue 6, May, 2025
ISSN: 2454-8499, Impact Factor: 2.89(GIF), 0.679(IIFS)

REAL LMS (Learning Management Systems) of Education: An Adaptable, Accessible and Sustainable future for all.

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Abstract:
Learning Management Systems (LMS) have acquired a foundational role in the digital education revolution of the 21st century.
Initially developed for collegiate and higher education levels, LMS platforms have diversified into a wide range of learners, from K-12 to universities, corporate as well as vocational training programs. These systems enable a systematic approach through massive online rollout, administration, tracking and management of educational content, offering synchronous and asynchronous experience for learners and educators alike. LMS platforms optimise content delivery through integrated multimedia adoption, automated administrative functions and personalized learning outcomes for individuals. LMS tools support learner engagement through interactive content, peer-to-peer learning, and real-time feedback. LMSs derive their practical use cases from contemporary education theories of behaviourism, constructivism and cognition. Modern LMSs build upon this to offer AI based analytics, access and insights which further enhance the inclusivity and scalability. The COVID-19 pandemic underscores indispensability of LMSs across all educational domains. Moving ahead, key goals for LMSs involve reducing setup costs, gaps in digital infrastructure and reduced in-person interaction. Accessibility, adaptability, and sustainability guide LMS improvements for future education.
Keywords: LMS, cognition, accessibility, adaptability, sustainability, online, analytics, modern education.

Introduction

The 21st century has witnessed a dramatic transformation in how education is delivered, accessed, and experienced. The convergence of technological innovation, globalization, and societal shifts has reshaped the learning landscape, making digital tools essential components of contemporary education systems. Among these tools, Learning Management Systems (LMS) have emerged as central platforms for organizing, distributing, and personalizing learning content across formal and informal settings.

LMS that actively promote engagement, flexibility, and equity in addition to managing learning are desperately needed. In order to lay the groundwork for future digital education infrastructures, this study presents the idea of "REAL LMS"—Responsive, Equitable, Adaptive, and Lifelong systems.

In order to highlight responsiveness, equity, adaptability, and lifelong learning as fundamental tenets for future digital education systems, this article presents the concept of the "REAL LMS," a conceptual framework that goes beyond traditional system features. In line with new pedagogical and technology trends and based on global education priorities like Sustainable Development Goal

Vol. 11, Special Issue 6, May, 2025
ISSN: 2454-8499, Impact Factor: 2.89(GIF), 0.679(IIFS)

4, the REAL LMS aims to create a digital learning infrastructure that can benefit all students, regardless of their location, aptitude, age, or socioeconomic status.
This article aims to guide future policy, platform design, and implementation strategies for inclusive, accessible, and sustainable digital education by charting the development of LMS, identifying current challenges, and bringing up an innovative paradigm.

2. Objectives

- To identify and formulate the REAL LMS concept.
- To assess the current LMS platforms' limitations.
- To investigate international best practices that support inclusive and sustainable learning.
- To put forth a framework that incorporates lifelong learning, flexibility, and digital equity.
- To match the growth of LMS with UNESCO's Education 2030 objectives and SDG 4.

❖ **To identify and formulate the REAL LMS concept.**
The term "REAL LMS" stands for Responsive, Equitable, Adaptive, and Lifelong Learning Management Systems. It is a forward-looking conceptual framework that redefines the purpose and design of LMS to meet the evolving needs of 21st-century learners and educators. Unlike traditional LMS that primarily function as content management tools, a REAL LMS is envisioned as a transformative learning ecosystem that supports inclusivity, personal growth, and sustainable digital education across all learning contexts—formal, informal, and lifelong.

1. Responsive

- A REAL LMS is context-aware and responsive to diverse learner needs, devices, infrastructure, and local environments. It provides real-time support, mobile-friendly design, offline capabilities, and culturally relevant content.

2. Equitable

- Equity is at the heart of a REAL LMS. It must ensure inclusive access for all learners, regardless of their physical abilities, socio-economic status, language, or location. This includes support for assistive technologies, multi-language content, universal design for learning (UDL), and low-bandwidth functionalities.

3. Adaptive

- Adaptability refers to the LMS's capacity to personalize learning experiences using data analytics, AI, and learner feedback. It supports differentiated instruction and continuous improvement in both teaching and learning processes.

4. Lifelong

- A REAL LMS is not limited to a particular phase of education (e.g., school or university). It promotes lifelong learning, enabling individuals to acquire skills, competencies, and certifications throughout their lives. This includes integration with micro-credentials, professional development modules, and open educational resources (OER), making learning flexible, modular, and aligned with real-world demands.

Vol. 11, Special Issue 6, May, 2025
ISSN: 2454-8499, Impact Factor: 2.89(GIF), 0.679(IIFS)

• "REAL LMS" is an educational innovation model that envisions Learning Management Systems as inclusive, intelligent, and future-ready ecosystems—capable of supporting learners from all backgrounds in achieving success in a rapidly changing digital world.

❖ **Current Limitations in Existing LMS Platforms**

Despite their widespread adoption, most traditional LMS platforms still face significant challenges in functionality, accessibility, and inclusivity.

These restrictions may make it more difficult for them to provide equitable, sustainable, and meaningful education.

1. Insufficient Inclusivity and Accessibility: It's not made for all students, Inadequate multilingual support, Device dependency

2.Limited Customization and Flexibility: One-size-fits-all model, Limited data use.

3. Antiquated Pedagogical Frameworks: Content-first focus, Low interactivity.

4. Barriers to Infrastructure and the Digital Divide

• Bandwidth-heavy platforms such as Many systems overlook the realities of students in distant or low-income areas by assuming powerful gadgets and high-speed internet.

• High licensing and hosting fees.

5. The Burden of Teachers and Administrators

• Complicated interfaces: Teachers who lack a good command of digital literacy may find it tough to use and navigate some LMS platforms.

• Insufficient pedagogical alignment.

6. Concerns about Data Privacy and Ethics

• Inadequate data governance, Limited transparency.

The majority of LMS systems on the market are not adequately built to provide inclusive, universal, and future-ready education. LMS must be redesigned to fill these shortcomings, particularly for underserved students and changing pedagogical requirements, if they are to be effective catalysts for educational change.

❖ **Global Best Practices Aligned with Inclusive and Sustainable Education**

Several countries, institutions, and organizations around the world have pioneered innovative, inclusive, and sustainable uses of Learning Management Systems.

1. Mobile-First LMS Design (Africa & Southeast Asia)

In countries like Kenya, India, and the Philippines, mobile-first LMS platforms (e.g., Eneza Education, DIKSHA) have been developed to support learners with limited access to desktops and broadband. These platforms offer:

- Low-bandwidth operation
- Offline access to lessons via SMS or downloadable content
- Multilingual interfaces tailored to local dialects

These models demonstrate how technology can be scaled in underserved regions while maintaining inclusivity.

2. Universal Design for Learning (UDL) Implementation (United States, Canada)

Vol. 11, Special Issue 6, May, 2025
ISSN: 2454-8499, Impact Factor: 2.89(GIF), 0.679(IIFS)

Institutions such as the University of Washington and CAST (Center for Applied Special Technology) have embedded UDL principles into LMS and content delivery.

- Multiple modes of content presentation (text, audio, video, interactive)
- Adaptive learning pathways
- Built-in screen reader compatibility and keyboard navigation

These efforts support students with disabilities, neurodivergent learners, and those with diverse learning styles.

3. Open Educational Resources and Open LMS (Europe)

In Europe, initiatives like Open Edu (European Commission) and platforms like Moodle promote open-source LMS usage and open content sharing.

- Reduction in institutional cost and dependence on proprietary software
- Reuse and localization of educational materials
- Collaboration across borders and institutions

This supports sustainable and equitable learning by removing commercial barriers and encouraging community-driven innovation.

4. Green Digital Infrastructure (Scandinavia)

Nordic countries such as Finland and Sweden focus on environmentally sustainable digital learning ecosystems.

- Hosting LMS on energy-efficient data centers
- Promoting minimalist digital design to reduce data load and power consumption
- Encouraging the use of digital tools that promote sustainable values in curricula

These approaches link digital transformation with environmental consciousness—a key pillar of sustainability.

5. LMS-Integrated Lifelong Learning (Singapore, Germany)

They have integrated LMS into national upskilling and reskilling programs, offering access to:

- Micro-credentials and certifications via LMS platforms (e.g., SkillsFuture, Volkshochschule)
- Partnerships with industries for demand-driven learning modules
- Personalized learning dashboards that track lifelong learning progress

6. Inclusive Content Co-Creation (Indigenous & Rural Education in Latin America)

Initiatives like the Telesecundaria program in Mexico and UNESCO's "ICT4E" projects in rural Latin America promote locally-developed content on LMS platforms.

- Community co-creation of culturally relevant digital materials
- Teacher training in digital pedagogy and content authoring
- Bridging the digital divide with solar-powered offline LMS servers

These programs emphasize contextual inclusivity and empower marginalized communities.

❖ **Proposed Framework: REAL LMS (Responsive, Equitable, Adaptive, Lifelong)**

The REAL LMS framework is structured around four interconnected pillars: Responsiveness, Equity, Adaptability, and Lifelong Learning.

1.Equitable LMS Design

Vol. 11, Special Issue 6, May, 2025
ISSN: 2454-8499, Impact Factor: 2.89(GIF), 0.679(IIFS)

Mobile-first design is used for low-resource environments . It includes Multilingual and culturally localized content. It integrate
UDL principles. to reduce licensing barriers they use open-source infrastructure. In this design inclusive and underserved students can enrolled.

2. AI-Driven Personalization

It Create learning environments individual learner needs, abilities, pace, and preferences. It gives opportunities for personalized, flexible learning experiences that evolve with the learner.

3. Beyond Formal Schooling

It is continuous, self-directed education from early education to workforce development and beyond. MOOCs, LXP are the examples cross-platform. Through this continuous up skilling and reskilling opportunities aligned with evolving personal and professional needs.

4. Sustainable System Layer (Infrastructure + Policy)

It build LMS platforms that are environmentally, economically, and institutionally sustainable. This model is Long-term cost planning and community-supported. This model includes supportive national/institutional policies for digital inclusion.

Benefits of the Framework

- It reduces the digital divide through inclusive design.
- It enhances learner engagement and outcomes through AI.
- Encourages continuous and lifelong learning.
- It can Supports institutional and environmental sustainability
- Because of this framework Quality Education is possible for all
- ❖ **To align LMS development with SDG 4 and UNESCO's Education 2030 goals for inclusive, equitable, and quality education for all.**

In the context of global education reform, the development of LMS must be aligned with, SDG 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all"—as well as UNESCO's Education 2030 Framework for Action.

A REAL LMS model supports this alignment by:

•SDG 4.5: Eliminate gender disparities and ensure equal access for the vulnerable
•SDG 4.1 and 4.2: Improving learning outcomes via adaptive and data-driven content
•SDG 4.3 and 4.4: Promoting lifelong learning by offering modular, stackable micro-credentials
•SDG 4.c: Supporting teacher capacity building with training modules and pedagogical tools
•Providing universal access to quality digital education through open-source, affordable platforms.

3. Importance of LMS Today

The relevance of LMS in today's education landscape cannot be overstated. These platforms enable flexibility, access, and scalability of education across borders and demographics. They support asynchronous and synchronous learning, facilitate data-driven pedagogy, and serve as vital tools for teacher development and learner engagement.

In the rapidly evolving landscape of educationLMS have become indispensable tools for enabling, enhancing, and managing digital learning experiences. Their relevance has grown significantly in

Vol. 11, Special Issue 6, May, 2025
ISSN: 2454-8499, Impact Factor: 2.89(GIF), 0.679(IIFS)

the 21st century due to increasing demands for flexibility, inclusivity, personalization, and resilience in education systems worldwide.

1. Centralized and Scalable Learning Delivery
2. Access Anytime, Anywhere
3. Support for Lifelong and Self-Paced Learning
4. Facilitation of Blended and Hybrid Learning Models
5. Enhanced Engagement and Interactivity
6. Data-Driven Decision Making
7. Equity and Inclusion
8. Crisis-Resilient Education Systems
9. Administrative Efficiency and Cost Savings
10. Alignment with Global Education Goals

LMS are foundational infrastructure for modern education systems. As the world shifts toward more inclusive, learner-centered, and digitally mediated education, the importance of LMS will continue to grow. Designing **REAL LMS—Responsive, Equitable, Adaptive, and Lifelong—**is not just important, but essential to the future of learning.

4. Literature Review

The development of LMS from static repositories to interactive platforms has been documented by literature review studies (Siemens, 2005). However, issues like inadequate UX design, a dearth of accessibility features, inflexibility, and digital inequality still exist (Selwyn, 2016). According to scholars, LMS design should be equity-centered and include elements like AI-driven personalization, mobile-first interfaces, and multilingual support (Means et al. 2020). Others emphasize the significance of open-source tools and ecologically friendly digital infrastructure (Bozkurt et al. 2020).

1. LMS Evolution and Functions: Moodle, Blackboard, and Canvas have become essential digital tools for education, enabling communication, learner assessment, and content delivery (Coates et al. (Watson and Watson, 2007; 2005). Although large-scale e-learning has been made possible by these systems, their design frequently placed an emphasis on institutional efficiency rather than learner inclusivity and engagement (Al-Fraihat et al. 2020).
2. Accessibility and Digital Equity Research indicates that non-inclusive content, a lack of devices, and inadequate connectivity present obstacles for students from underrepresented groups (UNESCO, 2021; Selwyn et al. 2020). Research highlights the significance of offline capabilities, mobile-first tactics, and universal design in order to address these issues (Feldstein and Hill, 2016). For instance, the DIKSHA platform in India is credited with bridging the gap between rural and urban areas by integrating offline and multilingual access (KPMG & Google, 2017).
3. Adaptive and Personalized Learning: To enable individualized learning pathways, contemporary LMS systems are progressively integrating data analytics and artificial intelligence (Pardo et al. (2019). By taking into account each student's unique progress, preferences, and learning style, adaptive learning models enhance student engagement and results (Dziuban et al. 2018). But

according to Vasiletianos and Moe (2017), many LMSs still lack integrated adaptive systems that scale across various learning contexts.

4. Skills Development and Lifelong Learning: The need for lifelong learning has prompted the use of learning management systems (LMS) in continuing education and workforce development. Studies indicate that learning management systems (LMS) need to change to accommodate adult learners' micro-credentials, flexible learning pathways, and skills-based evaluation (OECD, 2021; UNESCO UIL, 2020). As a major force behind sustainable educational ecosystems, the relationship between LMS and national digital education strategies is being highlighted more and more.

5. Sustainability and Scalability: In contemporary literature, there is an increasing focus on the institutional and environmental sustainability of digital education. Energy-efficient design, open-source development, and cloud-based learning management systems with green hosting are marketed as scalable and environmentally beneficial solutions (Jisc, 2020). Long-term financial viability, ethical AI, and data privacy must also be taken into account when designing a sustainable LMS (Henderson et al. (2020).

6. Gaps in Current LMS Models: According to critics, mainstream LMS frequently duplicate instructor-centered, hierarchical pedagogies and fall short in adopting local educational contexts or empowering students (Castañeda and Selwyn, 2018). LMSs that are co-designed with communities, educators, and learners are becoming more and more popular in order to guarantee flexibility and contextual relevance. The literature demonstrates the pressing need for a new generation of learning management systems (LMS) that are equitable in design and access, responsive to learner needs, flexible enough to accommodate evolving educational objectives, and supportive of lifelong learning paths. This foundation is strengthened by the suggested REAL LMS framework, which incorporates these ideas into a unified model with an emphasis on sustainability, adaptability, and inclusion.

The literature demonstrates the pressing need for a new generation of learning management systems (LMS) that are equitable in design and access, responsive to learner needs, flexible enough to accommodate evolving educational objectives, and supportive of lifelong learning paths. This foundation is strengthened by the suggested REAL LMS framework, which incorporates these ideas into a unified model with an emphasis on sustainability, adaptability, and inclusion.

5. REAL LMS Framework

R-Responsive: Real-time feedback, offline access, mobile optimization, and culturally appropriate content are all components of the REAL LMS Framework.

E-Equitable: Systems should guarantee diverse linguistic communities, learners with disabilities, and those in low-bandwidth environments inclusive access.

A - Adaptive: A flexible learning management system (LMS) can offer teachers and students performance dashboards, remedial materials, and personalized feedback.

L-Lifelong: A true learning management system (LMS) must encourage lifelong learning for people of all ages, including professionals, students, and informal learners.

6. Challenges and Considerations

Vol. 11, Special Issue 6, May, 2025
ISSN: 2454-8499, Impact Factor: 2.89(GIF), 0.679(IIFS)

The goal of a REAL LMS is to be responsive, equitable, adaptive, and lifelong; this is both necessary and aspirational. Its execution is difficult and necessitates resolving several issues in the fields of technology, society, economics, and policy. Recognizing these difficulties is necessary to make sure the suggested framework is practical and long-lasting. Among these are:

1. Gaps in Infrastructure and the Digital Divide
2. Contextualization is lacking.

Ethical and Data Privacy Issues

4. Sustainability and Scalability.

Teachers' Readiness and Opposition to Change

6. Learners with Disabilities: Accessibility
7. Regulatory and Policy Alignment
8. Pedagogical Vigor and Student Involvement
9. Fairness in AI Algorithms
10. Models for funding and costs.

Multi-stakeholder cooperation between educators, technologists, legislators, students, and communities is necessary to address these issues. To genuinely deliver on its promise of universal education, a REAL LMS needs to be not only technically sound but also socially just, pedagogically sound, and politically supported.

7. Recommendations

In order to achieve the goal of a REAL LMS, educators, institutions, legislators, developers, and international education partners need to take specific steps. The following suggestions provide tactical guidance for creating, implementing, and growing learning management systems (LMS) that are inclusive, prepared for the future, and in line with international educational objectives.

• Encourage the use of interoperable, open-source LMS platforms. •Incorporate inclusive design concepts right away.

• Make investments in professional development for teachers and infrastructure.

• Encourage cooperation across sectors between ed-tech companies, NGOs, and governments. Stakeholders need to take a systems-thinking stance that places LMS in a larger context.

In order to achieve the goal of a REAL LMS, educators, institutions, legislators, developers, and international education partners must take specific steps. In order to create, implement, and scale learning management systems (LMS) that are inclusive, future-ready, and in line with international educational objectives, the following suggestions provide strategic guidance.

• Encourage the use of open-source, compatible LMS systems.

• From the beginning, incorporate inclusive design principles.

• Make infrastructural and professional development investments for teachers.

• Encourage cooperation between ed-tech companies, NGOs, and governments across sectors.

In order to place LMS within a larger educational ecosystem, stakeholders must embrace a systems-thinking methodology. In the digital age, learning management systems (LMS) can only become effective catalysts for equitable and lifelong learning by combining policy reform, community input, inclusive design, and sustainable practices.

Vol. 11, Special Issue 6, May, 2025
ISSN: 2454-8499, Impact Factor: 2.89(GIF), 0.679(IIFS)

8. Conclusion

The chance to reevaluate LMS is crucial as educational systems work to improve after COVID. REAL LMS provide a path toward inclusive, flexible, and sustainable educational platforms in addition to being functional. Adopting this model can aid in closing the achievement gap and get students ready for a fair digital future. Learning Management Systems (LMS) must evolve from static content platforms into dynamic ecosystems that serve all learners fairly and sustainably as the global education ecosystem continues to change in response to social injustices, technological advancements, and environmental challenges. In order to fill the gaps in the existing digital education models, this paper has conceptualized the idea of a REAL LMS—a system that is Responsive, Equitable, Adaptive, and Lifelong.

The REAL LMS framework, which is based on international best practices and is in line with UNESCO's Education 2030 vision and Sustainable Development Goal 4, reimagines digital learning environments as inclusive, intelligent, and prepared for the future. This model prioritizes impact and accessibility by combining the ideas of lifelong learning, AI-powered adaptability, and digital equity, guaranteeing that students from all backgrounds can gain significant benefits from digital education. Policymakers, educators, and technologists can use the suggested framework as a starting point to create and execute learning management system (LMS) solutions that are sustainable for both institutions and the environment, accessible in underserved areas, and tailored to the needs of individual learners. It promotes a change in perspective from considering learning management systems (LMS) as merely delivery tools to acknowledging them as transformative infrastructure for inclusive education in the digital age. In conclusion, realizing the goal of a REAL LMS is a human and ethical imperative in addition to a technological one.

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Advanced Pedagogy

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१९. शिक्षण ५.० : एक नवीन युगाची सुरुवात

डॉ. मदुरा पवार
सहयोगी प्राध्यापक, पी.ई.सोसायटीचे बी.एड. कॉलेज, शिवाजीनगर, पुणे.

"आजच्या वेगवान बदलत्या जगात, तंत्रज्ञान आणि समाजशास्त्राच्या क्षेत्रात नवनवीन ट्रेंड्स उदयास येत आहेत. हे ट्रेंड्स आपल्या जीवनशैलीवर, व्यवसाय पद्धतींवर आणि शिक्षण प्रणालीवर मोठा प्रभाव टाकत आहेत."

शिक्षण क्षेत्रात अनेक नवीन ट्रेंड पाहायला मिळत आहेत, ज्यांचा समाज, उद्योग आणि शिक्षण यांवर सकारात्मक आणि नकारात्मक दोन्ही प्रकारे प्रभाव पडतो. शिक्षण क्षेत्रात तंत्रज्ञानाचा वापर वाढतो आहे. यात ऑनलाइन शिक्षण (Online learning), मोबाईल लर्निंग (Mobile learning), आणि 3D मॉडेलिंगचा वापर (3D modelling) यांचा समावेश आहे. हे विद्यार्थ्यांना अधिक आकर्षक पद्धतीने शिकण्याची संधी देतात आणि ज्ञान मिळवण्याची प्रक्रिया सोपी करतात.

शिक्षण क्षेत्रात वेगाने बदल होत आहेत, आणि २०२५ मध्ये काही महत्त्वाचे ट्रेंड दिसून येत आहेत. यातील काही प्रमुख ट्रेंड:

१. कृत्रिम बुद्धिमत्ता (AI) आणि वैयक्तिक शिक्षण

- AI आधारित वैयक्तिक शिकण्याच्या संधी वाढत आहेत, जिथे विद्यार्थ्यांच्या गरजेनुसार अभ्यासक्रम तयार केला जातो.
- AI ट्यूटर आणि स्वयंचलित मूल्यांकन प्रणालींमुळे शिक्षण अधिक प्रभावी आणि सुलभ होत आहे.

२. हायब्रिड आणि डिजिटल वर्ग

- पारंपरिक आणि ऑनलाइन शिक्षणाचा समावेश असलेले मिश्र शिक्षण प्रतिमान अधिक लोकप्रिय होत आहे.
- व्हर्च्युअल आणि ऑगमेंटेड रिॲलिटीच्या मदतीने संवादात्मक शिक्षण अधिक वाढत आहे.

३. आंतरशाखीय शिक्षण

- विविध विषय एकत्र करून शिकण्याची संकल्पना वाढत आहे, जसे की AI आणि नैतिकता, व्यवसाय आणि डेटा सायन्स, किंवा आरोग्य आणि तंत्रज्ञान.
- विद्यार्थ्यांना विविध कौशल्ये आत्मसात करण्याची संधी मिळत आहे, जे

ISBN – 978-93-6732-591-9

भविष्यातील नोकऱ्यांसाठी उपयुक्त ठरू शकते.

४. मानसिक आरोग्य आणि समावेशकता

- विद्यार्थ्यांच्या मानसिक आरोग्यावर अधिक लक्ष दिले जात आहे, आणि समावेशक शिक्षण धोरणे विकसित केली जात आहेत.
- शाळा आणि महाविद्यालये समुपदेशन आणि भावनिक कल्याण कार्यक्रम राबवत आहेत.

५. कौशल्य-आधारित शिक्षण

- पारंपरिक पदवी शिक्षणाच्या ऐवजी कौशल्य-केंद्रित शिक्षणाला अधिक महत्त्व दिले जात आहे.
- व्यावसायिक प्रशिक्षण आणि छत्रसेवाकालाच्या संधी वाढत आहेत, जे विद्यार्थ्यांना प्रत्यक्ष अनुभव देतात.

६. शिक्षण धोरणांमध्ये सुधारणा

- नवीन राष्ट्रीय शैक्षणिक धोरण (NEP २०२०) अंतर्गत शिक्षण प्रणालीत मोठे बदल होत आहेत.
- भारतात डिजिटल शिक्षण आणि ग्रामीण भागातील विद्यार्थ्यांसाठी इंटरनेट प्रवेश सुधारला जात आहे.

शिक्षण ५.० ही संकल्पना वैयक्तिकृत, तंत्रज्ञान-चालित शिक्षणावर केंद्रित आहे, ज्याचा उद्देश विद्यार्थ्यांच्या सहभागाला चालना देणे, गंभीर विचारसरणी वाढवणे आणि भविष्यातील आव्हानांसाठी व्यक्तींना तयार करणे आहे. ते मानव-केंद्रित शिक्षण, नावीन्यपूर्णता आणि समावेशकतेवर भर देते, अधिक आकर्षक आणि लवचिक शिक्षण अनुभव तयार करण्यासाठी तंत्रज्ञानाचा वापर करते. शेवटी, शिक्षण ५.० विद्यार्थ्यांना वेगाने बदलणाऱ्या जगात यशासाठी आवश्यक कौशल्ये आणि ज्ञानाने सुसज्ज करण्याचा प्रयत्न करते.

शिक्षण ५ .० ही संकल्पना शिक्षणाच्या उत्क्रांतीचा पुढील टप्पा आहे , जिथे तंत्रज्ञान आणि मानवी मूल्ये एकत्रित करून शिक्षण अधिक समावेशक आणि प्रभावी पणे दिले जाते. याचा इतिहास समजून घेण्यासाठी शिक्षण ५ .० आणि पूर्वीच्या टप्प्यांतील तुलना अभ्यासणे गरजेचे आहे .

शिक्षण ५ .० आणि पूर्वीच्या टप्प्यांतील तुलना:

शिक्षण प्रणाली	मुख्य वैशिष्ट्ये
शिक्षण १.०	पारंपरिक गुरुकुल प्रणाली किंवा शिक्षक-केंद्रित शिक्षण पद्धती, जिथे ज्ञान मुख्यतः पुस्तके आणि शिक्षकांद्वारे

ISBN – 978-93-6732-591-9

	दिले जात होते.
शिक्षण २.०	मुद्रण तंत्रज्ञानाच्या विकासामुळे शिक्षण अधिक प्रमाणात उपलब्ध झाले, आणि औद्योगिक क्रांतीमुळे शालेय शिक्षणाची संकल्पना विकसित झाली.
शिक्षण ३.०	डिजिटल तंत्रज्ञानाचा उदय, जिथे संगणक आणि इंटरनेटच्या मदतीने शिक्षण अधिक सुलभ आणि व्यापक झाले.
शिक्षण ४.०	कृत्रिम बुद्धिमत्ता (AI), इंटरनेट ऑफ थिंग्ज (IoT), आणि आभासी वास्तव (VR) यांसारख्या तंत्रज्ञानाचा शिक्षणात समावेश, ज्यामुळे वैयक्तिकृत आणि संवादात्मक शिक्षण शक्य झाले.
शिक्षण ५.०	शिक्षणाच्या मानवीकरणावर भर देणारा टप्पा, जिथे केवळ तंत्रज्ञान नव्हे तर विद्यार्थ्यांमधील मानवी मूल्ये,सामाजिक आणि भावनिक विकासावरही लक्ष केंद्रित केले.

शिक्षण ५.० चा विकास

- कोविड-१९ नंतरचा प्रभाव - महामारीनंतर शिक्षण अधिक डिजिटल झाले, आणि ऑनलाइन शिक्षणाची गरज वाढली.
- नवीन तंत्रज्ञानाचा समावेश - कृत्रिम बुद्धिमत्ता, ब्लॉकचेन, आणि मिश्र वास्तव यांचा उपयोग शिक्षण अधिक सानुकूलित आणि प्रवेशयोग्य करण्यासाठी केला जात आहे.
- समाज आणि शिक्षण यांचा समतोल - शिक्षण केवळ कौशल्य विकासासाठी नव्हे, तर विद्यार्थ्यांच्या मानसिक आणि सामाजिक कल्याणासाठीही महत्त्वाचे ठरते.

संदर्भ साहित्याचा अभ्यास:

शिक्षण ५.० संदर्भातील विद्यमान संशोधन आणि अभ्यास विविध पैलूंवर प्रकाश टाकतात, जसे की तंत्रज्ञानाचा प्रभाव, शिकण्याच्या पद्धती, आणि भविष्यातील दिशा. येथे काही महत्त्वाचे संशोधन आणि अहवाल आहेत:

१. Education ५.०: Requirements, Enabling Technologies, and Future Directions - हा संशोधन पेपर AI, ब्लॉकचेन, आणि VR/AR यांसारख्या तंत्रज्ञानाच्या शिक्षणातील भूमिकेचा अभ्यास करतो. तसेच,

ISBN – 978-93-6732-591-9

शिक्षणाच्या वैयक्तिकरण आणि सहभाग वाढवण्याच्या संधी यावर प्रकाश टाकतो.

२. Navigating the shift to Education ५.०: Enhancing higher education in India - हा अहवाल भारताच्या उच्च शिक्षण क्षेत्रातील बदल आणि शिक्षण ५ .० ची अंमलबजावणी यावर आधारित आहे. यात फिनलंड, सिंगापूर आणि दक्षिण कोरियातील यशस्वी उदाहरणे दिली आहेत.

३. Addressing Pedagogical Challenges in Digital Literacy for the Adoption of Society ५.० - हा अभ्यास डिजिटल साक्षरतेच्या आव्हानांवर केंद्रित आहे. यात शिक्षण प्रणालीतील नैतिकता आणि समावेशकतेच्या मुद्द्यांचा सखोल अभ्यास केला आहे.

संशोधनातील महत्त्वाचे मुद्दे:

- तंत्रज्ञानाचा प्रभाव - AI आणि ब्लॉकचेनमुळे शिक्षण अधिक वैयक्तिकृत आणि पारदर्शक होत आहे.
- शिक्षण प्रणालीतील बदल - शिक्षण अधिक विद्यार्थी-केंद्रित आणि कौशल्याधारित होत आहे.
- समाजातील स्वीकार - नवीन तंत्रज्ञान स्वीकारण्यासाठी शिक्षक आणि विद्यार्थ्यांना प्रशिक्षण देण्याची गरज आहे.

विविध देशांमध्ये शिक्षण ५ .० ची अंमलबजावणी वेगवेगळ्या पद्धतीने केली जाते, कारण प्रत्येक देशाची शैक्षणिक गरजा, धोरणे आणि तंत्रज्ञानाची उपलब्धता वेगळी असते.

विकसित देशांमध्ये शिक्षण ५.०:

- फिनलंड - येथे शिक्षण प्रणाली अत्यंत विद्यार्थी-केंद्रित आहे, आणि AI आणि VR/AR चा प्रभावी वापर केला जातो. शिक्षण अधिक सर्जनशील आणि सहयोगात्मक बनवण्यासाठी तंत्रज्ञानाचा समतोल साधला जातो.
- सिंगापूर - येथे ब्लेंडेड लर्निंग आणि स्मार्ट क्लासरूम चा मोठ्या प्रमाणावर वापर केला जातो. डेटा ॲनालिटिक्स आणि AI आधारित शिक्षण विद्यार्थ्यांच्या प्रगतीचा अभ्यास करण्यासाठी वापरले जाते.
- दक्षिण कोरिया - येथे हाय-टेक शिक्षण प्रणाली विकसित केली गेली आहे, जिथे ऑगमेंटेड रिॲलिटी आणि ब्लॉकचेन चा वापर प्रमाणपत्रे आणि शिक्षण व्यवस्थापनासाठी केला जातो.

विकसनशील देशांमध्ये शिक्षण ५.०:

- भारत § येथे NEP २०२० अंतर्गत शिक्षण प्रणालीत बदल होत आहेत. डिजिटल शिक्षण आणि कौशल्याधारित अभ्यासक्रम यावर भर दिला जात आहे.
- झिम्बाब्वे आणि श्रीलंका § येथे शिक्षण ५.० ची अंमलबजावणी हळूहळू होत आहे. तंत्रज्ञानाचा प्रवेश आणि संसाधनांची उपलब्धता हे मोठे आव्हान आहे, पण स्थानीय गरजांनुसार सुधारणा केली जात आहे.

शिक्षण ५.० संकल्पना

शिक्षण ५ .० हा शिक्षणाच्या क्षेत्रातील एक नवीन टप्पा आहे, जो तंत्रज्ञान आणि मानवी मूल्ये यांचा समतोल साधतो. ही संकल्पना शिक्षणाच्या वैयक्तिकरण, समावेशकता आणि नैतिकतेवर भर देते, तसेच कृत्रिम बुद्धिमत्ता (AI), ब्लॉकचेन, व्हर्च्युअल आणि ऑगमेंटेड रिॲलिटी (VR/AR), आणि IoT यांसारख्या अत्याधुनिक तंत्रज्ञानाचा प्रभावी वापर करते.

शिक्षण ५.० ची प्रमुख वैशिष्ट्ये:

- व्यक्तिकेंद्रित शिक्षण - प्रत्येक विद्यार्थ्याच्या गरजेनुसार वैयक्तिक शिकण्याचा अनुभव.
- समाजोपयोगी शिक्षण - शिक्षणाचा उद्देश केवळ नोकरी मिळवणे नसून समाजाच्या कल्याणासाठी योगदान देणे.
- तंत्रज्ञानाचा समतोल वापर - शिक्षणात डिजिटल साधनांचा वापर सहज आणि प्रभावी पद्धतीने केला जातो.
- भावनिक आणि नैतिक विकास - विद्यार्थ्यांना भावनिक बुद्धिमत्ता, सर्जनशीलता आणि समस्या सोडवण्याच्या कौशल्यांचा विकास करण्यास मदत.

शिक्षण ५.० चे फायदे:

- ❖ वैयक्तिकृत शिक्षण - कृत्रिम बुद्धिमत्ता (AI) आणि डेटा ॲनालिटिक्सच्या मदतीने प्रत्येक विद्यार्थ्याच्या गरजेनुसार शिकण्याचा अनुभव मिळतो.
- ❖ समावेशकता आणि प्रवेशयोग्यता - डिजिटल साधनांमुळे शिक्षण भौगोलिक आणि आर्थिक अडथळ्यांपासून मुक्त होते.
- ❖ भावनिक आणि नैतिक विकास - शिक्षण केवळ ज्ञान देण्यापुरते मर्यादित न राहता भावनिक बुद्धिमत्ता आणि नैतिक मूल्ये विकसित करण्यावर भर दिला जातो.

- तंत्रज्ञानाचा प्रभावी वापर - ब्लॉकचेन, IoT, VR/AR यांसारख्या तंत्रज्ञानामुळे शिक्षण अधिक सहज आणि पारदर्शक होते.

शिक्षण ५.० ची अंमलबजावणी करताना येणाऱ्या अडचणी:

- तंत्रज्ञानाची उपलब्धता - सर्व देशांमध्ये उच्च-स्तरीय तंत्रज्ञान सहज उपलब्ध नाही, विशेषतः विकसनशील देशांमध्ये.
- शिक्षक प्रशिक्षण - नवीन तंत्रज्ञानाचा प्रभावी वापर करण्यासाठी शिक्षकांना प्रशिक्षण देणे आवश्यक आहे.
- डेटा गोपनीयता आणि नैतिकता - AI आणि ब्लॉकचेनमुळे डेटा सुरक्षितता आणि पारदर्शकतेचे आव्हान निर्माण होते.
- समाजातील स्वीकार - काही ठिकाणी पारंपरिक शिक्षण पद्धतींना अधिक महत्त्व दिले जाते, त्यामुळे नवीन प्रणाली स्वीकारण्यास वेळ लागू शकतो.

तंत्रज्ञानाचा प्रभाव:

- AI आणि मशीन लर्निंग - शिक्षण अधिक वैयक्तिकृत आणि प्रभावी बनवण्यासाठी AI चा वापर केला जातो.
- ब्लॉकचेन आधारित प्रमाणपत्रे - शिक्षणाच्या प्रमाणपत्रांची सुरक्षितता आणि पारदर्शकता वाढवण्यासाठी ब्लॉकचेनचा उपयोग केला जातो.
- ऑगमेंटेड आणि व्हर्च्युअल रिॲलिटी (AR/VR) – शिक्षण अधिक आकर्षक आणि अनुभवसंपन्न बनवण्यासाठी AR/VR चा वापर केला जातो.

शिक्षण ५.० ची भविष्यातील दिशा आणि संभाव्य सुधारणा शिक्षणाच्या तंत्रज्ञान-सक्षम, समावेशक आणि नैतिक स्वरूपावर केंद्रित आहेत.

शिक्षण ५.० मध्ये शिक्षकांची भूमिका :

शिक्षण ५.० मध्ये शिक्षकांची भूमिका पारंपरिक शिकवण्याच्या पद्धतींपेक्षा अधिक व्यापक आणि गतिशील आहे . शिक्षक हा मार्गदर्शक, सल्लागार आणि ज्ञाननिर्माते म्हणून कार्य करतो .

१. वैयक्तिकीकृत शिक्षणाचा मार्गदर्शक
२. नव्या तंत्रज्ञानाचा समावेशक
३. सर्वांगीण विकासाचा मार्गदर्शक
४. उद्योग आणि शिक्षण यामधील दुवा
५. आजीवन शिकण्यास प्रोत्साहन देणारा

ISBN – 978-93-6732-591-9

शिक्षण ५ .० मध्ये शिक्षक विद्यार्थ्यांच्या सर्वांगीण विकासासाठी महत्त्वाची भूमिका बजावतात.

भविष्यातील दिशा:

- वैयक्तिकृत शिक्षणाचा विस्तार - कृत्रिम बुद्धिमत्ता (AI) आणि डेटा ॲनालिटिक्सच्या मदतीने प्रत्येक विद्यार्थ्याच्या गरजेनुसार शिकण्याचा अनुभव अधिक प्रभावी होईल.
- ब्लॉकचेन आधारित प्रमाणपत्रे - शिक्षणाच्या प्रमाणपत्रांची सुरक्षितता आणि पारदर्शकता वाढवण्यासाठी ब्लॉकचेनचा उपयोग अधिक प्रमाणात केला जाईल.
- तंत्रज्ञानाचा प्रभाव - शिक्षण अधिक आकर्षक आणि अनुभवसंपन्न बनवण्यासाठी कृत्रिम बुद्धिमत्ता (AI), आभासी वास्तव (VR), मिश्र वास्तव (MR), इंटरनेट ऑफ थिंग्ज (IoT), आणि ब्लॉकचेन यांसारख्या तंत्रज्ञानाचा शिक्षणात अधिक व्यापक वापर होईल.
- समावेशकता आणि प्रवेशयोग्यता - विविध भाषांमध्ये शिक्षणसामग्री उपलब्ध करून सर्व स्तरांवरील विद्यार्थ्यांना शिक्षणाची संधी दिली जाईल.
- सतत शिकण्याची संस्कृती - पारंपरिक शिक्षणाच्या मर्यादा ओलांडून, आजीवन शिक्षणाला चालना दिली जाईल.
- नवीन मूल्यांकन पद्धती - पारंपरिक परीक्षांच्या ऐवजी कौशल्य-आधारित आणि प्रकल्प-आधारित मूल्यांकन पद्धतींचा अधिक वापर होईल.

शिक्षण ५.० ही संकल्पना शिक्षणाच्या भविष्यातील दिशेचा विचार करते, जिथे तंत्रज्ञान, मानवी मूल्ये आणि समावेशकता यांचा समतोल साधला जातो.

भविष्यातील संभाव्य सुधारणा :

- शिक्षण धोरणांमध्ये सुधारणा - नवीन राष्ट्रीय शैक्षणिक धोरण (NEP २०२५) अंतर्गत शिक्षणाची रचना बदलली जात आहे, ज्यामध्ये ५+३+३+४ मॉडेलचा समावेश आहे.
- शालेय अभ्यासक्रमाची पुनर्रचना - नवीन अभ्यासक्रम आणि पाठ्यपुस्तकांची अंमलबजावणी २०२५-२६ पासून टप्प्याटप्प्याने केली जाणार आहे.
- STEM आणि AI शिक्षणावर भर - विज्ञान, तंत्रज्ञान, अभियांत्रिकी आणि

ISBN – 978-93-6732-591-9

गणित (STEM) शिक्षणाला अधिक प्रोत्साहन दिले जाईल, तसेच कृत्रिम बुद्धिमत्ता आणि मशीन लर्निंगसाठी विशेष अभ्यासक्रम विकसित केले जातील.

- सार्वजनिक-खाजगी भागीदारी (PPP) मॉडेल - शिक्षण क्षेत्रात सरकारी आणि खाजगी संस्थांच्या सहकार्याने नवीन उपक्रम राबवले जातील, जे शिक्षणाच्या गुणवत्तेत सुधारणा करतील.

शैक्षणिक संस्थांमध्ये शिक्षण ५ .० लागू करणे म्हणजे उन्नत तंत्रज्ञानाचे प्रभावी उपयोग करून मानव-केंद्रित शिक्षण साकार करणे. यासाठी खालील उपाय करता येतील:

शिक्षण पद्धतीचा पुनर्विचार :

- पारंपरिक आठवणीवर आधारित शिक्षणाऐवजी अनुभवाधारित आणि वैयक्तिक शिक्षणाला चालना.
- प्रोजेक्ट-आधारित, आंतरशाखीय आणि कौशल्य-केंद्रित शिक्षण प्रोत्साहन.
- सृजनात्मक विचार, समस्या सोडवण्याची क्षमता आणि भावनिक बुद्धिमत्ता विकसन .

आधुनिक तंत्रज्ञानाचा समावेश :

- AI, VR, AR, IoT आणि Blockchain तंत्रज्ञान वापरून परस्परसंवादी आणि प्रभावी शिकण्याच्या अनुभवांची निर्मिती.
- अडॅप्टिव लर्निंग प्लॅटफॉर्म्स वापरून विद्यार्थ्यांच्या गरजेनुसार वैयक्तिक शिक्षणा चा समावेश .
- डेटा ॲनालिटिक्स च्या मदतीने विद्यार्थ्यांची प्रगती मोजणे आणि शिकण्याच्या पद्धतीत सुधारणा करणे .

सर्वसमावेशकता आणि प्रवेशयोग्यता वाढवणे

- बहुभाषिक आणि सांस्कृतिकदृष्ट्या अनुकूल शैक्षणिक सामग्री निर्मिती .
- दिव्यांगांसाठी सहाय्यक तंत्रज्ञानाचा समावेश .
- मुक्त शैक्षणिक संसाधने (OERs) उपलब्ध करून सर्वांसाठी शिक्षणाची संधी .

उद्योग आणि शिक्षण संस्थांमधील सहकार्य

- तंत्रज्ञान कंपन्या आणि उद्योगांशी भागीदारी करून अभ्यासक्रम प्रत्यक्ष कार्यक्षमतेशी संलग्न करणे .

- इंटर्नशिप, संशोधन व प्रयोगशील उपक्रमांस प्रोत्साहन देणे .
- उद्योजकता विकास कार्यक्रम सुरू करणे, जे नव सर्जनशील आणि समस्यांचे निराकरण यांना चालना देतील.

सर्वांगीण विकासाला महत्त्व देणे

- शाश्वतता, नैतिकता आणि सामाजिक जबाबदारी शिकवणीमध्ये समाविष्ट करणे .
- विद्यार्थ्यांच्या मानसिक आरोग्यासाठी आणि भावनिक बुद्धिमत्तेसाठी प्रशिक्षणे देणे.
- आजीवन शिक्षणाचे संस्कार रुजवणे, ज्यामुळे सतत नव्या गोष्टी शिकण्याची वृत्ती जोपासली जाईल.

धोरणात्मक आणि संस्थात्मक पाठबळ

- शिक्षण धोरणांमध्ये डिजिटल परिवर्तनास अनुकूल बदल घडवून आणणे.
- शिक्षकांना डिजिटल साक्षरता आणि नवीन तंत्रज्ञान प्रशिक्षण प्रदान करणे .
- समर्पित पायाभूत सुविधा निर्माण करून शिक्षण संस्थांना तंत्रज्ञान-सुसंगत करणे.

समारोप

शिक्षण ५.० हे पारंपरिक शैक्षणिक पद्धतींमध्ये आमूलाग्र बदल घडवणारे आहे. हे फक्त तंत्रज्ञानाचा समावेश करणारे शिक्षण नसून, मानवी मूल्यमापन, नैतिकता आणि समावेशकता यांचा विचार करणारे एक विकसित शिक्षण पद्धती आहे. कृत्रिम बुद्धिमत्ता, मशीन लर्निंग, आणि ब्लॉकचेन यांसारखी तंत्रज्ञानं शिक्षणाचे स्वरूप अधिक व्यक्तिगत, क्रियाशील आणि समस्यांचे समाधान करणारे बनवत आहेत.

शिक्षण ५ .० चा मुख्य उद्देश म्हणजे विद्यार्थ्यांना केवळ माहिती देणे नव्हे, तर त्यांना स्वतंत्र विचार करण्यास, नवोपक्रम घडवण्यास, आणि सामाजिक जबाबदारीसाठी सक्षम करण्यास प्रेरित करणे. डिजिटल साधनांचा योग्य उपयोग करून शिक्षणाची गुणवत्ता सुधारता येईल आणि सर्वांना समान संधी उपलब्ध करून देता येईल.

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ISBN – 978-93-6732-591-9