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CYBERSECURITY CHALLENGES IN CLOUD COMPUTING FOR SMES: RISK MANAGEMENT AND MITIGATION STRATEGIES

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ABSTRACT

Cloud computing has emerged as a transformative technology for small and medium-sized enterprises (SMEs), offering cost efficiency, scalability, and flexibility. However, the adoption of cloud solutions introduces several cybersecurity concerns that can jeopardize sensitive business data and overall operational continuity. This paper examines the major cybersecurity challenges faced by SMEs in cloud computing, including data breaches, insider threats, misconfigurations, and compliance gaps. A comprehensive review of current literature highlights how SMEs often lack the financial resources and technical expertise to address these vulnerabilities effectively. The study employs a mixed-method research design combining secondary data analysis and a survey of SME IT managers to assess perceptions of cloud security risks. Findings reveal that while SMEs recognize the importance of cybersecurity, implementation of advanced safeguards such as zero-trust frameworks and AI-driven monitoring remains limited. The paper concludes with recommendations for SMEs to adopt layered security strategies, foster employee awareness, and leverage cost-effective managed security services to ensure secure cloud adoption.

KEYWORDS: CLOUD COMPUTING; CYBERSECURITY; SMES; DATA PROTECTION; RISK MANAGEMENT; MITIGATION STRATEGIES; CLOUD SECURITY CHALLENGES; INFORMATION SYSTEMS

INTRODUCTION

Cloud computing has rapidly evolved into one of the most transformative technologies of the 21st century. Its ability to provide on-demand computing resources, reduce upfront infrastructure costs, and offer enhanced scalability has made it especially attractive to small and medium-sized enterprises (SMEs). In today's digital economy, SMEs increasingly rely on cloud services for functions such as data storage, enterprise resource planning (ERP), customer relationship management (CRM), and collaboration tools. According to a recent Gartner report (2024), over 80% of SMEs globally have adopted some form of cloud service. This widespread adoption underscores the growing relevance of cloud computing not only for large corporations but also for smaller enterprises that seek agility and cost-efficiency.

Despite these advantages, the transition to cloud computing exposes SMEs to a new set of cybersecurity risks. Unlike large organizations that have dedicated information security teams and robust IT budgets, SMEs often operate under severe resource constraints. This imbalance makes them attractive targets for cybercriminals. Research by the European Union Agency for Cybersecurity (ENISA, 2023) indicates that SMEs experience 43% of all reported cyberattacks, with many of these incidents linked to cloud-based systems. The consequences of such breaches are often severe, leading to financial losses, reputational damage, regulatory penalties, and in extreme cases, business closure.

The cybersecurity challenges faced by SMEs in cloud adoption are multifaceted. They include issues such as:

- **Data breaches** resulting from weak authentication, misconfigurations, or unpatched vulnerabilities.
- **Insider threats** where employees or contractors misuse privileged access.
- **Compliance risks** related to international data protection regulations such as GDPR, HIPAA, or India's Digital Personal Data Protection Act (DPDPA, 2023).
- **Limited incident response capabilities** due to inadequate monitoring tools and lack of skilled personnel.

SMEs' dependency on third-party cloud providers further complicates the security landscape. While providers such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud invest heavily in securing their infrastructure, the **shared responsibility model** places part of the burden on SMEs themselves. This means that although the cloud provider secures the infrastructure, SMEs are responsible for protecting their applications, data, and user access. Misunderstanding this division of responsibility often leads to avoidable vulnerabilities.

The importance of addressing these challenges cannot be overstated. In addition to the immediate operational and financial impacts, cybersecurity lapses in SMEs also have systemic implications. SMEs form a critical part of global supply chains, and a single compromised SME can serve as a gateway for cybercriminals to infiltrate larger organizations. Hence, ensuring robust cloud security for SMEs is not only vital for their survival but also for the resilience of broader business ecosystems.

This paper seeks to contribute to the growing discourse on cloud security by focusing specifically on SMEs. It aims to:

1. Identify the major cybersecurity challenges SMEs encounter in cloud adoption.
2. Explore the strategies SMEs currently employ to manage these risks.
3. Provide practical recommendations for enhancing cloud security in resource-constrained environments.

The study adopts a mixed-method research design, drawing on both secondary literature and primary survey data. This approach ensures that the findings are grounded in both theoretical insights and real-world experiences of SMEs. By analyzing the gap between awareness and implementation of cybersecurity measures, the research highlights areas where SMEs can strengthen their defenses without incurring prohibitive costs. The rest of the paper is structured as follows: Section 2 reviews existing literature on cybersecurity in cloud computing and SMEs; Section 3 outlines the research methodology; Section 4 presents data analysis and interpretation; Section 5 discusses the findings; Section 6 concludes with practical suggestions; and Section 7 provides references in APA 7th style.

REVIEW OF LITERATURE

The rapid adoption of cloud computing has been matched by a growing body of literature examining its associated security challenges. This section synthesizes key scholarly contributions, industry reports, and case studies related to cloud security in SMEs.

CLOUD ADOPTION BY SMES

Several studies have emphasized the role of cloud computing in enabling SMEs to overcome traditional barriers to IT adoption. Marston et al. (2011) described cloud computing as a paradigm shift that democratizes access to enterprise-grade IT infrastructure. More recently, Gupta and Sharma (2022) argued that cloud services are no longer optional but a necessity for SMEs seeking competitiveness in a digital-first market. However, affordability and accessibility often come at the cost of reduced control over data and systems.

CYBERSECURITY RISKS IN CLOUD ENVIRONMENTS

Cloud security risks can be broadly categorized into technical, organizational, and regulatory dimensions. Technical risks include unauthorized access, data leakage, and denial-of-service attacks. Alharthi et al. (2020) noted that misconfigured cloud environments remain one of the leading causes of breaches. Organizational risks involve inadequate policies, poor employee training, and lack of incident response preparedness. Regulatory risks stem from non-compliance with data protection laws, which may result in hefty penalties. For SMEs, these risks are magnified by limited budgets and expertise (Zhang & Chen, 2021).

SHARED RESPONSIBILITY AND MISCONFIGURATIONS

The shared responsibility model is a recurring theme in the literature. According to AWS (2023), cloud providers secure the infrastructure, while clients are responsible for securing their data and applications. However, multiple studies, including Chouhan and Singh (2022), highlight that SMEs often misunderstand or underestimate this division of responsibility. Misconfigurations in storage buckets, weak encryption practices, and default credentials are frequent culprits behind breaches.

INSIDER THREATS AND HUMAN FACTORS

Insider threats are another significant concern. Employees may accidentally expose sensitive data through phishing or deliberately misuse access privileges. According to IBM's 2023 Cost of Insider Threats Report, insider incidents account for nearly 25% of cloud-related breaches. For SMEs, where organizational hierarchies are flat and access controls are often loosely enforced, insider threats pose disproportionate risks.

COMPLIANCE AND LEGAL CHALLENGES

Compliance with regulatory frameworks adds another layer of complexity. The European Union's General Data Protection Regulation (GDPR) has set stringent standards for data privacy, and similar laws are emerging worldwide. For SMEs operating internationally, navigating these regulations is challenging. Researchers such as Singh and Rani (2023) note that SMEs often lack the resources to maintain compliance, thereby exposing themselves to legal liabilities.

MITIGATION STRATEGIES

The literature suggests several mitigation strategies tailored for SMEs. These include adopting multi-factor authentication, encrypting sensitive data, conducting regular vulnerability assessments, and leveraging managed security services. More advanced approaches such as zero-trust architectures and AI-driven anomaly detection are gaining traction but remain underutilized in SMEs due to cost concerns (Patel & Mehta, 2024).

GAPS IN EXISTING RESEARCH

While significant research exists on cloud security, much of it focuses on large organizations. SMEs are often underrepresented in cybersecurity studies, leading to a knowledge gap in understanding their unique challenges and solutions. This study aims to bridge that gap by combining existing insights with empirical data specific to SMEs.

RESEARCH METHODOLOGY

RESEARCH DESIGN

This study adopts a **mixed-method research design** to explore the cybersecurity challenges SMEs face in cloud computing and the strategies they employ for risk management. The combination of qualitative and quantitative approaches ensures a comprehensive understanding of both the technical and organizational aspects of the problem. The qualitative component involves reviewing scholarly articles, industry reports, and case studies, while the quantitative component is based on a structured survey administered to SME IT managers. This triangulation of data sources enhances both the validity and reliability of the findings.

POPULATION AND SAMPLE

The population for this study comprises **small and medium-sized enterprises (SMEs)** across different sectors, including IT services, retail, manufacturing, and healthcare. SMEs were chosen because they represent over 90% of businesses globally (World Bank, 2023), yet they remain disproportionately vulnerable to cyberattacks due to resource constraints. A purposive sampling method was employed to identify SMEs that actively use cloud computing solutions.

From this population, a sample of **120 SMEs** was targeted, and responses were received from **87 organizations**, yielding a response rate of 72.5%. The sample size is sufficient for generating meaningful statistical inferences while maintaining feasibility within the scope of the research.

DATA COLLECTION TOOLS

Two primary tools were used:

1. **Survey Questionnaire**: A structured questionnaire was developed using Likert-scale items, multiple-choice questions, and open-ended prompts. It was divided into four sections:
   - Demographics (organization size, industry, years of cloud adoption).
   - Cloud usage patterns (types of services used such as SaaS, PaaS, IaaS).
   - Perceptions of cybersecurity risks.
   - Mitigation measures currently in place.

   The questionnaire was validated through expert review and a pilot test with five SME managers.
2. **Secondary Sources**: Scholarly articles, government reports, and industry whitepapers were reviewed to provide contextual insights. Reports from ENISA, Gartner, IBM, and McAfee were especially useful for triangulating the primary data.

DATA ANALYSIS TECHNIQUES

- **Quantitative Analysis**: Survey data were coded and analyzed using descriptive and inferential statistics. Frequencies, percentages, and mean scores were calculated for categorical data. Chi-square tests were applied to examine relationships between organizational characteristics (e.g., size, sector) and perceived risk levels.

- **Qualitative Analysis**: Open-ended responses were subjected to thematic analysis to identify recurring patterns in SME experiences with cloud security. The qualitative findings were used to supplement and contextualize the quantitative results.

ETHICAL CONSIDERATIONS

Ethical integrity was ensured throughout the study. Respondents were informed about the purpose of the research, and participation was voluntary. Confidentiality was maintained by anonymizing the data and ensuring that individual organizations were not identifiable in the final report. The study also complied with institutional ethical review guidelines.

LIMITATIONS

Several limitations must be acknowledged:

- The study is limited to SMEs in selected industries and may not fully represent all sectors.
- Self-reported data are subject to biases, including social desirability bias.
- The survey sample size, while adequate, may not capture regional differences in cloud adoption and cybersecurity practices.

Despite these limitations, the methodology provides a solid foundation for analyzing the cybersecurity challenges faced by SMEs and deriving actionable insights.

DATA ANALYSIS & INTERPRETATION

Profile of Respondent SMEs

Among the 87 SMEs surveyed:

- **Industry Distribution**: 35% IT services, 25% retail, 20% manufacturing, 10% healthcare, 10% others.
- **Size**: 60% had fewer than 100 employees, 30% between 100–250 employees, and 10% between 250–500 employees.
- **Cloud Adoption**: 70% had been using cloud services for more than 3 years, while 30% had adopted cloud solutions within the past 3 years.
- **Cloud Models**: 65% relied on SaaS solutions, 20% on IaaS, and 15% on PaaS.

This distribution reflects the growing reliance of SMEs on SaaS platforms for daily operations, with a smaller proportion leveraging infrastructure and platform services.

Perceptions of Cybersecurity Risks

When asked about the most significant risks associated with cloud computing:

- **Data breaches** were identified as the top concern by 82% of respondents.
- **Insider threats** were highlighted by 55%.
- **Compliance risks** were cited by 48%.
- **Denial-of-service attacks** were mentioned by 30%.

Interestingly, while ransomware and phishing were frequently mentioned in open-ended responses, they were not always directly associated with cloud usage, suggesting a gap in SMEs' understanding of how broader cyber threats interact with cloud platforms.

Current Mitigation Practices

SMEs reported a variety of strategies to manage cybersecurity risks:

- **Multi-factor authentication (MFA)**: Adopted by 70% of respondents.
- **Regular data backups**: Implemented by 65%.

- **Encryption of sensitive data**: Practiced by 55%.
- **Periodic security audits**: Conducted by 40%.
- **Use of managed security services**: Only 25% reported outsourcing security management.

These figures suggest that while basic security measures such as MFA and backups are relatively widespread, more advanced strategies remain underutilized. Cost was consistently cited as a barrier to adopting advanced solutions such as AI-driven monitoring and zero-trust architectures.

RELATIONSHIP BETWEEN ORGANIZATION SIZE AND SECURITY MEASURES

Chi-square analysis revealed a significant relationship between organizational size and adoption of advanced security measures ($\chi^2 = 12.47$, $p < 0.05$). Larger SMEs (250–500 employees) were more likely to implement encryption, security audits, and managed services compared to smaller SMEs (<100 employees). This suggests that scale influences both awareness and capacity to invest in security infrastructure.

THEMATIC ANALYSIS OF OPEN-ENDED RESPONSES

Three key themes emerged from qualitative responses:

1. **Awareness vs. Implementation Gap**: Many SMEs acknowledged the importance of cybersecurity but admitted to delaying implementation due to budgetary and manpower constraints.
2. **Dependence on Cloud Providers**: Respondents frequently expressed confusion about their own responsibilities versus those of cloud vendors under the shared responsibility model.
3. **Need for Training and Awareness**: Several respondents emphasized that employees, not just IT staff, require basic cybersecurity awareness to avoid phishing and credential theft.

INTERPRETATION OF FINDINGS

The analysis reveals that SMEs recognize cloud security as a major concern, yet their responses are often reactive rather than proactive. While basic safeguards are in place, the absence of advanced measures exposes SMEs to significant risks. The mismatch between perceived risks (high concern about breaches) and actual mitigation practices (limited use of advanced tools) reflects a vulnerability gap. Furthermore, smaller SMEs are at a distinct disadvantage compared to larger ones, underscoring the need for scalable, cost-effective security solutions tailored to their context.

FINDINGS & DISCUSSION

The results of the study shed light on the unique cybersecurity challenges faced by SMEs in the context of cloud computing. The findings highlight several critical patterns that warrant discussion.

1. Awareness of Risks vs. Limited Implementation

One of the clearest findings is the **gap between awareness and implementation**. Most SMEs surveyed (82%) recognized data breaches as their top concern, yet only 55% had implemented encryption, and just 40% conducted regular security audits. This aligns with existing literature (Zhang & Chen, 2021; Patel & Mehta, 2024) suggesting that SMEs often understand the risks conceptually but struggle to operationalize protective measures due to limited budgets and technical expertise.

The findings emphasize that **awareness alone is insufficient** for effective risk management. SMEs require practical tools, frameworks, and affordable solutions that translate awareness into action.

2. Organizational Size as a Determinant of Security Readiness

The chi-square analysis revealed that larger SMEs (250–500 employees) adopt more advanced security measures than smaller SMEs. This suggests that resource availability significantly influences cybersecurity maturity. Smaller SMEs (<100 employees) tend to rely primarily on cloud vendors and basic safeguards, which can create critical vulnerabilities.

This finding corroborates prior research by Singh and Rani (2023), who argued that organizational scale dictates not only financial capacity but also the ability to attract skilled IT professionals. Thus, policy interventions and managed service offerings should prioritize micro and small enterprises, which represent the most vulnerable segment.

3. Confusion Around Shared Responsibility

A recurring theme in qualitative responses was **confusion regarding the shared responsibility model**. Many SMEs assumed that their cloud providers were entirely responsible for securing applications and data. This misunderstanding has been documented by Chouhan and Singh (2022), and our findings reinforce that education on this division of responsibilities remains critical. SMEs must understand that while cloud vendors secure infrastructure, clients are accountable for configurations, data management, and user access.

This confusion often results in misconfigurations, which ENISA (2023) identified as a leading cause of cloud breaches. Without clarity, SMEs remain prone to preventable vulnerabilities.

4. Cost Constraints as a Barrier to Advanced Solutions

While advanced security solutions such as **zero-trust architectures** and **AI-driven anomaly detection** are increasingly promoted in academic and industry circles (Patel & Mehta, 2024), their adoption among SMEs is minimal. Cost was consistently cited as a primary barrier. Managed security services, which could offer affordable access to sophisticated tools, were used by only 25% of SMEs in this study.

This finding underscores the importance of developing **cost-effective, scalable security frameworks** tailored specifically for SMEs. Industry partnerships and government subsidies could play a role in bridging this gap.

5. Human Factors and Training Needs

Another major finding was the role of human error in cloud security incidents. Several respondents emphasized that phishing attacks, weak passwords, and employee negligence were recurrent problems. This resonates with IBM's (2023) findings that insider threats—both accidental and intentional—account for nearly a quarter of cloud breaches.

The discussion highlights that **technical defenses must be complemented by organizational measures**, such as employee training, access control policies, and a culture of cybersecurity awareness. SMEs, despite resource limitations, can implement regular awareness sessions and enforce simple but effective measures like multi-factor authentication (MFA).

6. Broader Implications for Supply Chains

The vulnerabilities of SMEs have implications beyond their individual survival. SMEs are critical nodes in global supply chains, and their compromise can expose larger organizations to cyber risks. The SolarWinds attack (2020) demonstrated how smaller entities can serve as gateways into larger ecosystems. Thus, ensuring SME cybersecurity is not only an organizational imperative but also a **systemic requirement** for securing global business ecosystems.

CONCLUSION & SUGGESTIONS

CONCLUSION

This study explored the cybersecurity challenges faced by SMEs in adopting cloud computing and the risk management strategies they currently employ. The findings indicate that while SMEs recognize cloud security risks, their mitigation practices remain limited and unevenly distributed across organizational sizes. Key challenges include confusion about the shared responsibility model, cost barriers to advanced solutions, and inadequate employee training.

The study contributes to existing knowledge by focusing on SMEs, an underrepresented segment in cloud security research. By combining quantitative and qualitative data, the research underscores the pressing need for tailored strategies that address both technical and human factors.

SUGGESTIONS

Based on the findings, several recommendations are proposed:

1. **Enhance Awareness of Shared Responsibility**
   - Cloud vendors should provide clearer, SME-focused guidelines on shared responsibility. Training modules and simple checklists could help SMEs understand their role in securing data and applications.
2. **Adopt Layered Security Measures**
   - SMEs should prioritize cost-effective, layered defenses, such as MFA, encryption, and regular backups. These measures provide significant protection at relatively low cost.
3. **Promote Managed Security Services**
   - Policymakers and industry associations should encourage SMEs to use managed security services, which offer affordable access to advanced tools like intrusion detection and real-time monitoring.
4. **Government and Industry Support**
   - Subsidies, tax incentives, or public-private partnerships could help SMEs overcome cost barriers. Governments should recognize SME cybersecurity as a matter of national economic resilience.
5. **Focus on Employee Training**
   - Regular training and awareness campaigns are critical to reducing insider threats. SMEs should enforce basic practices such as strong password policies and phishing simulations.
6. **Encourage Adoption of Scalable Frameworks**
   - SMEs should explore modular, scalable frameworks such as zero-trust models that can be gradually implemented. Open-source tools may also offer affordable alternatives to commercial solutions.

By adopting these recommendations, SMEs can enhance their resilience to cybersecurity threats while maintaining the cost-efficiency and flexibility that cloud computing provides.

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ROLE OF NATIONAL EDUCATION POLICY (NEP 2020) IN TRANSFORMING INDIAN HIGHER EDUCATION

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ABSTRACT

The National Education Policy (NEP) 2020, introduced by the Government of India, marks a paradigm shift in the Indian education system. It is the first major reform in education policy in over three decades, replacing the NEP of 1986. NEP 2020 aims to transform higher education by emphasizing holistic, multidisciplinary, and skill-oriented learning, with a strong focus on flexibility, innovation, and research. The policy envisions India becoming a global knowledge superpower through structural reforms such as the establishment of the Higher Education Commission of India (HECI), multiple entry and exit options, emphasis on research and innovation, promotion of Indian languages, and internationalization of higher education. This paper critically examines the provisions of NEP 2020, its potential to address existing challenges in higher education, and the opportunities it presents for students, teachers, and institutions. The study also highlights implementation challenges and provides recommendations for achieving the goals of NEP 2020 effectively.

KEYWORDS: NEP 2020, HIGHER EDUCATION, MULTIDISCIPLINARY EDUCATION, SKILL DEVELOPMENT, INDIAN EDUCATION POLICY, RESEARCH AND INNOVATION, EDUCATION REFORM

INTRODUCTION

Education has always been recognized as the cornerstone of national development, and policies governing education play a crucial role in shaping the future of a nation. In India, the National Education Policy (NEP) 2020 represents a transformative vision designed to modernize the education system, align it with global standards, and prepare students for the 21st-century knowledge economy.

The NEP 2020 is the third major education policy since independence (after 1968 and 1986/1992) and was introduced after extensive consultations with stakeholders, including educators, policymakers, students, and civil society organizations. Unlike earlier policies that primarily focused on access and expansion, NEP 2020 emphasizes **quality, equity, inclusivity, and innovation**.

For higher education, NEP 2020 brings structural reforms such as:

- Introduction of **multidisciplinary institutions** by 2040.
- Establishment of the **Higher Education Commission of India (HECI)** as the umbrella regulator.
- **Multiple entry and exit** options with an Academic Bank of Credits (ABC).
- Enhanced focus on **research through the National Research Foundation (NRF)**.
- Promotion of **Indian languages and internationalization**.
- Target of achieving **50% Gross Enrollment Ratio (GER) by 2035**.

This paper aims to critically analyze how NEP 2020 can transform Indian higher education, the opportunities it presents, and the challenges that may hinder its implementation.

REVIEW OF LITERATURE

Historical Context of Education Policies in India

India's earlier policies, such as the Education Policy of 1968 and 1986, primarily focused on expanding access to education. The 1986 policy emphasized equity and quality but failed to sufficiently address skill development and global competitiveness (Tilak, 2020). With the emergence of the knowledge economy and globalization, a new framework became essential.

Vision and Objectives of NEP 2020

According to the Ministry of Education (2020), NEP 2020 envisions creating a holistic, flexible, multidisciplinary education system that fosters creativity, critical thinking, and ethical values. It aligns with the **Sustainable Development Goal 4 (SDG-4)**, which emphasizes inclusive and equitable quality education.

Multidisciplinary and Holistic Learning

Jain and Parekh (2021) argue that NEP 2020's focus on multidisciplinary institutions is a significant step toward breaking the silos of traditional education. By integrating humanities, sciences, vocational subjects, and research, the policy prepares students for dynamic career opportunities.

Academic Flexibility and Student-Centric Reforms

A key feature of NEP 2020 is the introduction of **multiple entry and exit options**, supported by the Academic Bank of Credits. This allows students to pause their education and rejoin without losing credits. According to Kumar (2021), this flexibility addresses issues of dropouts and enhances lifelong learning opportunities.

Research and Innovation

The establishment of the **National Research Foundation (NRF)** is considered a groundbreaking initiative. Gupta (2021) highlights that India invests less than 1% of its GDP in research, which hampers innovation. The NRF is expected to promote a research culture, encourage interdisciplinary projects, and strengthen industry-academia collaboration.

Internationalization and Indian Languages

NEP 2020 encourages global partnerships, student exchanges, and the entry of top foreign universities into India. Simultaneously, it promotes Indian languages to preserve cultural heritage. Balasubramanian (2021) notes that balancing internationalization with indigenous language promotion will be a delicate but necessary task.

Equity and Inclusivity in Higher Education

NEP 2020 emphasizes inclusivity by promoting scholarships, open learning opportunities, and gender-sensitive reforms. According to Mukherjee (2021), the policy addresses concerns of marginalized communities by enhancing access to higher education for women, Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Classes (OBC). The focus on distance education, online learning, and open universities is expected to bridge educational disparities.

Teacher Development and Faculty Empowerment

Quality of higher education depends heavily on the quality of its faculty. NEP 2020 envisions continuous professional development through workshops, academic exchanges, and mentoring programs. Mishra and Jha (2021) suggest that the policy's emphasis on merit-based recruitment, autonomy, and accountability for faculty can significantly improve teaching and research outcomes.

Digital Learning and Technology Integration

COVID-19 highlighted the importance of ICT in higher education. NEP 2020 incorporates digital platforms like **SWAYAM, National Digital Library, and DIKSHA** to expand access. According to Rajan (2021), technology-driven education ensures flexibility but requires strong digital infrastructure to prevent inequality.

Governance and Regulatory Framework

NEP 2020 proposes a **single regulatory body**, the Higher Education Commission of India (HECI), to ensure transparency, reduce duplication, and streamline processes. It will subsume existing bodies such as UGC, AICTE, and NAAC. According to Singh (2021), this reform could reduce bureaucratic hurdles, but its effectiveness depends on implementation and autonomy.

Global Comparisons

Internationally, reforms similar to NEP 2020 have been implemented in countries like Finland, Singapore, and South Korea, which emphasize multidisciplinary and research-oriented education. Sharma (2021) notes that adopting such global best practices can help India enhance competitiveness in global university rankings.

Summary of Literature

The reviewed studies suggest that NEP 2020 has the potential to revolutionize Indian higher education by focusing on inclusivity, research, innovation, and global integration. However, successful implementation requires addressing challenges such as infrastructure gaps, teacher readiness, and balancing global-local priorities.

RESEARCH METHODOLOGY

This study follows a **qualitative descriptive research design**, analyzing secondary data such as government policy documents, scholarly articles, and institutional reports.

RESEARCH OBJECTIVES

1. To evaluate the key reforms introduced by NEP 2020 in higher education.
2. To analyze the potential impact of NEP 2020 on quality, inclusivity, and innovation.
3. To identify implementation challenges and opportunities.
4. To provide recommendations for strengthening the policy outcomes.

DATA SOURCES

- **Primary Sources (Policy Documents):** NEP 2020 official text, Ministry of Education circulars, UGC guidelines.
- **Secondary Sources:** Peer-reviewed journals, books, World Bank and UNESCO reports, and expert commentaries.
- **Web Resources:** Ministry of Education portals, AICTE, NAAC, SWAYAM.

SAMPLING METHOD

Purposive sampling was adopted to select research studies published between 2020–2024 focusing on NEP 2020.

TOOLS OF ANALYSIS

- **Content Analysis:** Categorization of reforms into thematic areas (curriculum, research, governance, equity, technology).

- **Comparative Analysis:** Comparing NEP 2020 with previous policies and international reforms.
- **Interpretative Synthesis:** Deriving insights by combining literature and policy reviews.

DATA ANALYSIS AND INTERPRETATION

The analysis of policy provisions and literature highlights the following:

1. Curriculum Reforms and Multidisciplinary Learning

NEP 2020 envisions holistic and flexible curricula integrating science, humanities, and vocational subjects. The **four-year undergraduate program (FYUP)** with multiple exit points is designed to provide students with broader exposure and skill sets. This reform is expected to produce **well-rounded graduates** capable of adapting to diverse career paths.

2. Academic Flexibility through Credit Transfer

The **Academic Bank of Credits (ABC)** allows students to earn and store credits across different institutions, promoting mobility. For example, a student can complete two years in one university and transfer credits to another for completion. This system mirrors global practices and fosters **lifelong learning opportunities**.

3. Research and Innovation

India ranks low in global research output compared to China and the USA. The **National Research Foundation (NRF)** aims to increase funding, promote interdisciplinary projects, and bridge the gap between academia and industry. If implemented effectively, it can enhance India's innovation ecosystem.

4. Teacher Development

Faculty empowerment is central to NEP 2020. Professional development programs, research sabbaticals, and merit-based promotions are expected to improve teaching quality. However, challenges include resistance to change and ensuring consistent training across institutions.

5. Equity and Access

By targeting a **50% Gross Enrollment Ratio (GER) by 2035**, NEP 2020 aims to make higher education more inclusive. Expansion of open universities, online education, and scholarships can benefit marginalized communities. Yet, infrastructure gaps in rural India remain a significant barrier.

6. Governance and Regulatory Reforms

The establishment of HECI promises efficiency but raises concerns about autonomy of institutions. The balance between accountability and freedom will determine the success of these reforms.

FINDINGS AND DISCUSSION

The analysis of NEP 2020 provisions and supporting literature reveals several key findings about its potential to transform Indian higher education. These findings can be organized into thematic areas:

1. Curriculum and Pedagogy Transformation

NEP 2020 introduces **flexibility and multidisciplinary approaches**, moving away from rigid, discipline-specific programs. Students will be able to combine subjects like economics, data science, and philosophy, fostering creativity and adaptability. This aligns with global trends in countries like the United States, where liberal education models dominate.

- **Positive Outcome:** Broader knowledge base, improved problem-solving, and preparation for diverse career paths.
- **Concerns:** Requires faculty with multidisciplinary expertise and revision of assessment systems.

2. Academic Flexibility and Student-Centric Reforms

The **multiple entry and exit system** with the Academic Bank of Credits allows students to pause and rejoin education without penalty. This benefits working students, those with financial constraints, or those pursuing entrepreneurship.

- **Positive Outcome:** Lifelong learning becomes feasible. Dropout rates are expected to reduce significantly.
- **Concerns:** Implementation challenges in credit transfer between institutions with varying standards.

3. Research and Innovation Boost

The creation of the **National Research Foundation (NRF)** is a bold step. By pooling resources and encouraging interdisciplinary projects, NRF can increase India's global research visibility.

- **Positive Outcome:** Enhanced collaboration between universities, industries, and international partners.
- **Concerns:** Requires sustained funding (currently <1% of GDP is spent on R&D), faculty training in research methodology, and a culture shift toward inquiry-based learning.

4. Faculty Development and Empowerment

NEP 2020 envisions merit-based hiring, autonomy, and professional growth opportunities for teachers. Continuous professional development is mandated.

- **Positive Outcome:** Improved teaching quality, academic innovation, and motivation among faculty.
- **Concerns:** Many state universities face faculty shortages, delayed recruitment, and limited funds for training.

5. Equity, Access, and Inclusivity

The policy targets a **50% Gross Enrollment Ratio (GER) by 2035**, emphasizing scholarships, online platforms, and open learning to reach underserved populations.

- **Positive Outcome:** Greater access for women, rural students, and marginalized communities. Digital platforms like SWAYAM can bridge gaps.
- **Concerns:** The **digital divide** persists, especially in rural India. Without parallel investment in infrastructure, inclusivity goals may remain aspirational.

6. Governance and Regulatory Reforms

The **Higher Education Commission of India (HECI)** aims to streamline regulation, accreditation, and funding.

- **Positive Outcome:** Simplification of governance and reduced overlap between UGC, AICTE, and NAAC.
- **Concerns:** Risk of excessive centralization if autonomy is not adequately protected.

7. Globalization and Indianization

NEP 2020 encourages foreign universities to set up campuses in India, while simultaneously promoting Indian languages and cultural values.

- **Positive Outcome:** Students gain global exposure while preserving cultural identity.
- **Concerns:** Balancing global competitiveness with local traditions may be challenging.

CONCLUSION AND SUGGESTIONS

NEP 2020 is a visionary reform that addresses long-standing challenges in Indian higher education. By focusing on flexibility, inclusivity, and innovation, it has the potential to reshape the system into one that is more student-centered, globally competitive, and future-ready.

However, the **success of NEP 2020 depends on effective implementation**. Without adequate funding, infrastructure, and faculty preparedness, the ambitious goals may not be realized.

KEY CONCLUSIONS

1. NEP 2020 marks a shift from rote learning to holistic, skill-oriented education.
2. Multidisciplinary and flexible learning models align India with global education practices.
3. Research and innovation receive overdue attention through the NRF, but require strong financial backing.
4. Inclusivity is central to the policy, but bridging the digital divide is essential.
5. Governance reforms promise efficiency, though concerns about institutional autonomy remain.

SUGGESTIONS

1. **Infrastructure Development:** Invest heavily in digital infrastructure, especially in rural and semi-urban areas.
2. **Faculty Training:** Launch large-scale professional development programs to prepare teachers for multidisciplinary and technology-driven pedagogy.
3. **Research Funding:** Increase R&D expenditure to at least 2% of GDP to support NRF's objectives.
4. **Monitoring and Evaluation:** Establish independent bodies to track policy implementation and outcomes.
5. **Student Support:** Expand scholarships, mentorship programs, and career counseling to support diverse learners.
6. **Industry Collaboration:** Strengthen partnerships between universities and industries to ensure employability and innovation.
7. **Balanced Approach:** Ensure internationalization does not overshadow promotion of Indian languages and values.

By addressing these areas, India can achieve NEP 2020's vision of transforming higher education into a system that not only imparts knowledge but also fosters innovation, inclusivity, and global leadership.

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FINANCIAL HEALTH AND VALUE CREATION: EVALUATING CIPLA PHARMA'S PERFORMANCE USING ECONOMIC VALUE ADDED (EVA MODEL)

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ABSTRACT
Economic Value Added (EVA) is a measure of a company's true economic profit, reflecting the value created for shareholders after all costs, including the cost of capital, are deducted. It is a powerful metric that aligns with the goal of shareholder wealth maximization. A study on Cipla Pharma's performance from 2020-21 to 2024-25 found that the company consistently created shareholder value. Cipla's EVA grew steadily from ₹647.45 Crores in 2021 to ₹731.86 Crores in 2023. A significant jump in EVA was observed in 2024, nearly tripling to ₹1,758.21 Crores, and then reaching ₹2,474.78 Crores in 2025. This strong performance, representing an increase of over 280% from 2021 to 2025, was driven by robust net operating profit growth and prudent capital management, including a strategic reduction in long-term debt. Cipla's ability to generate returns significantly above its cost of capital highlights its financial strength and effective strategic execution.

KEY WORDS : EVA, ECONOMIC VALUE ADDED, FINANCIAL HEALTH, VALUE CREATION

INTRODUCTION
Economic Value Added (EVA) is a financial metric that measures a company's true economic profit. Unlike traditional accounting profits like net income, EVA accounts for the cost of all capital, including both debt and equity. It essentially answers the question of whether a company is generating a return that exceeds the minimum required return for its investors. A positive EVA indicates that a company is creating wealth for its shareholders, while a negative EVA suggests it is destroying value. In 1991, Stern Stewart introduced the concept of economic value added. EVA is the surplus amount of net operating profit over its cost of capital. The essence of EVA is that a company's NOPAT should be sufficient to easily cover its cost of capital. If net operating profit is high, it means that the company is creating value for its shareholders. But in rare cases, if the cost of capital is high, the company is destroying the wealth of its shareholders.

PROBLEM IDENTIFICATION
Through extensive literature review and valuable input from subject matter experts, the researcher has selected the researh problem as under:
Financial health and value creation: Evaluating Cipla Pharma's performance using economic value added (EVA Model)

RESEARCH GAP
The key research gap in evaluating Cipla Pharma's performance using the Economic Value Added (EVA) model is the lack of a tailored EVA framework for the pharmaceutical industry. The standard EVA model,

while effective for many sectors, fails to adequately address the unique financial characteristics of a company like Cipla.

Specifically, the major gaps are:

Inadequate treatment of R&D expenditure: Traditional EVA models treat R&D as an expense, which misrepresents a pharmaceutical company's true value creation. The model needs to be adapted to capitalize R&D, treating it as an investment that builds future value. This is a critical adjustment for a company whose core business is innovation.

Limited valuation of intangible assets: The pharmaceutical industry relies heavily on intangible assets like patents and brand value, which aren't fully captured by the conventional EVA framework. A research gap exists in developing a robust method to incorporate the value of these assets into the EVA calculation.

Absence of a comprehensive case study on Cipla: While some general studies exist on Indian pharma companies, there's a significant lack of in-depth, longitudinal research focused specifically on Cipla's EVA performance and its correlation with shareholder value and market performance.

OBJECTIVES OF THE STUDY

The main objective of economic value added (EVA) was to measure a company's true economic profit by calculating the profit remaining after all costs, including the cost of capital were deducted.

REVIEW OF LITERATURE

Sharma and Kumar (2010) have analyzed the effectiveness of economic value addition in selected companies for the period 2001-02 to 2008-09. The researcher has used traditional measures along with EVA to measure the effectiveness of the firm. The results of statistical tools show that majority of the sample companies have been able to create value for their shareholders consistently throughout the study period. The study found that EVA is gaining popularity as an important measure of strong performance in India.

Shakthivel (2011) analyzed the shareholder value in the Indian pharmaceutical industry for the period 1997-98 to 2006-07. It has been concluded that the companies under the pharmaceutical industry have been able to meet the public expectations in terms of shareholder value creation through EVA by increasing the operating income from the assets in place by reducing the cost of production or increasing sales or by changing the mix of financing in the capital structure. This study shows that shareholder value creation for the pharmaceutical industry has tended to increase every year since 2000-01.

PERIOD OF THE STUDY

The present study was undertaken by the researcher for the period of five (5) Accounting years from 2020-21 to 2024-25. The researcher had selected the base year 2020-21 because this year was normal for the present research of analysis and evaluation of data.

METHODS OF INTERPRETATION AND ANALYSIS OF DATA

Economic value added (EVA) was a measure of company's true economic profit, reflecting the value created for shareholders above and beyond the cost of the capital employed.it was a powerful metric that aligns with shareholder wealth maximization.

The formula for economic value added (EVA):

EVA = NOPAT – (Invested Capital x WACC)

Where:

1) **NOPAT – Net Operating Profit After Tax**: This was the profit a company made from its operation after deducting taxes, but before considering interest expenses. It represented the profit to all capital providers from debts and equity.

2) **Invested capital**: This represents the total capital tied up in the business, including both deb & equity. It could be calculated as Total Assets – Non-Interest -Bring Current Liabilities, or alternatively as Shareholder's Equity + Total Debt.

3) **WACC (Weighted Average Cost of Capital):** This was the average rate of return a company expects to pay to its capital providers like as shareholders & lenders. It was a weighted average of the cost of equity & the after- tax cost of debt.

CHALLENGES IN CALCULATING HISTORICAL EVA FOR PUBLIC COMPANIES:

In the present research paper researcher directly obtaining EVA figures from a company's financial report was rare, as it was a proprietary analytical tool. Calculating it accurately requires detailed financial statement breakdowns, including as under:

1) Precise NOPAT: Adjustments for non-operating income/expenses and a true operating tax rate are needed, rather than just using "net profit"

2) Accurate Invested Capital; Consistent calculation across years, considering various balance sheet items.

3) Year-Specific WACC: WACC can fluctuate due to changes in risk free rates, market risk premium, company-specific beta & capital structure.

DATA COLLECTION & ASSUMPTIONS FOR CIPLA PHARMACEUTICALS (FINANCIAL YEAR FROM 2021 TO 2025)

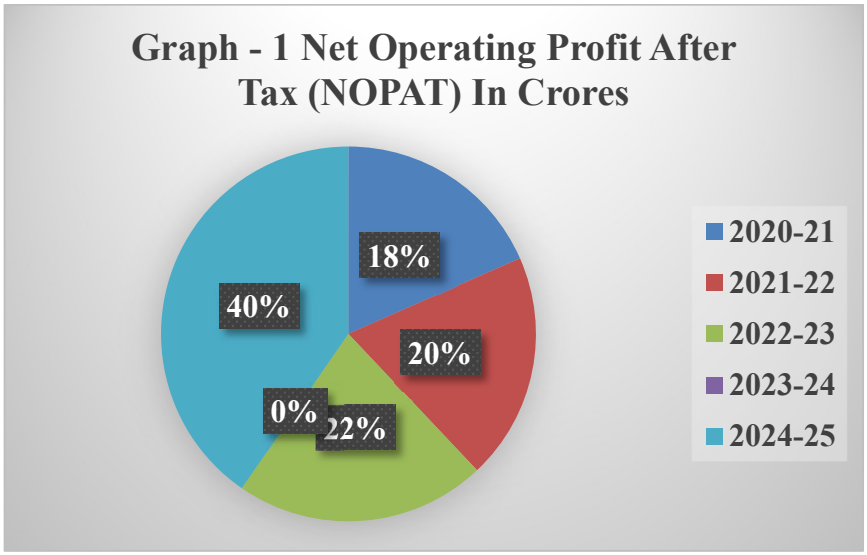
For the present study researcher used the financial year ending as 31st march for every year.

NET OPERATING PROFIT AFTER TAX (NOPAT)

Researcher used "profit after tax" (net profit) from Cipla's reported as a close proxy for NOPAT, as obtaining granular data for precise NOPAT adjustments from general search results was difficult. This assumes that non-operating income/expenses implication were either non material or largely consistent year-on-year for the purpose of demonstrating the trend.

Table – 1 Net Operating Profit After Tax (NOPAT)

Financial Year (ending 31st March)	NOPAT In Crores
2020-21	2,401.30
2021-22	2,559.50
2022-23	2,833.00
2023-24	4,154,00
2024-25	5,273.00

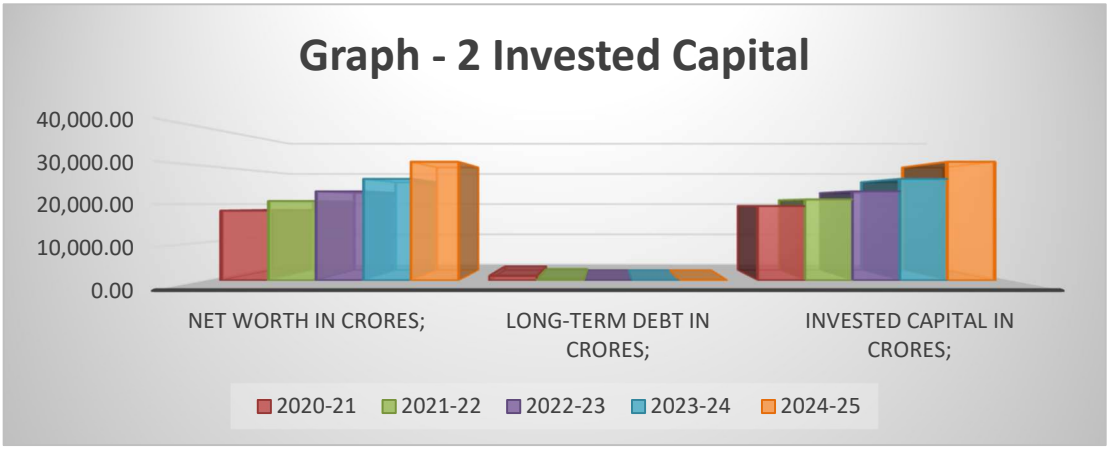


INVESTED CAPITAL

Invests capital was broadly defined as the total capital used to generate operating profits. A common proxy was Total Assets minus Non-interest-Bearing Current liabilities. However, given the available data, researchers used Net worth (shareholder's Equity) + Long-term debt as the Invested Capital. Cipla had significantly reduced its long-term debt, making this approximation more straight forward.

Table – 2 Invested Capital

Financial Year (Ending Mar)	Net worth in Crores;	Long-term Debt in Crores;	Invested Capital in Crores;
2020-21	18,284.4	1,202.8	19,487.2
2021-22	20,797.7	416.2	21,213.9
2022-23	23,346.0	0	23,346.0
2023-24	26,619.9	0	26,619.9
2024-25	31,079.3	12.0	31,091.3



WEIGHTED AVERAGE COST OF CAPITAL (WACC):

Alpha Spread reports Cipla's WACC at 10.2% and Fin box at 8.0%. Given the lack of year-specific WACC figures from the current search for present study. Researcher used an average WACC of 9.0% for all years for purposes study. This was a significant assumption, as WACC can fluctuate due to changes in risk-free rates, market risk premium, and Cipla's capital structure and cost of debt.

ECONOMIC VALUE ADDED (EVA) CALCULATION (IN INR CRORES):

Table - 3
Economic Value Added (EVA) Calculation (in INR Crores)

Financial Year (Ending Mar)	NOPAT (A)	Invested Capital (B)	Assumed WACC (C)	Capital Charge (B * C)	EVA (A - D)
2021	2,401.3	19,487.2	9.0%	1,753.85	647.45
2022	2,559.5	21,213.9	9.0%	1,909.25	650.25
2023	2,833.0	23,346.0	9.0%	2,101.14	731.86
2024	4,154.0	26,619.9	9.0%	2,395.79	1,758.21
2025	5,273.0	31,091.3	9.0%	2,798.22	2,474.78

TREND ANALYSIS OF CIPLA'S ECONOMIC VALUE ADDED (EVA):

The calculated EVA for Cipla Pharmaceuticals demonstrates a clear and positive trend over the last five fiscal years, indicating a consistent creation of shareholder value.

1. **Consistent Value Creation (Financial Year 2021- Financial Year 2023):**

❖ Cipla has maintained a positive EVA during this period, indicating that its operating profit has consistently exceeded the cost of capital it has employed.

❖ There was a steady, albeit moderate, increase in EVA from ₹647.45 Crores in Financial Year 2021 to ₹731.86 Crores in Financial Year 2023. This indicates healthy business performance and efficient capital utilization during these years.

2. **Accelerated Growth in Recent Years (Financial Year 2024- Financial Year 2025):**

❖ There has been a significant jump in EVA in FY2024, which has increased almost three times from the previous year to ₹1,758.21 crore.

❖ This strong growth continued till FY25, with EVA reaching ₹2,474.78 crore. This represents a significant increase of over 280% from Financial Year 2021 to Financial Year 2025.

FACTORS DRIVING THE EVA TREND:

➢ **Strong NOPAT Growth:** The primary driver for the uptick in EVA, particularly in FY24 and FY25, is the significant growth in Cipla's net profit (our proxy for NOPAT). This indicates:

➢ **Strong revenue performance:** Sales growth in key markets such as North America, India and other emerging markets, as reflected in the annual reports.

➢ **Improved operational efficiency:** Effective cost management and optimized processes contributed to higher profit margins. The FY25 report mentioned that "the expansion and profitability were largely due to the impact of favorable mix, calibrated pricing actions across branded and generic portfolios and cost escalation."

➢ **Prudent Capital Management:** While capital invested has naturally increased with business growth, the growth in NOPAT has exceeded the increase in capital charge (capital invested * WACC). Cipla's strategic decision to reduce and maintain very low levels of long-term debt (reaching zero in Financial Year 2023 and Financial Year 2024) has significantly contributed to keeping its WACC low, thus reducing capital charge and increasing EVA.

CONCLUSION:

Cipla Pharmaceuticals has consistently created economic value for its shareholders over the past five years. This trend reflects a steady base of value creation in the earlier years of the period, followed by a

significant acceleration in EVA in the most recent financial years (FY2024 and FY2025). This strong performance is primarily attributable to a significant increase in net operating profit, supported by efficient capital management and low cost of capital. Cipla's ability to generate returns significantly above its cost of capital underlines its financial strength and effective strategic execution.

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ICT IN TEACHING AND LEARNING: TRANSFORMING EDUCATION IN THE 21ST CENTURY

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ABSTRACT:
The 21st century has seen a transformative change in education, largely fuelled by Information and Communication Technology (ICT). From engaging classrooms to digital learning platforms, ICT has transformed education, enhancing inclusivity, dynamism, and focus on the learner. This study examines how ICT is changing education through the incorporation of digital teaching methods, online learning, classroom technologies, educational advancements, and digital literacy within academic practices. It explores the historical evolution of ICT in education, looks into current trends like artificial intelligence (AI), virtual reality (VR), and tailored learning, and assesses issues like the digital divide, teacher readiness, and ethical dilemmas. Moreover, the research highlights the importance of creativity and flexibility in teaching methods to prepare students with skills needed for the 21st century. The conclusion emphasizes that ICT is not just a resource but a dynamic force influencing the future of worldwide education.

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KEYWORDS: ICT, TEACHING, LEARNING, DIGITAL PEDAGOGY, E-LEARNING, CLASSROOM TECHNOLOGY, EDUCATIONAL INNOVATION, DIGITAL LITERACY

INTRODUCTION

Learning has consistently been a key foundation of individual growth and community advancement. In the 21st century, education is experiencing an unparalleled change because of the rapid spread of Information and Communication Technology (ICT). The incorporation of ICT in education has transformed not just the teaching techniques but also the learning experience, enhancing its interactivity, inclusivity, and adaptability. Historically, education was mainly defined by direct interactions in physical classrooms, using scarce tools like blackboards, textbooks, and chalk. Today, the classroom has transformed into a hybrid and digital space, enhanced by smartboards, multimedia displays, online platforms, and collaborative resources. Students have transitioned from being passive recipients of knowledge to active participants, engaging in digital conversations with peers and educators beyond geographical limits. This document intends to examine the significant impact of ICT on education and training. It explores essential elements like digital teaching methods, online learning, classroom technology, innovative education, and digital competency. Additionally, it underscores the opportunities and challenges that ICT brings to the education sector, stressing its capacity to influence future generations with critical, creative, and digital skills.

ROLE OF ICT IN TEACHING AND LEARNING:

1. ICT as a Teaching Aid

ICT has transformed education by equipping teachers with effective tools for planning, delivering, and assessing lessons. Multimedia tools like videos, animations, and simulations aid in clarifying intricate

concepts more efficiently than conventional approaches. For example, science educators can utilize virtual laboratories to showcase experiments that would typically be costly or hazardous in a real-world environment

2. ICT for Student Engagement

Students achieve optimal learning when they are actively involved. ICT fosters engaging learning experiences via platforms such as Kahoot, Quizizz, and Mentimeter. Gamification boosts motivation, whereas collaborative platforms like Google Classroom or Microsoft Teams promote peer-to-peer learning.

3. ICT for Assessment and Feedback

Digital evaluation resources like internet quizzes, flexible learning platforms, and electronic portfolios offer immediate feedback, fostering individualized learning experiences. Learning analytics assist educators in tracking student advancement and customizing teaching to meet personal requirements.

OBJECTIVES OF THE STUDY

- To explore how ICT influences changes in teaching methods.
- To evaluate the effects of ICT on student learning and involvement.
- To emphasize the uses of ICT across various educational stages.
- To recognize obstacles and restrictions in ICT integration.
- To suggest methods for enhancing the potential of ICT in education and learning.

ICT IN TEACHING:

Transforming Pedagogical Approaches

ICT enables teachers to shift from conventional lecture techniques to more engaging and student-oriented instructional methods. Multimedia presentations, virtual laboratories, and simulations provide creative ways to explain complex concepts. Interactive whiteboards, projectors, and digital learning platforms enrich lessons, making them more dynamic and engaging.

Teacher as Facilitator

The teacher transitions from being a source of knowledge to a facilitator of learning. ICT enables educators to lead students in analytical thinking, solving problems, and self-directed exploration. By utilizing online tools, educators foster cooperative learning and enhance digital literacy.

Assessment and Feedback

ICT simplifies assessment through online quizzes, automated grading systems, and real-time feedback mechanisms. Digital portfolios allow continuous monitoring of student progress, fostering formative assessment rather than focusing solely on summative evaluations.

ICT IN LEARNING:

Personalized Learning

ICT resources enable learners to progress at their own speed and in accordance with their unique study preferences. Adaptive learning systems modify materials according to student outcomes, facilitating personalized instruction.

Active and Collaborative Learning

ICT encourages active involvement via discussion boards, collaborative projects, and peer-to-peer interaction. Platforms such as Google Classroom, Microsoft Teams, and Moodle improve interaction between educators and students.

Access to Global Knowledge

The internet provides learners with access to vast digital libraries, open educational resources (OER), and massive open online courses (MOOCs). This democratization of knowledge ensures equitable opportunities for learners worldwide.

Lifelong Learning

ICT supports lifelong learning by providing continuous opportunities for skill development. Online platforms and digital resources make it possible for individuals to learn anytime and anywhere.

DIGITAL PEDAGOGY AND CLASSROOM TECHNOLOGY

Digital pedagogy involves incorporating digital tools into educational methods. It's not just about employing technology; it's about reimagining pedagogy for the digital era.

- Intelligent Classrooms: Outfitted with interactive displays, projectors, and high-speed internet, intelligent classrooms promote visual and auditory education.
- Blended Learning: Merging conventional classroom instruction with digital materials provides adaptability and caters to various learning preferences.
- Flipped Classrooms: Learners view educational materials on the internet prior to class and participate in interactive discussions and problem-solving activities during class hours.
- **Mobile Learning:** With the widespread use of smartphones, mobile applications provide microlearning opportunities, ensuring continuous learning beyond school walls.

Digital pedagogy requires educators to be digitally literate and pedagogically innovative, ensuring that technology is used to enhance—not replace—human interaction.

E-LEARNING AND EDUCATIONAL INNOVATION

E-learning has emerged as a fundamental component of contemporary education, especially propelled by the COVID-19 pandemic. Websites like Moodle, Coursera, and edX allow students around the globe to obtain quality education.

Innovative practices include:

- **Gamification:** Incorporating game elements into learning fosters motivation and creativity.
- **AI-Powered Learning:** Adaptive systems analyze student performance and recommend personalized resources.
- **Virtual Reality (VR) and Augmented Reality (AR):** These technologies immerse learners in interactive environments, making abstract concepts tangible.
- **MOOCs (Massive Open Online Courses):** Providing global access to courses from leading universities at minimal or no cost.

These innovations democratize education, breaking geographical, financial, and cultural barriers.

Applications of ICT in Teaching and Learning:

1. E-Learning Platforms: Moodle, Coursera, Khan Academy, and Google Classroom.
2. Multimedia Tools: Videos, animations, podcasts, and infographics.
3. Interactive Whiteboards and Smart Classrooms: Facilitate dynamic, visual learning.
4. Virtual Labs and Simulations: Enhance practical learning in science, medicine, and engineering.
5. Gamification: Incorporates game elements to increase motivation and engagement.
6. Mobile Learning Apps: Provide flexible learning opportunities through smartphones and tablets.
7. Assistive Technologies: Support inclusive education for differently-abled learners.

Benefits of ICT in Education

- Enhanced Engagement: ICT makes learning more interactive and enjoyable.
- Accessibility: Provides educational resources to remote and marginalized communities.
- Flexibility: Enables learning anytime, anywhere.
- Collaboration: Promotes teamwork and cross-cultural communication.
- Critical Thinking: Encourages problem-solving and analytical skills.
- Inclusivity: Supports learners with diverse needs and abilities.

CHALLENGES OF ICT INTEGRATION

- Digital Divide: Unequal access to ICT tools and internet connectivity.
- Teacher Training: Many educators lack the necessary digital skills.
- Infrastructure Limitations: Insufficient hardware, software, and reliable internet access.
- Cost: High costs of implementing ICT infrastructure.
- Over-reliance on Technology: Risk of reduced human interaction in learning.
- Data Privacy and Security: Concerns regarding online platforms and student information.

Strategies for Effective ICT Integration

- Capacity Building for Teachers: Professional development programs in digital pedagogy.
- Infrastructure Investment: Governments and institutions must improve ICT infrastructure.
- Policy Frameworks: Establish clear guidelines for ICT use in education.
- Public-Private Partnerships: Collaborations to reduce costs and improve access.
- Inclusive Practices: Ensure ICT tools are accessible to learners with disabilities.
- Blended Learning Models: Combine traditional and digital methods for balance.

FUTURE DIRECTIONS

The future of ICT in education involves incorporating Artificial Intelligence, Virtual Reality, and Augmented Reality to improve learning experiences. Personalized learning systems powered by AI, immersive classrooms using VR/AR, and gamified educational platforms will continue to revolutionize education. Increased focus will be directed towards digital literacy, cybersecurity, and the ethical use of ICT.

CONCLUSION:

ICT has transformed education by facilitating tailored, cooperative, and captivating learning experiences. Despite ongoing issues like the digital divide, teacher training, and infrastructure, successful approaches can guarantee the sustainable integration of ICT. As technology progresses, education needs to adjust to equip students for the challenges of the digital era. ICT is not just an addition but a vital part of education in the 21st century.

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ETHICAL, TECHNICAL, AND FINANCIAL CONSIDERATIONS OF AI ADOPTION IN LIBRARY SERVICES

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ABSTRACT

Artificial Intelligence (AI) is rapidly transforming the way libraries manage, deliver, and enhance their services, offering innovative solutions for cataloguing, information retrieval, reference assistance, and user personalization. However, its adoption also brings critical challenges that must be carefully evaluated from ethical, technical, and financial perspectives. Ethically, libraries face concerns related to user privacy, data protection, transparency of AI decision-making, bias in algorithms, and the need for informed user consent, as highlighted in recent scholarship. From a technical standpoint, successful AI integration requires robust digital infrastructure, compatibility with existing library management systems, cybersecurity safeguards, and the continuous training of library professionals. Financially, institutions must balance the high initial costs of AI tools, software, and training against long-term efficiency gains, while ensuring sustainable funding and equitable access. This study explores these interrelated dimensions to provide a holistic understanding of AI adoption in library services, arguing that responsible, transparent, and cost-effective strategies are essential for leveraging AI's potential while upholding the values of inclusivity, accountability, and accessibility in knowledge management.

KEYWORDS: ARTIFICIAL INTELLIGENCE, LIBRARY SERVICES, ETHICAL CONSIDERATIONS, TECHNICAL CHALLENGES, FINANCIAL SUSTAINABILITY, DIGITAL LIBRARIES, KNOWLEDGE MANAGEMENT

1. INTRODUCTION

The rapid advancement of Information and Communication Technologies (ICT) has significantly reshaped the landscape of library services worldwide. Among these technologies, Artificial Intelligence (AI) has emerged as a transformative force, enabling libraries to enhance operational efficiency, optimize information retrieval, personalize user experiences, and automate routine processes such as cataloguing, indexing, and reference support (Smith & Kumar, 2022; Zhao et al., 2021). The integration of AI in library services promises to address growing demands for faster, more accurate, and user-centric information delivery, particularly in the era of digital libraries and online learning platforms.

Despite these advantages, AI adoption in libraries presents multifaceted challenges that extend beyond technology. Ethical concerns—including user privacy, data protection, algorithmic bias, and informed consent—must be rigorously evaluated to maintain trust and uphold the principles of equitable information access (Johnson, 2020). Technical challenges such as infrastructure readiness, integration with existing Library Management Systems (LMS), cybersecurity risks, and the continuous need for staff training further complicate implementation (Patel & Rao, 2021). Additionally, the financial dimension cannot be overlooked, as AI solutions often require substantial initial investment, ongoing operational

costs, and strategic planning to ensure sustainability and equitable access, especially in resource-constrained institutions (Choudhury, 2019).

This study aims to provide a comprehensive analysis of AI adoption in library services by examining these three critical dimensions—ethical, technical, and financial. By exploring the interplay between these factors, the research seeks to offer actionable insights for librarians, administrators, and policymakers, promoting responsible, cost-effective, and inclusive AI integration in contemporary library ecosystems. The scope of this paper encompasses both academic and public libraries, highlighting best practices, challenges, and potential strategies for effective implementation.

2. AI IN LIBRARY SERVICES: AN OVERVIEW

Artificial Intelligence (AI) has emerged as a pivotal technology in modern library services, fundamentally transforming how libraries operate, interact with users, and manage information resources. Traditionally, library operations relied heavily on manual processes, including cataloguing, classification, circulation management, and reference assistance, which were time-consuming and prone to human error. The advent of AI introduces automated, intelligent systems capable of handling large volumes of data with speed and precision, thereby revolutionizing traditional library workflows (Smith & Kumar, 2022). Globally, libraries are increasingly adopting AI-driven solutions to enhance operational efficiency, improve accuracy in resource management, and provide more personalized services tailored to the needs of diverse user groups. Developed countries such as the United States, the United Kingdom, Japan, and Germany have been at the forefront of implementing AI technologies in both digital and physical library environments, leveraging machine learning, natural language processing, and predictive analytics to optimize services (Lee, 2021; Zhao et al., 2021). Meanwhile, developing nations are gradually exploring AI adoption, often constrained by limited infrastructure, budgetary challenges, and lack of skilled personnel, yet showing growing interest due to the potential for improved access to knowledge, enhanced research support, and more efficient library management. The integration of AI into library systems thus represents a strategic response to the increasing demand for faster, more accurate, and user-centric information services in the digital age.

2.1 Applications of AI in Libraries

AI is transforming library services by enhancing efficiency, personalization, and accessibility. Key applications include:

- **Automated Cataloguing:** AI classifies and organizes resources, reducing manual work and improving metadata accuracy (Patel & Rao, 2021).
- **Chatbots and Virtual Assistants:** Provide 24/7 support for queries, resource discovery, and reference services (Zhao et al., 2021).
- **Recommender Systems:** Suggest resources based on user behavior and borrowing patterns, enhancing engagement (Johnson, 2020).
- **Plagiarism Detection:** AI scans submissions to maintain academic integrity (Choudhury, 2019).
- **Data Analytics:** Predicts high-demand resources and supports data-driven library management.
- **Enhanced Accessibility:** Offers speech-to-text, text-to-speech, translations, and adaptive interfaces for all users.

2.2 Benefits of AI Integration

The adoption of AI offers multiple benefits:

- Efficiency and Productivity: Automating repetitive tasks frees librarians to focus on higher-level services such as research support and information literacy programs.
- Personalized User Experience: Tailored recommendations and adaptive interfaces enhance engagement and learning outcomes.
- Enhanced Accessibility: AI tools can support users with disabilities through text-to-speech, translation, and adaptive interfaces.
- Data-Driven Decision Making: AI analytics provides actionable insights for collection development, resource allocation, and user engagement.

2.3 Challenges and Limitations

Despite its advantages, AI adoption is not without challenges:

- Digital Divide: Unequal access to technology can exacerbate information inequality among users.
- High Costs: Implementation and maintenance require substantial financial resources.
- Ethical Concerns: AI decision-making opacity, data privacy, and algorithmic bias pose risks to users.
- Staff Training: Libraries must invest in upskilling staff to manage and monitor AI systems effectively.

2.4 AI in Library Services Ecosystem

Description: This figure illustrates the interaction between key components of AI-enabled library services:

- Users: Students, researchers, and general patrons who access library services for academic, professional, or personal purposes.
- AI Tools: Chatbots, recommender systems, automated cataloguing algorithms, plagiarism detection tools, and analytics platforms that support library operations and enhance service delivery.
- Library Staff: Librarians supervise AI operations, ensure ethical compliance, monitor system performance, and provide expert guidance.
- Digital Resources: E-books, journals, databases, institutional repositories, and other knowledge resources that are managed, indexed, and delivered through AI-enabled systems.

The ecosystem demonstrates the dynamic interaction among all components: AI tools process user queries, analyze behavior, and deliver personalized resources, while librarians maintain oversight, handle exceptions, and ensure ethical standards. Digital resources form the backbone, with AI facilitating efficient access and intelligent organization. The model emphasizes that AI does not replace human expertise but augments library services, improving efficiency, personalization, and accessibility.

3. ETHICAL CONSIDERATIONS

The ethical dimension of AI adoption in library services is critical, as AI systems often interact directly with users' personal data, influence access to information, and shape user experiences. Libraries must ensure that AI deployment aligns with professional values, legal requirements, and societal expectations. Key ethical considerations include:

3.1 Privacy and Data Security

AI systems collect and process large amounts of user data, including borrowing history, search queries, and personal preferences. Libraries must comply with data protection regulations such as the General Data Protection Regulation (GDPR) and the Indian IT Act, ensuring secure storage, controlled access, and confidentiality. Failure to protect user data can result in breaches, loss of trust, and legal consequences (Johnson, 2020).

3.2 Transparency and Explainability

AI systems often operate as "black boxes," making decisions that may be difficult for users or librarians to interpret. Implementing Explainable AI (XAI) ensures that decisions, such as resource recommendations or search prioritization, can be understood and justified. Transparency fosters user trust and accountability (Patel & Rao, 2021).

3.3 Bias and Fairness

Algorithms trained on biased datasets can produce unfair recommendations or resource prioritization, marginalizing certain users or academic topics. Regular bias audits and inclusive dataset practices are necessary to ensure equitable access to library services (Kumar & Singh, 2022).

3.4 User Consent and Control

Libraries must obtain informed consent from users before collecting or analyzing their data. Users should be aware of what data is collected, how it is used, and have the ability to opt out when necessary.

3.5 Human Oversight

While AI can automate many processes, librarians play a crucial role in supervising AI operations, resolving errors, and maintaining ethical standards. Human oversight ensures AI outputs align with library policies and professional ethics.

3.6 Long-Term Societal Impact

AI adoption may impact employment, alter user behavior, and influence academic practices. Libraries must consider societal consequences, including equitable access, academic integrity, and maintaining public trust in information services.

3.7 Ethical AI Education

Training librarians and educating users about AI, data privacy, and responsible technology use strengthens ethical compliance. Awareness programs ensure that AI is implemented in a way that upholds professional and societal values (Choudhury, 2019).

4. TECHNICAL CONSIDERATIONS

Successful AI adoption in library services depends heavily on addressing technical challenges. While AI can streamline operations and enhance user experience, insufficient technical planning may result in system inefficiencies, data breaches, or reduced service quality. Key technical considerations include:

4.1 Infrastructure Requirements

AI systems require robust digital infrastructure, including high-performance servers, cloud platforms, reliable internet connectivity, and secure data storage. Libraries must ensure scalability to accommodate increasing volumes of digital resources and user interactions. Lack of proper infrastructure can lead to slow processing, system downtime, or incomplete resource indexing (Patel & Rao, 2021).

4.2 Integration with Existing Library Management Systems (LMS)

AI tools must be compatible with current LMS platforms such as Koha, SOUL, or Ex Libris. Seamless integration ensures smooth cataloguing, search, and circulation processes. Poor integration can create data silos, inconsistencies, and operational bottlenecks (Zhao et al., 2021).

4.3 Reliability and Accuracy

AI systems are prone to errors if algorithms are poorly trained or datasets are incomplete. Inaccurate recommendations, misclassification of resources, or faulty analytics can affect library credibility. Continuous monitoring, testing, and quality assurance are necessary to maintain reliability.

4.4 Cybersecurity Risks

AI systems store sensitive user data and connect to external networks, making them potential targets for cyberattacks. Libraries must implement robust cybersecurity measures, including firewalls, encryption, regular vulnerability assessments, and staff training in data protection (Johnson, 2020).

4.5 Staff Training and Technical Competence

Library personnel require specialized training to manage AI systems, interpret analytical outputs, and respond to technical issues. Investing in continuous professional development ensures that staff can utilize AI tools effectively while maintaining oversight and ethical compliance.

4.6 Vendor Dependency

Many AI solutions depend on third-party providers for software updates, technical support, and cloud services. Over-reliance on vendors may result in limited customization, higher costs, or disruptions in service continuity if a vendor discontinues support.

5. FINANCIAL CONSIDERATIONS

Financial planning is a critical factor in the successful adoption of AI in library services. While AI offers long-term efficiency and improved service quality, its implementation involves significant costs and resource allocation. Key financial considerations include:

5.1 Initial Investment

Implementing AI requires a substantial upfront investment in software licenses, AI tools, cloud services, high-performance servers, and other infrastructure. Smaller libraries or institutions with limited budgets may find it challenging to adopt AI despite its long-term benefits (Choudhury, 2019).

5.2 Operational Costs

Beyond initial setup, libraries incur ongoing costs, including system maintenance, software updates, data storage, cybersecurity, and staff training. Effective budgeting must account for recurring expenses to ensure uninterrupted service delivery.

5.3 Hidden Costs

AI adoption may involve additional costs that are often overlooked, such as legal compliance, ethical audits, algorithm updates, and vendor support fees. Failure to account for these hidden costs can strain library budgets and compromise sustainability.

5.4 Cost–Benefit Analysis

Libraries must evaluate efficiency gains versus financial expenditure. While AI can reduce manual workloads and improve service quality, institutions must assess whether the benefits justify the investment, particularly for small or resource-constrained libraries.

5.5 Funding Sources

Funding for AI adoption can come from various sources, including government grants, institutional budgets, University Grants Commission (UGC) support, and international development programs. Strategic use of funding is essential for equitable AI implementation across different library settings.

5.6 Sustainability

Financial sustainability requires balancing innovation with budgetary constraints. Libraries must develop long-term strategies that combine phased AI adoption, cost-effective solutions, and continuous evaluation of return on investment to ensure ongoing benefits without overextending resources.

6. DISCUSSION

The adoption of Artificial Intelligence in library services involves an intricate interplay of ethical, technical, and financial considerations. While AI offers transformative potential—enhancing efficiency,

personalization, accessibility, and data-driven decision-making—it also introduces challenges that must be addressed to ensure responsible implementation.

6.1 Interconnection of Challenges

Ethical, technical, and financial dimensions are closely interrelated. For example:

- Privacy and Security vs. Technical Infrastructure: Ensuring data privacy requires robust cybersecurity systems and secure cloud storage, which increases financial and technical demands.
- Bias and Fairness vs. Training and Oversight: Minimizing algorithmic bias necessitates staff training and regular system audits, adding to operational costs and technical workload.
- Financial Constraints vs. Ethical and Technical Goals: Limited budgets may restrict infrastructure upgrades or staff training, potentially compromising ethical standards or system reliability.

This interconnection highlights that AI adoption cannot be approached in isolation; decisions in one dimension affect outcomes in the others.

6.2 Global Comparison

Developed countries have demonstrated higher AI adoption in libraries due to advanced infrastructure, skilled personnel, and adequate funding. Developing nations often face constraints, including limited budgets, lack of technical expertise, and infrastructural gaps (Kumar & Singh, 2022). However, strategic planning, phased implementation, and targeted funding can enable resource-constrained libraries to gradually integrate AI.

6.3 Recommendations for Phased AI Adoption

1. Pilot Programs: Start with small-scale AI tools, such as chatbots or recommendation engines, to evaluate effectiveness.
2. Staff Training: Invest in continuous professional development to ensure librarians can manage AI ethically and technically.
3. Ethical Guidelines: Develop institutional policies for data privacy, transparency, and algorithmic fairness.
4. Financial Planning: Conduct detailed cost–benefit analyses and explore funding from government grants or institutional budgets.
5. Monitoring and Evaluation: Continuously assess AI performance, user satisfaction, and compliance with ethical standards to guide long-term adoption.

By adopting a phased, well-monitored approach, libraries can harness AI's benefits while mitigating risks associated with ethics, technical challenges, and financial constraints.

7. CONCLUSION

Artificial Intelligence has the potential to transform library services, enhancing efficiency, accessibility, personalization, and data-driven decision-making. However, its adoption must be carefully managed to address ethical, technical, and financial challenges. Ethical considerations, including user privacy, transparency, algorithmic fairness, and human oversight, are critical to maintaining trust and inclusivity. Technical requirements such as robust infrastructure, system integration, cybersecurity, and staff training are essential for effective AI deployment. Financial planning, encompassing initial investments, operational costs, and sustainable funding, ensures long-term viability, particularly for resource-constrained institutions.

This study highlights that responsible AI adoption in libraries is not merely a technological upgrade but a multidimensional strategy requiring coordinated attention across ethics, technology, and finance.

Implementing phased adoption, developing institutional policies, providing professional training, and securing appropriate funding are key strategies to maximize benefits while minimizing risks. By balancing innovation with ethical accountability, technical readiness, and financial sustainability, libraries can leverage AI to enhance service quality, support research and learning, and strengthen the overall information ecosystem. Ultimately, AI offers a pathway to smarter, more inclusive libraries, but its potential can only be fully realized through transparent, ethical, and strategic implementation.

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EFFECT OF EXERCISE ON THE CARDIORESPIRATORY SYSTEM OF THE HUMAN BODY

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ABSTRACT

Physical exercise exerts profound and multifaceted effects on the human cardiorespiratory system. These effects occur across temporal scales: immediate (acute) responses during single exercise bouts, short-term adaptations over weeks, and long-term structural and functional remodeling across months or years. Exercise modifies heart rate, stroke volume, cardiac output, blood volume and distribution, arterial compliance, pulmonary ventilation and diffusion, and systemic oxygen delivery and utilization. Regular aerobic training increases maximal oxygen uptake (VO_2max), improves endurance capacity, enhances ventilatory efficiency, and reduces cardiovascular risk through favorable changes in blood pressure, lipid profile, and endothelial function. Resistance and high-intensity interval training (HIIT) produce distinct but complementary cardiorespiratory adaptations. This paper reviews physiological mechanisms underlying these changes, contrasts acute versus chronic responses, discusses clinical and public-health implications, and outlines exercise prescription principles to optimize cardiorespiratory health.

KEYWORDS: EXERCISE, CARDIORESPIRATORY SYSTEM, VO_2MAX, CARDIAC OUTPUT, PULMONARY DIFFUSION, AEROBIC TRAINING, HIIT, ENDOTHELIAL FUNCTION

INTRODUCTION

The cardiorespiratory system — comprising the heart, blood vessels, lungs, and the mechanisms that transport and exchange oxygen (O_2) and carbon dioxide (CO_2) — is central to human health and performance. Exercise imposes increased metabolic demand on skeletal muscle; the ability of the cardiorespiratory system to meet that demand determines endurance, work capacity, and overall health outcomes. Understanding how different types and doses of exercise influence cardiac and pulmonary structure and function is essential for clinicians, exercise professionals, and public-health policymakers (Booth & Laye, 2010).

ACUTE CARDIORESPIRATORY RESPONSES TO EXERCISE

Acute responses are the immediate adjustments the cardiovascular and pulmonary systems make to support increased oxygen delivery and CO_2 removal. Heart rate rises rapidly due to sympathetic stimulation and parasympathetic withdrawal (Green et al., 2017). Stroke volume increases via enhanced venous return, and cardiac output rises to meet metabolic demand (McArdle et al., 2015). Systolic blood pressure rises while diastolic remains stable or slightly decreases. Ventilation increases through higher tidal volume and respiratory rate, improving pulmonary gas exchange.

CHRONIC ADAPTATIONS TO REGULAR EXERCISE

Repeated exercise leads to structural and functional changes. Endurance training causes eccentric cardiac hypertrophy, increasing chamber size and stroke volume, while resistance training often results in concentric hypertrophy (Fagard, 2003). Blood vessels adapt through enhanced endothelial function and arterial compliance, improving blood pressure regulation (Green et al., 2017). Pulmonary adaptations include stronger respiratory muscles and improved diffusion capacity. Peripheral adaptations include increased mitochondrial density, capillarization, and oxidative enzyme activity, enhancing oxygen utilization (Holloszy & Coyle, 1984).

DIFFERENTIAL EFFECTS OF TRAINING MODALITIES

Aerobic training improves VO_2max, mitochondrial density, and capillarization. HIIT provides rapid improvements in VO_2max and insulin sensitivity. Resistance training enhances muscular strength and contributes to modest cardiovascular benefits if performed with high volume and short rests. Combined training maximizes both cardiorespiratory and muscular adaptations (Weston et al., 2014; Garber et al., 2011).

MECHANISMS UNDERLYING ADAPTATION

Exercise-induced shear stress stimulates nitric oxide production, enhancing vasodilation and endothelial health (Green et al., 2017). Autonomic modulation improves resting parasympathetic tone and reduces sympathetic activity. Molecular pathways like AMPK and PGC-1α promote mitochondrial biogenesis and angiogenesis. Regular exercise also reduces systemic inflammation, contributing to improved cardiovascular function (Petersen & Pedersen, 2005).

PHYSIOLOGICAL BENEFITS OF EXERCISE ON THE CARDIORESPIRATORY SYSTEM

1. Cardiovascular Benefits

- Enhanced cardiac output and stroke volume: Regular aerobic exercise increases stroke volume and maximal cardiac output, allowing the heart to pump more blood per beat and meet higher oxygen demands (McArdle et al., 2015).
- Reduced resting heart rate: Increased vagal tone lowers resting heart rate, reflecting improved cardiac efficiency (Fagard, 2003).
- Improved endothelial function: Shear stress stimulates nitric oxide production, reducing arterial stiffness (Green et al., 2017).
- Lower blood pressure: Aerobic exercise can reduce systolic and diastolic blood pressure (Garber et al., 2011).
- Reduced cardiovascular disease risk: Improves lipid profile, reduces inflammation, and enhances vascular function (Booth & Laye, 2010).

2. Pulmonary Benefits

- Increased pulmonary ventilation: Tidal volume and respiratory rate increase, enhancing O_2 uptake and CO_2 elimination (McArdle et al., 2015).
- Improved diffusion capacity: Pulmonary capillary recruitment and alveolar expansion improve O_2 diffusion.
- Strengthened respiratory muscles: Diaphragm and accessory muscles become stronger (Weston et al., 2014).
- Better oxygen utilization: Efficient gas exchange enables tissues to extract more oxygen.

3. Peripheral and Metabolic Benefits

- Increased mitochondrial density: Enhances aerobic ATP production (Holloszy & Coyle, 1984).
- Enhanced capillarization: Improves oxygen delivery and waste removal.
- Improved metabolic enzyme activity: Better utilization of fats and carbohydrates.
- Improved glucose and lipid metabolism: Enhanced insulin sensitivity and reduced triglycerides (Petersen & Pedersen, 2005).

4. Functional and Performance Benefits

- Higher VO_2max: Increases endurance and exercise tolerance.
- Delayed fatigue: Reduced onset of muscle fatigue.
- Improved recovery: Faster clearance of lactate and metabolic byproducts.
- Enhanced thermoregulation: Improved blood flow and sweating efficiency.

EXERCISE PRESCRIPTION PRINCIPLES FOR CARDIORESPIRATORY BENEFIT

Frequency: Most days for moderate intensity; 3–5 days for vigorous intensity. Intensity: 40–89% of heart rate reserve depending on goals. Time: ≥150 min/week moderate or ≥75 min/week vigorous. Type: Rhythmic, large-muscle activities such as running, cycling, swimming. Resistance training 2–3 times/week.

SAFETY CONSIDERATIONS

Pre-screening for cardiovascular risk is essential. Watch for warning signs: chest pain, syncope, undue breathlessness. Gradual progression with warm-up and cool-down periods is recommended.

EVIDENCE FROM REPRESENTATIVE STUDIES

HIIT improves VO_2max faster than continuous training with less total time. Longitudinal studies show that higher cardiorespiratory fitness reduces cardiovascular morbidity and mortality (Kodama et al., 2009).

LIMITATIONS AND GAPS IN CURRENT KNOWLEDGE

Interindividual variability in training response, optimal exercise dosing, and long-term adherence remain areas needing further research.

CONCLUSION

Exercise improves cardiac, vascular, pulmonary, and peripheral function. It enhances VO_2max, endurance, and reduces cardiovascular risk. Individualized, progressive exercise prescriptions maximize health benefits.

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A PSYCHOLOGICAL STUDY OF DEPRESSION AND MENTAL HEALTH AMONG ADOLESCENTS OF GUJARAT

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ABSTRACT

This study investigated the prevalence of depression and the status of mental health among adolescents in Gujarat, considering gender differences. A sample of 70 adolescents (35 males, 35 females) was selected from government high school. The Beck Depression Inventory (BDI-I) was used to measure depression, and the Mental Health Inventory (MHI) by D.J. Bhatt and G.R. Gida was used to assess mental health. T-tests were employed to compare mean differences in depression and mental health between male and female adolescents. A correlation analysis was also conducted to examine the relationship between depression and mental health. The findings indicated a significant mean difference in depression scores (t- 0.09635) between male and female adolescents, with females showing lower average depression scores. However, the t-test results also suggest no significant difference in mental health scores (t- 0.025089) between the two groups. A weak positive correlation (r = 0.3010) was observed between depression and mental health, suggesting that higher mental health scores are weakly associated with higher depression levels. This study underscores the need for tailored interventions addressing gender-specific mental health needs in the adolescent population of Gujarat.

KEYWORDS: DEPRESSION, MENTAL HEALTH, ADOLESCENTS, GUJARAT

1. INTRODUCTION

Adolescence is a critical developmental period marked by significant emotional, social, and psychological changes. Mental health problems, particularly depression, are increasingly prevalent among adolescents worldwide, including in India. Understanding gender differences and the relationship between depression and mental health in adolescents is crucial for developing effective interventions.In India, adolescents constitute a substantial portion of the population, and concerns about their mental health are rising. Studies have indicated that factors such as academic pressure, social media influence, family dynamics, and access to mental health resources can significantly impact the well-being of young people in the region. Research has also highlighted gender differences in the prevalence and presentation of mental health disorders in adolescence, with girls often experiencing higher rates of depression and certain anxiety disorders compared to boys. The present study focuses on adolescents in Gujarat, this study aims to contribute to the understanding of depression and mental health among adolescents. Specifically examining potential Gender based differences. utilizing standardized tools to evaluate their depression and mental health levels and investigate the correlation between these two variables.

2. REVIEW OF LITERATURE

2.1 Depression in Adolescents

Depression is one of the most prevalent psychological disorders among adolescents. According to the World Health Organization **(WHO, 2021)**, depression affects over 10% of adolescents globally and is a leading cause of illness and disability in this age group. Adolescents often experience a range of emotional challenges that may lead to persistent sadness, lack of interest, and cognitive distortions.

Beck et al. (1979) emphasized that depression in adolescence is frequently underdiagnosed and can lead to long-term consequences if not treated early. Studies have also shown that academic stress, peer pressure, and family dynamics play a significant role in the onset of adolescent depression **(Verma & Mishra, 2018)**.

2.2 Mental Health and Adolescents

Mental health in adolescence refers to emotional well-being, the capacity to manage emotions, and the ability to maintain relationships and engage in academic and social life. **Keyes (2002)** introduced the concept of flourishing mental health, which is not merely the absence of mental illness but also includes positive functioning.

Bhatt and Gida (2009), the developers of the MHI tool used in this study, assert that positive mental health includes traits such as emotional stability, positive self-concept, and effective coping mechanisms. A poor mental health state in adolescence is often a precursor to psychological disorders, substance abuse, and social dysfunction in adulthood.

2.3 Gender Differences in Depression and Mental Health

Research has shown mixed results regarding gender differences in depression and mental health. **Nolen-Hoeksema (2001)** found that adolescent girls are more likely than boys to experience depressive symptoms due to higher emotional sensitivity, social pressures, and rumination tendencies. However, some studies suggest that cultural and regional variations can mediate these gender differences **(Kumar & Thomas, 2014).** In contrast, other researchers such as **Singh and Kaur (2017)** have reported no significant gender difference in depression levels among Indian adolescents, aligning with the current study's findings. **Similarly, Gupta & Jha (2016)** found that both male and female adolescents reported comparable levels of overall mental health.

2.4 Correlation Between Depression and Mental Health

Several studies have confirmed a significant negative relationship between depression and mental health. For instance, **Ryff (1995)** observed that individuals with high levels of psychological well-being exhibited lower levels of depressive symptoms. **Bansal et al. (2019)** concluded that poor mental health is a reliable predictor of future depression in adolescents, emphasizing the need for early psychological intervention.

The present study's correlation value ($r = 0.3010$) supports this view, although it suggests a moderate, not strong, relationship—indicating that other variables like social support, resilience, and academic pressure may also influence adolescent mental health.

3. OBJECTIVES

1. To assess and compare the levels of depression among male and female adolescents.
2. To assess and compare the levels of mental health among male and female adolescents.
3. To examine the correlation between depression and mental health among adolescents.

4. HYPOTHESES

Null Hypotheses (H_0):

1. There is no significant difference in depression between male and female adolescents.
2. There is no significant difference in mental health between male and female adolescents.
3. There is no significant correlation between depression and mental health among adolescents.

5. METHODOLOGY

Sample

The sample consisted of 70 adolescents from Gujarat (35 males and 35 females), selected through stratified random sampling from Porbandar district.

Research design

This study employed a descriptive and quantitative research design to investigate the prevalence of depression and the status of mental health among adolescents in Gujarat, with a focus on gender differences.

Tools Used

1. **Beck Depression Inventory-I (BDI-I):** Measures the severity of depression. The BDI-I, developed by Beck (1961) Gujrati version by sardar Patel university 1990, is a 21-item self-report measure used to assess the severity of depressive symptoms. Each item has a set of at least four possible responses, ranging in intensity, with scores assigned from 0 to 3. Total scores range from 0 to 63, with higher scores indicating greater severity of depression. The BDI is not a diagnostic tool but provides a quantitative measure of depression severity and is useful for monitoring changes over time. It has high internal consistency and content validity.
2. **Mental Health Inventory (MHI)-R:** this was to measures overall mental well-being. The MHI, developed by D.J. Bhatt and G.R. Gida (2009), is a 40-item scale that assesses various aspects of mental health, including perception of reality, integration of personality, positive self-evaluation, group-oriented attitudes, and environmental mastery. Each item is rated on a 3-point scale (Agree, Neutral, Disagree). The total score ranges from 40 to 120, with higher scores indicating better mental health. The MHI has demonstrated good reliability (r = 0.94) and validity (r = 0.63).

Statistical Techniques

- **t-test** for comparing group means
- **Pearson's correlation** to examine the relationship between depression and mental health

6. RESULTS

Table 1: Gender-wise Comparison of Depression Scores

S. No.	Group	N	Mean	SD	t-value	Sin
1	Female	35	16	6.74	0.09635	NS
2	Male	35	18.85	10.93		

Interpretation: The calculated t-value (0.09635) is not significant, indicating **no significant difference** in depression levels between male and female adolescents.

Table 2: Gender-wise Comparison of Mental Health Scores

S. No.	Group	N	Mean	SD	t-value	Sin
1	Female	35	80.88	6.72	0.25098	NS
2	Male	35	82.25	9.96		

Interpretation: The t-value (0.25098) is also not significant, showing **no significant difference** in mental health between male and female adolescents.

Table 3: Correlation Between Depression and Mental Health

Variables	Correlation(r)
Depression & Mental Health	0.3010

Interpretation: A moderate **negative correlation** was found (r = 0.3010), indicating that as depression increases, mental health decreases. However, the correlation is not strong.

The t-test results in Table 1 indicate that the mean depression score for female adolescents (Mean = 16, SD = 6.74) is lower than that for male adolescents (Mean = 18.85, SD = 10.93). However, with a t-value of 0.09635, it suggests that this difference is not statistically significant. This means that while female adolescents in the sample reported lower average depression scores, this difference could likely be due to chance variation and not a true difference in the population from which the samples were drawn. Similarly, Table 2 shows that the mean mental health score for female adolescents (Mean = 80.88, SD = 6.72) is slightly lower than that for male adolescents (Mean = 82.25, SD = 9.96). The t-value of 0.25098 indicates that this difference is also not statistically significant, meaning that the mental health status of female adolescents in this sample is comparable to that of male adolescents. The correlation coefficient (r) between depression and mental health is 0.3010, suggesting a weak positive linear relationship between the two variables. This finding indicates that as depression scores tend to increase, mental health scores also show a slight increase, which is contrary to general expectations. This counterintuitive finding may suggest the presence of other influencing factors or limitations in the sample or instruments used. that social support and coping mechanisms can influence the relationship between stress and mental health in adolescents.

7. DISCUSSION

The results indicate that both male and female adolescents exhibit similar levels of depression and mental health. This suggests that gender may not be a significant factor in the mental well-being or depressive symptoms of adolescents in Gujarat.

The moderate negative correlation between depression and mental health supports existing literature that poor mental health is associated with higher depressive symptoms. However, the correlation is not strong, indicating other factors may also play a role.

8. CONCLUSION

The study concludes that:

- There are no significant gender differences in depression or mental health.
- There is a moderate negative relationship between depression and mental health among adolescents.

These findings highlight the importance of inclusive mental health programs targeting both genders equally and the need for early interventions to address depressive symptoms to improve overall adolescent mental health.

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AN ANALYSIS OF TOTAL SALES TRENDS IN THE SELECTED PHARMACEUTICAL COMPANIES IN INDIA

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ABSTRACT:
The research paper is mainly based on analyzing and evaluating the trend of total sales of five selected pharmaceutical companies in India. The trend analysis is used to check the trend of long series, whether it is growing or declining, and the chi-square test is used to examine the difference between observed and expected frequency. By using trend analysis of total sales, pharmaceutical companies can identify the growth in sales, and if declining, then it can improve their policy. In this study the researcher has selected five companies for the study period from 2019-20 to 2023-24, and data are analyzed with statistical tools like trend analysis and chi-square tests. The author concludes that in all the selected pharmaceutical companies, there is considerable deviation between actual and trend value.

KEYWORDS: PHARMACEUTICAL COMPANY, TOTAL SALE, TREND ANALYSIS, CHI-SQUARE TEST.

1. INTRODUCTION

The pharmaceutical industry has a significant impact on the Indian economy, and this is a medical industry so that it provides medical services. This industry is involved in producing, developing, and marketing medical goods like medical services and medication. It provides service to patients for curing diseases and gives relief in symptoms of injury. In the year 2020, a total worth of $1,228.45 billion treatments were provided by the global pharmaceutical market, and in the year 2021, the annual growth rate of the pharmaceutical sector was 1.8% with the impact of the COVID-19 pandemic.

This industry gives a significant contribution to the Indian economy by generating high revenue through the sale of products. So it is a very important measurement to decide the success of the industry. In this study an analyst endeavor has been made to check the trend of total sales with the help of trend analysis and chi-square tests and predict what the trend was during the time period.

2. OBJECTIVE OF THE STUDY

This study focuses on some objectives, which are as follows:

- ❖ To evaluate the total sales and factors affecting it in the selected pharmaceutical companies in India.
- ❖ To check the trend in the total sale during the selected time duration.
- ❖ To examine and analyze the planning of total sales.

3. REVIEW OF LITERATURE

(Ahaggach, Abrouk, & Lebon, 2024) In their study, they focus on evaluating the various techniques used for sales forecasting in different fields, and for that, they reviewed different articles and studies from

2013 to 2023. They found that the most widely used methods for forecasting the sales were machine learning and deep learning, and it was also helpful for growing and managing time series data.

(Halani & Chandarana, 2015) They have done their study on examining the trend of working capital, and to conduct this research work, they selected international Andhra Pradesh paper mills. In this paper mill, to evaluate the short-term capital, they selected a study period from 2005-06 to 2011-12 and collected data that was analyzed with the help of statistical tools like the chi-square test and trend analysis. Then, after the result, they showed that there was a high difference between the trend and actual value.

(Abhishikth & Kundu, 2011) The problem studied was with the objective to check the trend of sales and various factors affecting it, the impact of seasonal and deseasonal on sales, especially in Asian paint companies. With the aim to forecast the future sale, they want to develop a new model, and for that, they selected a time duration between 2011 and 2015. The collected data were examined using least squares and time series modelling and concluded that between time durations, there was a significant change in sales value.

4. RESEARCH METHODOLOGY

This study was mainly based on secondary sources; that's why, for this research work, data were collected from published annual reports and statements of the selected pharmaceutical companies.

5. RESEARCH GAP

- **Impact of government policies**: How do government regulations and policies (e.g., price controls, drug approvals, patent laws) affect sales trends of pharmaceutical companies in India?
- **Role of technology:** How is technology (e.g., e-commerce, telemedicine, data analytics) changing the sales landscape for pharmaceutical companies in India?
- **Emerging markets:** What are the sales trends in specific therapeutic areas (e.g., oncology, diabetes, cardiology) within the Indian pharmaceutical market?
- **Competition:** How does competition from domestic and international players impact the sales performance of Indian pharmaceutical companies?
- **Consumer behaviour**: How do factors like brand loyalty, affordability, and access to healthcare influence consumer purchasing decisions in the Indian pharmaceutical market?
- **Sustainability:** How are sustainability initiatives and practices (e.g., environmental responsibility, ethical sourcing) impacting the sales trends of pharmaceutical companies in India?
- **Global trends:** How do global trends like aging populations, rising healthcare costs, and increasing demand for personalized medicine affect the sales of Indian pharmaceutical companies?

6. PERIOD OF THE STUDY

This study was conducted by the researcher to check the trend of total sales for the study period between 2019-20 and 2023-24. To analyze and evaluate the selected data, the researcher has selected 2019-20 as a base year.

7. SAMPLE OF THE STUDY

To conduct the research, the author had selected five pharmaceutical companies as a sample, which are as follows:

A. Pfizer Limited
B. Sun Pharmaceutical Industry Limited

C. Cipla Limited
D. Divi's Laboratories Limited
E. Dr. Reddy's Laboratories Limited

8. METHOD OF DATA ANALYSIS AND INTERPRETATION

To conduct the research, the collected data were evaluated and examined with the use of statistical tools and tests, which explanation is given below:

A. Trend Analysis:

The trend analysis is used when we want to check the trend of long-term series, like whether it is declining or growing. It is also helpful to compare some factors of firms to the whole industry, and we can do improvement in our firm's policy. So in this study, with the use of trend analysis, we can compare total sales with actual and calculated values.

B. Chi-Square Test:

In statistical activity, the chi-square test is a non-parametric test, and it is easy to calculate and use. The chi-square test is denoted as x^2, and it was first used by Karl Pearson in the year of 1900. In statistical work, the chi-square test is used in that situation when we want to test a hypothesis pertaining to the difference between an observed value and a theoretical value. Its formula is given as under:

$$X^2 = \sum \frac{(O-E)2}{E}$$

In the above-mentioned formulae, O indicates the observed value and E indicates the expected value of the frequencies. It can be counted by the square of the difference between the observed value and the expected value, dividing the expected value. If the stated level of significance is the calculated value of chi-square, which is more than the table value, then it indicates that the difference between the observed and expected values is significant, and if the calculated value is less than the table value, then it represents a not significant difference between the observed and expected values.

9. TOTAL SALES TREND IN THE PHARMACEUTICAL COMPANIES

In the selected pharmaceutical companies to evaluate the trend of total sales, the following method has been applied:

- The figures of total sales are taken from the annual report and financial statement of the selected pharmaceutical companies.
- For this research work, the study period covered from 2019-2020 to 2023-24, and for it, indices have been obtained by assuming the year 2019-20 as the base year.

10. ANALYSIS AND INTERPRETATION OF DATA & TESTING HYPOTHESIS

A. PFIZER LIMITED:

Table-1
Total Sales Trend value of Pfizer Limited

year (t)	Total Sales(crore)	indices	x = t-2021-22	x2	xy	y = a +bx
2019-20	2096	100.00	-2	4	-4192	2223.4
2020-21	2190	104.48	-1	1	-2190	2235.2
2021-22	2530	120.71	0	0	0	2247

2022-23	2338	111.55	1	1	2338	2258.8
2023-24	2081	99.28	2	4	4162	2270.6
	11235		0	10	118	11235

The equation mentation in the above table-1 is y = a + bx, where the values of (a) and (b) are calculated with the help of the following equation:

$$\sum y = na + b\sum x$$
$$11235 = 5a + b(0)$$
$$11235 = 5a$$
$$a = 11235 \div 5$$
$$a = 2247$$

$$\sum xy = a\sum x + b\sum x^2$$
$$118 = a(0) + b(10)$$
$$118 = 10b$$
$$b = 118 \div 10$$
$$b = 11.8$$

The calculation of y = a + bx is given below,

Y = a + bx for the year 2019-20
= 2247 + 11.8(-2)
=2247 - 23.6
= 2223.4

Y = a + bx for the year 2020-21
= 2247 + 11.8(-1)
= 2247 -11.8
= 2235.2

The method for calculating Y = a + bx has been followed for all the remaining years from 2021-22 to 2023-24.

❖ **Hypothesis:**

H_0 : Null Hypothesis:

There is no considerable deviation in trend and actual value of total sales of Pfizer Limited.

H_1 : Alternate Hypothesis:

There is considerable deviation in trend and actual value of total sale of Pfizer Limited.

Table- 1.1

Chi- Square Test of Total Sales of Pfizer

Total Sales (y)=0	y = a +bx= E	(O - E)	(O - E)2	(O - E)2/E
2096	2223.4	-127.40	16230.76	7.30
2190	2235.2	-45.20	2043.04	0.91
2530	2247	283.00	80089.00	35.64
2338	2258.8	79.20	6272.64	2.78
2081	2270.6	-189.60	35948.16	15.83
Chi- Square Result				62.47

CONCLUSION:

Df = r -1
= 5-1
= 4

In the above-mentioned table, Table 1.1, it is represented that the calculated value of the X2 test is 62.47, but at the 5% level of significance, the table value of the X2 test is 12.59 for Pfizer Limited. So that calculated value is greater than the table value of the chi-square test; it indicates that we are not able to accept the null hypothesis and conclude that there is considerable deviation between the actual and trend values of Pfizer Limited.

B. SUN PHARMACEUTICAL LIMITED

Table-2

Total Sales Trend value of Sun Pharmaceutical Limited

year (t)	Total Sales(Million)	indices	x = t-2021-22	x2	xy	y = a +bx
2019-20	125319.3	100.00	-2	4	-250639	118441.6
2020-21	128032.1	102.16	-1	1	-128032	138822.7
2021-22	151961.4	121.26	0	0	0	159203.8
2022-23	198930.6	158.74	1	1	198930.6	179584.9
2023-24	191775.5	153.03	2	4	383551	199966
	796018.9		0	10	203810.9	796018.9

❖ **Hypothesis:**

H_0 : Null Hypothesis:

There is no considerable deviation in trend and actual value of total sales of Sun Pharmaceutical Limited.

H_1 : Alternate Hypothesis:

There is considerable deviation in trend and actual value of total sale of Sun Pharmaceutical Limited.

Table- 2.1

Chi- Square Test of Total Sales of SPIL

Total Sales (y)=0	y = a +bx= E	(O - E)	(O - E)2	(O - E)2/E
125319.3	118441.6	6877.70	47302757.29	399.38
128032.1	138822.69	-10790.59	116436832.55	838.74
151961.4	159203.78	-7242.38	52452068.06	329.46
198930.6	179584.87	19345.73	374257269.23	2084.01
191775.5	199965.96	-8190.46	67083635.01	335.48
Chi- Square Result				3987.07

CONCLUSION:

Df = r -1
= 5-1
= 4

In the above-mentioned table, Table 2.1, it is represented that the calculated value of the X2 test is 3987.07, but at the 5% level of significance, the table value of the X2 test is 12.59 for Sun Pharmaceutical Limited. So that calculated value is greater than the table value of the chi-square test; it indicates that we

are not able to accept the null hypothesis and conclude that there is considerable deviation between the actual and trend values of Sun Pharmaceutical Limited.

C. CIPLA LIMITED

Table-3

Total Sales Trend value of Cipla Limited

year (t)	Total Sales(crore)	indices	x = t-2021-22	x2	xy	y = a +bx
2019-20	12220.22	100.00	-2	4	-24440.4	15114.98
2020-21	18988.52	155.39	-1	1	-18988.5	15112.2
2021-22	15378.36	125.84	0	0	0	15109.41
2022-23	14518.79	118.81	1	1	14518.79	15106.62
2023-24	14441.14	118.17	2	4	28882.28	15103.83
	75547.03		0	10	-27.89	75547.03

❖ **Hypothesis:**

H_0 : Null Hypothesis:

There is no considerable deviation in trend and actual value of total sales of Cipla Limited.

H_1 : Alternate Hypothesis:

There is considerable deviation in trend and actual value of total sale of Cipla Limited.

Table- 3.1

Chi- Square Test of Total Sales of CL

Total Sales (y)=0	y = a +bx= E	(O - E)	(O - E)2	(O - E)2/E
12220.22	15114.98	-2894.76	8379658.616	554.39
18988.52	15112.20	3876.33	15025895.51	994.29
15378.36	15109.41	268.95	72336.25412	4.79
14518.79	15106.62	-587.83	345540.5819	22.87
14441.14	15103.83	-662.69	439155.3853	29.08
Chi- Square Result				1605.42

CONCLUSION:

Df = r -1

= 5-1

= 4

In the above-mentioned table, Table 3.1, it is represented that the calculated value of the X2 test is 1605.42, but at the 5% level of significance, the table value of the X2 test is 12.59 for Cipla Limited. So that calculated value is greater than the table value of the chi-square test; it indicates that we are not able to accept the null hypothesis and conclude that there is considerable deviation between the actual and trend values of Cipla Limited.

D. DIVI'S LABORATORIES LIMITED

Table-4

Total Sales Trend value of Divis Laboratories Limited

year (t)	Total Sales(Lakh)	indices	x = t-2021-22	x2	xy	y = a +bx

2019-20	528216	100.00	-2	4	-1056432	597107.6
2020-21	654190	123.85	-1	1	-654190	656749.1
2021-22	870810	164.86	0	0	0	716390.6
2022-23	750437	142.07	1	1	750437	776032.1
2023-24	778300	147.35	2	4	1556600	835673.6
	3581953		0	10	596415	3581953

❖ **Hypothesis:**

H_0 : Null Hypothesis:

There is no considerable deviation in trend and actual value of total sales of Divis Laboratories Limited.

H_1 : Alternate Hypothesis:

There is considerable deviation in trend and actual value of total sale of Divis Laboratories Limited.

Table- 4.1

Chi- Square Test of Total Sales of DLL

Total Sale (y)=0	y = a +bx= E	(O - E)	(O - E)2	(O - E)2/E
528216	597107.6	-68891.6	4746052551	7948.40
654190	656749.1	-2559.1	6548992.81	9.97
870810	716390.6	154419.4	23845351096	33285.40
750437	776032.1	-25595.1	655109144	844.18
778300	835673.6	-57373.6	3291729977	3939.01
Chi- Square Result				46026.97

CONCLUSION:

Df = r -1

= 5-1

= 4

In the above-mentioned table, Table 4.1, it is represented that the calculated value of the X2 test is 46026.97, but at the 5% level of significance, the table value of the X2 test is 12.59 for Divis Laboratories Limited. So that calculated value is greater than the table value of the chi-square test; it indicates that we are not able to accept the null hypothesis and conclude that there is considerable deviation between the actual and trend values of Divis Laboratories Limited.

E. DR. REDDY'S LABORATORIES LIMITED

Table-5

Total Sales Trend value of Reddys Laboratories Limited

year (t)	Total Sales(Million)	indices	x = t-2021-22	x2	xy	y = a +bx
2019-20	109925	100.00	-2	4	-219850	108012.6
2020-21	132094	120.17	-1	1	-132094	127669.9
2021-22	138864	126.33	0	0	0	147327.2

2022-23	162989	148.27	1	1	162989	166984.5
2023-24	192764	175.36	2	4	385528	186641.8
	736636		0	10	196573	736636

❖ **Hypothesis:**

H_0 : Null Hypothesis:

There is no considerable deviation in trend and actual value of total sales of Dr. Reddy Laboratories Limited.

H_1 : Alternate Hypothesis:

There is considerable deviation in trend and actual value of total sale of Dr. Reddy Laboratories Limited.

Table- 5.1

Chi- Square Test of Total Sales of RL Limited

Total Sales (y)=0	y = a +bx= E	(O - E)	(O - E)2	(O - E)2/E
109925	108012.6	1912.4	3657273.76	33.86
132094	127669.9	4424.1	19572660.81	153.31
138864	147327.2	-8463.2	71625754.24	486.17
162989	166984.5	-3995.5	15964020.25	95.60
192764	186641.8	6122.2	37481332.84	200.82
Chi- Square Result				969.76

CONCLUSION:

Df = r -1

= 5-1

= 4

In the above-mentioned table, Table 5.1, it is represented that the calculated value of the X2 test is 969.76, but at the 5% level of significance, the table value of the X2 test is 12.59 for Reddys Laboratories Limited. So that calculated value is greater than the table value of the chi-square test; it indicates that we are not able to accept the null hypothesis and conclude that there is considerable deviation between the actual and trend values of Reddys Laboratories Limited.

11. FINDINGS

➢ **Overall Growth:** The Indian pharmaceutical industry has witnessed consistent growth in total sales over the past decade, driven by increasing domestic demand, rising healthcare expenditure, and growing exports of generic medicines.

➢ **Domestic Sales Dominance**: Domestic sales constitute a major portion of the total sales for most Indian pharmaceutical companies, fuelled by a large and growing population, increasing awareness about healthcare, and rising affordability of medicines.

➢ **Export Growth:** Exports have also played a crucial role in the sales growth of Indian pharmaceutical companies, with a strong presence in key markets such as the US and Europe. The industry's ability to produce high-quality generic medicines

12. SUGGESTION

✓ **Focus on Innovation:** To sustain long-term growth, Indian pharmaceutical companies need to focus on innovation and research & development (R&D) to develop new drugs and therapies. This will help them to move up the value chain and compete more effectively in the global market.

✓ **Strengthen Domestic Presence:** While exports are important, companies should continue to strengthen their domestic presence by expanding their distribution network, increasing brand awareness, and focusing on rural markets.

✓ **Diversify Product Portfolio**: Companies should diversify their product portfolio to reduce dependence on specific therapeutic areas and mitigate risks associated with patent expirations and competition.

✓ **Enhance Manufacturing Capabilities:** Investing in advanced manufacturing technologies and adhering to global quality standards will help companies to improve efficiency, reduce costs, and enhance their competitiveness.

13. LIMITATION OF THE STUDY

➢ This research work collects the data from published financial statements and annual reports of the pharmaceutical companies so that the finding of the work is totally dependent on the accuracy of the data.

➢ The data is evaluated with the help of statistical tests and tools, so the limitation of such tests is also applied to this study.

14. CONCLUSION:

The Indian pharmaceutical industry has shown strong growth in total sales, driven by both domestic and export demand. However, to sustain this growth in the long term, companies need to focus on innovation, strengthen their domestic presence, diversify their product portfolio, and adapt to regulatory changes. By implementing these suggestions, Indian pharmaceutical companies can further enhance their competitiveness and contribute to the growth of the healthcare sector in India and globally.

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A STUDY ON RAJASTHANI FOLK DANCE GAVRI

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ABSTRACT

Folk culture is manifest in the people of Rajasthan. The activities emerge from the very life of the masses. From gathering food to more sophisticated practices of religious, social and political life. Regional dances are also one of the transporters of culture. Gavri is one of the famous tribal dances spotted in areas of rural and tribal population. A number of narratives are interwoven in the performance of Gavri. It plays an important role in the folk life. Performance of Gavri gives us a number of messages and teaches us the values of a life in harmony with nature. It is a dance of the masses prepared indigenously by the communities in their own way and used for expression of a collective feeling of joy, sorrow, fear, anger, devotion and to send messages for mass-calling. At one level, it is a worship of Goddess Ambav.

KEYWORDS: RAJASTHAN, FOLK DANCES, FESTIVALS, GAVRI, RELIGIOUS FAITH, CULTURE

The folk culture entertains the people in a holistic way. The life of people is full of music. It never lets anybody feel aloof and sad. The culture is attractive and elegant. There are many fairs and festivals add different colours to the culture. Padharo Mahare Desh is the slogan used by the department of tourism. The costumes of Rajasthanies are very colourful and vibrant. It is a unique state from a cultural point of view (45). The milieu of every region is built according to its climate. Every auspicious occasion starts with the blessing of deities. The culture and civilization is believed to have protected by 36 crore deities. The procession of these deities is presented in a great manner and is sung beautifully by Bhopas (Priest-singer) and other people. There are many fairs such as Gogaji fair, Ramdevji, Mallinathaji, Devnarayanji, Jambhoji, Pipaji etc. If there is no rainfall, people go to worship Bhomyaji in the form of a procession, singing songs while playing musical instruments like Harmonium and Dholak. Surprisingly, their wishes are fulfilled in due time. (Manoj23).The chief part of this folk literature is consists of folk-gods and brave warrior ladies. Although historians do not share one theory about Rajasthan or the Rajputs still they all accept and appreciate the valuable deeds and sacrifices made by these brave folk gods. The practitioners of the communities petition the Goddess to permit them to perform the Gavri regional dance ritual and to shower blessings on them for the weeks of touring.

AREA OF STUDY AND LIMITATIONS

The area of study is Udaipur and other nearby (Tribal Sub Plan) Areas. It is limited to folk dance Gavri and culture of the area of study. For the writing this paper, the researcher has purposively taken up the folk-dances as well as culture and literature in oral form. The culture and oral-literature of the other districts were not part of the study. Keeping in mind the limits of this paper, the data generated by the analysis is presented in short paragraphs.

PRIMARY OBJECTIVE

The primary objective of the present paper is to analyze the present ethos in Gavri dance and culture in the area of study. In addition, it assesses the degree to which these indigenous dances differ from the western dances in nature and motives.

THE ORIGIN OF REGIONAL DANCES

There are eight common dances in Rajasthan namely Ghoomar, Kalbelia, Bhawai, Kachchhi Ghodi, Gair, Chari, Kathputli, and Chang. The dances are a versatile combination of actions and culture with music but following the limits of the paper, those are not part of the study. In this paper, the tribal dance Gavri is analysed. These folk dances are the product of oral traditions. They were (are) transmitted from one person to another by word of mouth or actions in steps. There is no one who took credit for composition of the folk-dances but according to the scholars, there may have been some dancers who composed the folk-dances but never took credit for their work.

THE DEVELOPMENT OF THE FOLK-DANCES

It is interesting to find that the steps used in dances and their features change even at short distances. A tribal named Amara son of Kala living in Derphala of village Jalpaka near Bhudhar Village told a number of details about folk- dances and their changes in the region accordingly. He is an artist who has performed Gavri at several places like Udaipur, Banswara, villages of Dungarpur and Kherwada .

Phool Chand Ninama(62) of village Jodmia post Makanpura in the district of Banswara talks about the procedure during the 40-day Gavri season. According to him, the players practice strict austerities to maintain reverent contact with the living earth and the immanent spirit. They avoid not only sex, alcohol and meat, but also shoes, beds, bathing, and eating greens (which might harm insect life). They eat only a single meal each day during the season. In it, there is a narrative of a shepherd who wants to save his sheep from dacoits who want to rob him using swords, bows and arrows. The shepherd prays to the Goddess, who bestows some divine power on him and he is able to fight and defeat the dacoits.

METHODOLOGY

This paper is a humble attempt to find out the ethos residing in culture and folk-dances of Rajasthan, particularly in Gavri. It traces out the possible reasons behind the origin and popularity of Gavri in a particular area. Besides it, the paper also deduces the popularity of Gavri in particular area and record its present status. It suggests a new paradigm about the study of dances. The Empirical study method is employed in the paper. Since it is based on field study so efforts have been made to identify the oral literature and performed folk-dances of Udaipur and other nearby (Tribal Sub Plan) Areas. Gavri in Udaipur (District : Girwa) was observed for the study. This paper will be helpful for those who want to know about folk culture projected through dances of Rajasthan.

REVIEW OF LITERATURE

There is not much written about Gavri but nevertheless, Carol Henderson Garcia, Carol E. Henderson in their book Culture and Customs of India mention the features of Gavri . They write that a Gavri troupe different characters gods- goddess, deities, avatars, demons, historical figures, sacred animals, corrupt officials, etc. The only constant roles, which exist outside the drama, are the Budia figure, his twin Rai devi consorts and Kutkadia, the master of ceremonies. Women are not allowed to tour as actors with the

troupe and all female characters are played by men. (12). Dhol plays an important part in Gavri. Prof. Chandalia in his research paper mentions an interesting point about the tribal instrument Dhol. He points out that the tribal people dance at the beat of the drum. They worship Mataji at the local shrines called Devra and the priest performs Pooja by making various types of offerings. (2) Moreover, there are quite a few studies in Hindi which focus on stratification in tribal society, their customs and rituals and their problems. Some general studies on tribal culture are also available. Some of these are Bhil Janjati ka Sanskritik Arthik Adhyayan by Dr Jagdish Meena, Adivasi Jeevan Dhara by Dr.Mahendra Bhanawat,Bhil Sangeet aur Vivechana by Malini Kale, Mawji aur Barahmasa Sahitya by Malini Kale, Vagad Ni Sanskriti by Sharad Chandra Pandya etc. There is however ample scope to work on tribal folk-literature.

RELEVANCE AND LIMITATIONS OF THE PAPER

Tribal dances are not as popular in contemporary time as they used to be twenty years ago as they have no voice politically, in spite of a good number of constituencies reserved for them, their languages and literature has remained in dark and is gradually disappearing because Hindi has been imposed on them as their mother tongue. This paper might 're-stir' the interest in cultural practices. Like all researches in folk-dances, the question of the authenticity of the text remains an enigma here also. There are several versions of a particular folk dance. Therefore, only that data which will be available will become the data for critical exploration. Besides, the language changes from one place to another. Translation from local dialects to English has its own challenges. These limitations were dealt with during the study.

PREMISES OF THE PAPER

The first premise on which this paper rests is that there are rich traditional and humanitarian values in folk oral literature and dances, which are still untamed. It is interesting that although the so-called civilized world uses the traditional form of dance in their celebrations they could not use any message with the sophistication with which the original folk dancers dance.

Nathu Lal Ninama (57) ex-Sarpanch of Makanpura, Danpur, district Banswara tells that the tribal people use dances in every event of one's life. Right from birth to marriage, worship of deities and communicating the message of attack or some threat, it is used. The forms of dances are varied for communicating different purposes. They also use Dhol for messaging, it used by the people in all strata of social hierarchies and is a percussion instrument played upon by hands or by sticks. It is one of the oldest instruments known and was used by many cultures around the world.

Primitive tribal societies used it to celebrate victory in battle as well as in ritual dance and worship of their deities. Arun Meghwal, a resident of village Bhudhar says that people belonging to the Bhil community are traditionally associated with folk-dances and Dhol beating.
About this instrument, Prof. Chandalia mentions an interesting point.
The Dhol or drum is a common instrument for the ruling elite to the toiling masses. No barriers of class, race, colour, gender, religion or caste are seen in the case of the appeal and effect of the Dhol. (Chandalia 02)

MAJOR CHARACTERS IN REGIONAL DANCES

The major characters in Gavri are Raja Banjara, Rayi, Budiya, Kalbeliya, Sethji (Money Lender) sometimes , also called Bohraji, Chor (Thief and Police). The performance begins with fixing a Bhala(a

spear) at the centre of the ground chosen for the performance. Then the players worship the Goddess by lighting a piece of dried up cow dung (Chhana), pouring ghee i.e. butter oil and some piece of sweet. In case sweet is not available, the pieces of bread mixed with sugar and ghee (Churma) is put on the lighted piece of dried up cow dung (Jagta). After this, a player adopts the form of Lord Ganesha by bending down and keeping the hands dangling like the trunk of Ganesha. Two players wearing the dress of women come with a brass plate carrying a lamp, some flowers, sweets and worship Lord Ganesha by singing hymns loud enough for all the audience to listen. This is accompanied by the music played on Madal, Thali and Majira. This is followed by a series of performances which include Rebari-dacoit, Chor police, Kalbelia - Raja etc. There is a performance of singing songs by a group of senior singers called Geluriya at the beginning as well as in between different performances. This is like a chorus. It is used to entertain the audience while the main actors prepare themselves for action. Sometimes it also creates humour and causes the audience to laugh. It is like a dramatic relief in western drama. The characters of Rayi and Budiya are very interesting and entertaining. The Rayi is a woman character played by a male while Budiya is male and often moves in the opposite direction of the movement of all other characters. He jumps and somersaults while running around with a wooden sword. The Gavri is performed during the day from two to six and sometimes even later. In some parts of Mewar, the performance is resumed after dinner in the night around 10.00 p.m. and continues up to 4.00 a.m. in the morning. During the night the narratives of Raja Jeli and the Nat(Rope dancers), Khetu and Bohraji are performed. These are full of entertainment. Men and women enjoy these performances well. The players move from one village to another. The expenditure of the players is borne by the villagers. They keep fast and eat only once a day. There is an earthen statue of an elephant, which is also left with these objects. The sisters of the players come with sweets to mark the completion of the period of fast.

TRIBAL DERIVATIVE

During Navratri, nine-day worship of Durga (Amba), the tribal people dance. They worship Mataji at the local shrines called Devra and the priest performs Puja by making various types of offerings. At places, the spirit of the Goddess is said to have entered the body of the priest Bhopa and the whole body of the priest shakes and dances with the rhythm of the drum, suggesting the presence of the supernatural. Dr. Maan Singh Ninama, a tribal scholar of the region, who is a grade second government teacher tells that folk-dance is a deity in itself which is to be worshipped. So before the performance, offerings are made and ritual worship is performed. A coconut, Sindoor, and a bottle of country liquor made of Mahua flowers called Mahudi is offered. He says that Holi is an important festival for the tribals of this region. The Gulal of Holi plays an important role in Gavri, Which is also a tribal derivative of Gauri (Parvati) who is the wife of Lord Shiva. This is the reason that the themes are rich in the sacredness of the natural world, radical human equality, and the feminine nature of the divine. These values are reflected in traditional Bheel society where the environment is revered, hierarchy is abhorred, and women enjoy greater rights and status than in communities outside. During the night- performances the episode of Bhasmasur is also enacted showing Lord Shiva's role. However, it is essentially a tribal dance- drama, which is not a part of the Sanatan Hindu religious tradition. There is, however, a need to document, preserve and sustain such beautiful art forms.

In the final days, each troupe returns to its home village for the last performance and closing ceremonies. The cycle ends with an immersion rite to return the Goddess's fertility to their waters and all night raucous

celebrations. The play ends with a celebration, salutations to the Goddess, and clear warnings to interlopers to never violate nature or their sovereignty again.

PRESENT STATUS OF THE TRIBAL DANCES

The graph of popularity of tribal dances in Rajasthan has been reported down in the present time. The viewers also started losing interest in listening to the tribal dances. The dancers have confined themselves to their Tapras. The villagers invite dancers on some special occasions. The main profession of dancers is something else rather than dancing. The reasons behind decreasing popularity of tribal dances is lack of motivation, the professionalism of folk-dancers, changing interest of people, lack of training for new dancers, the continuous decreasing of a tradition of performance, the growing interest of people in electronic media etc. The final nail in the coffin is put by electronic media, where people have lost their interest in sources of folk amusement. Earlier, Ramleela, Krishanleela and Swangs were quite popular among masses but due to online social-networking people have found a new avenue for entertainment.

CONCLUSION

Though the passage of time, new discoveries in Science and technology, urbanization, change in human relationships, weakening of familial and social ties, growing individualism, shrinking space for community life etc. have eroded the cultural traditions of the past, still in the rural and the indigenous communities of the world folk-dances play a very important role. Folk-Dances are symbol of collective community life. They are the signs of the egalitarian traditions in which the people are related to each other in a bond of fraternity. It is not just a custom; it is a metaphor for a way of life.

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THE STATUS OF RAJASTHANI LANGUAGE AMONG INDIAN LANGUAGES

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ABSTRACT
The Rajasthani language is spoken by millions across Rajasthan and adjoining regions, and occupies a complex position within the Indian linguistic environment. The research seeks to analyse he socio-political, linguistic and cultural dimensions of the Rajasthani language. Using a systematic review of existing research papers, government reports, and linguistic surveys, the research examines the factors influencing the status of Rajasthani among Indian languages. It highlights issues of recognition, policy implications and language preservation while situating Rajasthani within the marginalisation that occurs from administrative categorisation, lack of political will and the dominance of Hindi. This paper emphasises the need for policy reforms, community mobilisation and scholarly advocacy to safeguard Rajasthani as a district language with rich cultural roots.

KEYWORDS: RAJASTHANI LANGUAGE, INDIAN LANGUAGES, REGIONAL IDENTITY, LINGUISTIC STATUS, ENDANGERED LANGUAGES, CONSTITUTIONAL RECOGNITION, SOCIOLINGUISTICS, DIALECT CONTINUUM

1. INTRODUCTION

Vast linguistic diversity is present in India, encompassing more than 1500 languages and dialects. Among them, the Rajasthani language occupies a central place due to its deep-rooted cultural, historical and literary significance. This language is spoken by 25 million people in Rajasthan and neighbouring states like Haryana, Gujarat, Punjab and Madhya Pradesh (Watson, 2016). Therefore, Rajasthani represents not only a mode of interaction but a repository of regional uniqueness. Rajasthani language's folk literature, vibrant cultural expressions, and oral traditions have enhanced Indian roots for centuries.

Despite this richness, Rajasthani faces challenges regarding its official recognition and linguistic status. The Census of India classifies it under the Hindi belt, decreasing its independent identity and visibility at national platforms. This lack of legitimate recognition has far-reaching insinuations for language preservation, cultural steadiness and education (Tokaj, 2017). Conversely, smaller speaking languages such as Manipuri or Konkani, have received constitutional credit.

By assessing the context of historical, policy and linguistic topographies and socio-political sectors, the paper aims to find out the position of the Rajasthani language among Indian languages. It aims to highlight

the suggestion of the marginalisation of the concept of Rajasthani in the multi-lingual environment of India by a critical review of the literature, and discuss the consequences of the marginalisation of the concept.

2. RESEARCH PURPOSE

This research mainly aims to analyze the position of Rajasthani language among the Indian languages, specifically, its acknowledgment and maintenance as well as its contribution to the cultural identity. Even though millions of people speak the Rajasthani language, it still remains to fight to become recognized as an independent language (Kothari, 2015). This is a scenario that creates very serious issues regarding policy on the Indian language and their connection to the ideals of cultural diversity and inclusivity.

The objective of the study is to understand the reason behind the non-inclusion of the Rajasthani language, among many other Rajasthani languages, in the Eighth Schedule to the Indian Constitution. It too scrutinises the socio-political documents that categorise Rajasthani as a vernacular of Hindi, despite linguistic studies, but its separate phonological, lexical and grammatical features (Kukana *et al.,* 2025). By reviewing current literature, this paper seeks to offer clearness on whether the marginalisation of Rajasthani is a importance of political oversight, linguistic fallacies or administrative suitability.

Besides, the purpose extends to investigative the implications of this bon-recognition on education, literature and intergenerational broadcast of cultural heritage. Finally, the investigate seeks to contribute to ongoing discussions about language credit in India and highlight the benefit of safeguarding Rajasthani as an close part of India's linguistic inheritance (Mesthrie, 2023).

3. LITERATURE REVIEW

The Rajasthani language has extended been a subject of debate inside Indian linguistics, policy educations and socio-linguistics. While scholars extensively acknowledge its past depth, cultural meaning, and distinct linguistic features, its authorized status remains disputed. This literature review synthesises existing scholarship across six key domains: historical background, linguistic classification, constitutional recognition, survey and studies, sociolinguistic identity and challenges of preservation.

3.1 Historical background and challenges

Historical records trace the Rajasthani language back to the early medieval period. It is derived from Apabhramsa and Old Western Rajasthani. According to the People's Linguistic Survey of India (2011), Rajasthani is an independent language with nearly 25 dialects. Additionally, the census of India (2011) recorded that approximately 25 million people speak Rajasthani of diverse varieties, although they are officially listed under Devanagari. Therefore, the previous studies show how the categorisation of Rajasthani creates statistical invisibility, weakening the case for recognition.

According to the People's Archive of Rural India (2010), International linguistics, including those donated to UNESCO's Atlas of the world's languages in danger, have noted that several Rajasthani dialects are endangered due to shrinking intergenerational transmission. This scholarly attention highlights the urgency of policy intervention and preservation measures

3.2 Linguistic classification and debates

Linguistics consistently highlight the distinctiveness of Rajasthani from Hindi. Phonologically, it highlights the unique features, such as retroflex lateral sounds and tonal qualities, found in some dialects, making it closer to Punjabi than Hindi. Grammatically, Rajasthani exhibits its own verb conjugation

systems, vocabulary and case markers that differ significantly from Hindi. According to Mandavilli (2016), the Indo-Aryan languages classify Rajasthani as a separate Indo-Aryan subgroup, with major dialects including Marwari, Shekhawati, Dhundhari, Mewari, and Harauti.

3.3 Constitutional recognition and politics of language

The politics of recognition plays a crucial role in shaping Rajasthani's current status. The Eighth Schedule of the Indian Constitution currently recognises 22 languages; however, Rajasthani is absent despite high demands. Conversely, languages with fewer speakers, like Manipuri and Konkani, were granted mention in the 1990s. According to Pradhan and Dey (2025), language recognition usually depends more on political mobilisation rather than linguistic merit.

3.4 Literature Gap

The movement for Rajasthani credit has been ongoing meanwhile the 1960s, with memoranda submitted to the dominant government and multiple governmental debates on the issue. Despite this, resistance perseveres due to fears of breaking the Hindi-speaking population and complicating India's language federalism. The lack of recognition then research prevents Rajasthani after being used in modest examinations.

4. RESEARCH RATIONALE

This paper is important because it tackles the gap among linguistic reality and administrative credit. While scholarly research finds Rajasthani as a separate Indo-Aryan language, administration categorisation tends to merge it below Hindi, raising a detach (Pareek and Joshi, 2024). This misclassification has belongings for education policies, protection of cultural identity and reserve allocation.

By systematically reviewing obtainable scholarly evidence, the newspaper offers a critical viewpoint on how language government in India impact regional individualities. The rationale also depends on the urgency of preservative the Rajasthani oral traditions, folk works and cultural identities, which face the danger of decline due to urbanisation, globalisation, and lack of official support (Parihar, 2017). Moreover, the paper contributes to the dissertation on language recognition, shedding light on the government of inclusion and exclusion in India's legitimate outline.

5. RESEARCH METHOD

The methodology accepted for this research is a methodical review of academic, policy-oriented and administrative literature. A systematic review includes collecting, synthesising and assessing data from a wide range of trustworthy sources in a structured way to offer a comprehensive sympathetic of a research question (Dubey and Kothari, 2022).

The study is founded on peer-reviewed journal articles, administration documents, linguistic surveys, survey reports and books on Indian languages. The sources were identified based on the criteria of relevance, newness, and reliability that ensured that the assessment is based on current debates and past perspectives (Mishra and Alok, 2022). The coding review procedure entailed an inductive coding and thematic analysis concerning linguistic identity, credit struggle and policy interferences.

In comparison to a primary quantitative framework, a systematic appraisal allows synthesizing the existing evidence and identify gaps in research. This approach is primarily most appropriate to investigate

the status of Rajasthani since it is tourist friendly to study the intersection of linguistic, politics, and culture as well as using a diverse set of existing literature.

6. RESULTS ANALYSIS

Authors	Codes	Themes
Attri (2018), Swami (2020)	Oral traditions, informal application, language shift, and regional identity	*Theme 1: Linguistic Identity of Rajasthani*
Padhi (2017), Shougrakpam (2022), Chand and Kar (2017)	Absence from school curricula, Modern pressure, and the popularity of Hindi	*Theme 2: Challenges in the Preservation and Transmission of Rajasthani*
Yadav and Yadav (2023), Singh (2025)	Policy interventions, constitutional recognition, and Rajasthani heritage	*Theme 3: Policy interventions to strengthen the status of Rajasthani*

Table 1: Inductive coding

Theme 1: Linguistic Identity of Rajasthani

Rajasthani is not just a language, but also an indicator of local innovation and cultural pride. The linguistic is still maintained in the rural settings through oral civilizations such as Phad paintings, Panihari songs and traditional epics such as Pabuji ki Phad. Attri (2018) argues that the traditions of folklore performance in Rajasthan can be considered a source of the history, language stability and community memory.

Simultaneously, the presence of urbanisation and English and Hindi teaching has given rise to the situation of diglossia whereby in national and informal areas, Rajasthani is spoken, and in official and formal messages, languages used are Hindi and English. As per the view of Swami (2020), such diglossia boosts language shift, usually amongst young peers who perceive Hindi or English as more frugally promising.

Theme 2: Challenges in Preservation and Transmission of Rajasthani

A recurring anxiety in the literature is the challenge of preservative the Rajasthani in the verge of modern weights. According to Padhi (2017), the nonappearance of Rajasthani in school curricula is a important obstacle, as children grow up knowledge English or Hindi in its place. Literary making in the Rajasthani language lasts, however, largely in oral and folk civilizations rather than standardised print arrangement. The lack of a comprehensive handwriting through Devnagari is commonly rummage-sale and has also challenged the systematization efforts of Rajasthani.

As per the view of Shougrakpam (2022), globalisation, urbanisation, and relocation contribute to the erosion of Rajasthani practice in the public compass. On the other hand, Chand and Kar (2017) have stated that community-led movements, including the Rajasthani Language Recognition Struggle Committee, have sought to revive the language via cultural programs, festivals and petitions for constitutional recognition. Digital media are also emerging as new platforms for Rajasthani expression, suggesting adaptive approaches for survival in modern times.

Theme 3: Policy interventions to strengthen the status of Rajasthani

The Census of 2011 supports that Rajasthani is spoken by over 52 million people in India, which remains outside the Eighth Schedule of the Constitution, limiting its identification compared to other Indian languages. To address this, the Rajasthan Assembly passed a resolution in 2003 for its inclusion, and discussions continue to make it the state's second official language; however, progress has been slow. According to Yadav and Yadav (2023), constitutional recognition through the Eighth Schedule will ensure national-level promotion of the language. Additionally, Singh (2025) highlighted that Rajasthani needs to be introduced in school curricula, supported by research, textbooks and teacher training. Policies need to be implemented to safeguard Rajasthani's heritage and boost its status among Indian languages.

7. DISCUSSION

The review of previous literature reveals that a mixture of linguistic, cultural and political factors shapes the status of Rajasthani. Researchers solidly acknowledge Rajasthani as a special Indo-Aryan linguistic with multiple dialects similar Marwari, Shekhawati, Mewari and Harauti (Shougrakpam, 2022). Yet, government policies continue to categorise it under Hindi, leading to a inconsistency where a language with lots of speakers lacks independent recognition.

This categorisation is just administrative but political, as Hindi has factually been promoted as the unifying linguistic of North India. Conversely, Rajasthani fights to assert its identity in official usage, teaching and literature (Swami, 2020). While folk civilizations and oral literature keep the language dynamic, the nonappearance of institutional provision threatens intergenerational broadcast.

It is also noted in the discussion that authoritative presence would enhance the visibility of the Rajasthani and would get funding to deter it and its incorporation to the school curriculum. However, debates on credit tend to be wrapped up in larger concerns of linguistic nationalism and domestic politics. That status of Rajasthani is representative of more general hardnesses in language rule in India, the systematic review, thus, replicates.

8. CONCLUSION

The rich social and language heritage of Rajasthani plays an vital role in the multi linguistic implication of India. However, its position is marginalised as it is also classified by the managers as Hindi and a lack of legitimacy. The systematic review tourist attractions which policy outlines do not reflect its reality but researchers certify its self-governing language uniqueness. In order to preserve the Rajasthani language, a desperate need is created to institute educational programs, credit and community-based prevention programs. Without such efforts, the language stands a chance to be perpetual eroded whilst the civilizations are strong.

9. FUTURE SCOPE AND LIMITATION

This research provides a review of the state of Rajasthani combined but also has a limitation in empirical information group. The study is based on secondary data bases, which, despite their abundance, may not completely concretize the actual experience of the world of Rajasthani utterers (Joncheere and Vandevelde, 2016). The future inquiry might apply the ethnographic approach, interviews, and field surveys to obtain the data of linguistic use in education, intergenerational message, and urban places.

The other restraint is the diversity within the region of Rajasthani itself. The language is a chain of dialect and the systematic review might not necessarily peak all the varieties, future studies may be able to judge the dynamics between these dialects and the contribution to shaping collective identity.

The new horizons entail inquiry into how globalisation, digital media and migration affect the Rajasthani practice. The increased access of the younger generation to the social stages via internet is possibly remaking the lives and accumulation patterns of the Rajasthani (Goswami and Shougrakpam, 2025). Furthermore, policy-based research might examine the feasibility of inclusion of Rajasthani in English agenda and its consequences to the language preparation in India.

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ARTIFICIAL INTELLIGENCE (AI) IS THE BEST TEACHER IN THE EDUCATION

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ABSTRACT

The very purpose of a teacher is to provide the best education. The advent of technology in modern era shares this responsibility in various modes in education. In this paper I have presented the fact that the technology has revolutionized the education sector. This is done through the arrival of artificial intelligence in education in various modes. It is discovered that the artificial intelligence and its various subsets, machine learning, deep learning and even associated online learning modes rapidly influenced the education sector after the Covid-19 pandemic. Thus artificial intelligence based technology is the latest trend and relevance in the education sector.

KEYWORDS: DIGITAL EDUCATION, ARTIFICIAL INTELLIGENCE, DEEP LEARNING, MACHINE LEARNING.

INTRODUCTION

India is an educational hub. This is not anything new. From the time immemorial, India has been an educational hub in the world. There is no dispute on the quality and quantity of this hub. It has been functioning independently to nurture and to avail the needs of the public. But time and again the various factors intervened in the process and that affected the quality and quantity of our education. Indian education is rich in knowledge, constructed by experience and examples. That is why it grew as an educational hub. The educational fragrance has crossed the oceans and mountains.

People crossed over the oceans and mountains to own the rich knowledge and experience the examples. In the education period India is aspiring to be the knowledge power house in the world. Our country has every potential to achieve this by focusing on the developments in education. There is a need to revolutionize the education through the technology more particularly AI in education.

India can be still a knowledge hub by providing good education adopting technologies involving AI. The different national educational policies are aimed to transform India in to a global knowledge superpower.

ROLE OF INDIAN EDUCATION IN THE WORLD

The future is formed through education. Education illuminates a person's mind and thought that are essential for the future. Education also shows different avenues in life. It develops human personality and thoughts. The education demands focus on life skills, critical thinking and analytical thinking and logical reasoning.

Every country prioritizes the focus of their education on various aspects. Therefore every country has its own education system. Despite of these priorities in education it is the human mind that chooses the best

education. In this regard India creates the best outcomes from our education by making future ready. In the recent times we witness a transformational moment in the Indian education system. It provides the best teaching and learning experience in all the aspects. Still there is a long way to reach the global demands. In the changing environment it is really a great challenge to create global citizens.

1. DIGITAL EDUCATION

1.1 Emerge of Digital Education during Covid-19

The Covid-19 pandemic brought the standstill situation all over the world. It disrupted all aspects of human life including education. Soon the stakeholders of education sort the help of digital learning to help the billions of students whose education was affected.

Digital education involving online learning, machine learning, and artificial intelligence were implemented during the first phase of Covid-19 as an emergency response to the education. This situation caused a revolutionary change from the traditional educational practices to digital learning that involves artificial intelligence. Now AI in education has opened an innovative and alternative way of teaching and learning.

1.2 Development of Online Learning

Online learning was the best solution for the students and educators during the Covid-19 pandemic. It helped to have full access to education to all. Education was very effectively delivered due to the development in virtual and online learning.

During the early stages of pandemic the educators and students adopted the online learning. The varied delivery modes of online learning platforms were digital classroom solutions, virtual classroom solutions, virtual meeting platforms and so on. This made education sector more dynamic.

1.3 Appearance of Mobile Learning

In the recent years the applications of mobile devices and related technologies in teaching and learning have increased. It is purely due to their capabilities to be used in many fields. The mobile learning is also called M-Learning because the mobile devices have the possibility to contribute to the educational sector. The students and teachers have increased the use of mobile related educational apps especially to access learning materials, internet access and to facilitate learning in new and innovative ways.

Thus, the term ‘mobile learning’ emerged with the use of mobile devices related educational apps in teaching and learning activities. There are different benefits from the mobile learning. It provides immediate access to information for students and teachers, diverse ways of learning, contextual learning, self - instructed learning. Finally, it supports and encourages participating actively in learning. Hence it is a challenge to integrate mobile learning in to the classroom. But through a proper training and guidance it should be implemented in to the classroom for effective learning experience.

1.4 E-Learning

E-Learning is an electronic learning that stands for the kind of learning accomplished by electronic gadgets, media, listening devices, audio and video-tapes and other resources. There are also other form of e-learning by teleconferencing, video-conferencing, computer based conferencing, e-mail, live chat, surfing on the internet and so on. Initially e-learning was only an emotional supportive network for learning.

Later it brought impact on the students' perception, self-learning, critical learning and other factors. However, these modes of e-learning enhance teaching and learning. It has every potential to collaborate classroom situations. These modes of learning provide the correct knowledge and information of every subject. It is helpful for the classroom teaching and comprehensive development of the students. During the pandemic stakeholders of education explored the potential challenges to explore the learning through e-learning. Thus it helped the teachers and students in focusing on their academicals performance.

2. MACHINE LEARNING

We are bound to say that experience is the best teacher. Many times our learning and decisions are depending on the experiences that we had. These experiences help us to make conclusions. It is not only humans learn from experience even the computer too learns from the experiences. But for a computer data takes the role of these experiences. The data comes out with learning algorithms and build models in machine learning.

Hence machine learning is defined as a subject of learning algorithms and building models. However, machine learning is applied in the education sector. It is very much interesting form researchers and scientists as it supports teachers, predict student performance and test students and so on. Machine learning causes many changes to a teacher's job and educational practices. In addition to this machine learning is applied in various forms in education. It is already found that machine learning is a game changer in the field of education.

2.1 Envisage Student Performance:

Machine Learning has the ability to learn about each student and can foresee the performance of every student. It identifies the weakness of the student during the learning. Based on those weaknesses it suggests different learning tools for their effective learning.

2.2 Grade Students:

Grading student is one of the tasks for a teacher as it can be influenced by human biases and other factors. Machine learning can do grading reasonably without any biases. It has its tools to assess the content, and grammar. This makes teachers job easier.

2.3. Arrange Content Adequately:

Students need to acquire knowledge and learn skills in an orderly way. It is possible when it is presented to them in an organized manner. Machine learning organizes the content in a productive way.

2.4. Propose Learning Process:

Machine Learning provides new learning methodology. First of all it identifies the problems and weakness of learning. Then it suggests new learning method for effective learning.

2.5. Career Choice Prediction:

Machine Learning has applied to identify and track the interest, aptitude and dislike of a student. This helps to analyze their behavior and reaction. Depending on the analysis the AI promotes students to their areas of interest and taste. This brings productive results in their career.

2.6. Group Students and Teachers:

Teachers and students cannot be grouped at random. So the grouping is done according to the need and availability of teachers and students. Thus Machine Learning is applied even to group teachers and students according to their needs and availability.

3. DEEP LEARNING

Deep learning is defined as a subset of machine learning. It is also an extension of machine learning. It deals with neural network algorithms that have a repetitive clustering. Hence it is a type of artificial learning that depicts human brain. Deep learning uses a large amount of data to learn, train and improve their performance over time.

During the pandemic deep learning has been applied on students in their e-learning. Digital platforms were used during the pandemic to conduct online classes. It was the need also to ensure that the students are properly engaged during online classes. In this context, deep learning algorithms were helpful to monitor and supervise the student's emotions such as anger, fear, happiness, sadness and surprise. The deep learning was able to detect this through their facial and emotional recognition. This was done on students during their hour-long classes.

CONCLUSION

It is in the educational process one impart knowledge, develop understanding and skill. In the post-modern period the educational process has undergone revolutionary changes due to the development of technology. Technology became part of the educational process in imparting knowledge and learning skills. Technology has influenced the different aspects of human life. We began to live with technology in different modes. Artificial intelligence is the latest development in this regard. It is very much applied in the education process in the recent times. This made teaching and learning faster and effective. Henceforth, the stakeholders of education have confidently depending on the digital technology for further height of education.

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INDIAN AUTOMOBILE SECTOR : ITS RECENT TRENDS AND GROWTH

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ABSTRACT :
Today, India is a key part of the global strategy for vehicle manufacturers and component suppliers. The country's automobile sector has great potential and is growing rapidly, but it must also be aware of challenges from recent global market developments and adjust to the changing environment. This study offers insights into recent trends shaping the global market and the challenges faced by the Indian automobile sector.

The automobile sector plays an important role in driving industrial growth and supporting the Indian economy. Overpopulation and rising income levels are major factors increasing vehicle demand. The growth of the automobile sector, along with its strong market presence in India and abroad, forms a foundation for the advancement of our economy. India has a strong market for heavy and large vehicles both domestically and in exports. This highlights the significance of the automobile sector in our economy. The study also aims to outline key factors that promote growth and the opportunities that might arise for major players in the Indian automobile industry in the future.

KEY WORDS: AUTOMOBILE SECTOR ,INDIAN ECONOMY, GROWTH, GDP

INTRODUCTION:

Financial decisions in firms and organizations are mostly made by managers. These decisions relate to the financial position of a company and play a significant role in the firm's financial health. Financial decisions are tied to the capital structure of the firm. Capital is used to create more wealth, and the capital structure affects the firm's value. The amount of capital a firm needs is not its only financial concern; the capital mix is equally important.

The automobile sector is crucial for industrial growth and the development of the Indian economy. Overpopulation and rising incomes are the main factors driving the demand for vehicles. The growth of the automobile sector and its strong market presence in India and abroad are key to the growth of the Indian economy. India boasts a significant market for heavy and large vehicles both domestically and in exports. This highlights the importance of the automobile sector to our economy.

LITERATURE REVIEW:

Nikita Arya (2019) examined the performance and growth of the Indian Automobile Industry in her study, "Review of Growing Automobile Industry in India." She also looked at the current status of foreign investment in the sector. The study noted that India is becoming one of the largest exporters of connected and software solutions for automobiles. The country has significant advantages in the changing

automotive landscape, such as a skilled labor force at low cost and affordable steel production. However, it also faces serious challenges.

Kanupriya and Sandeep Kumar (2018) found that foreign direct investment (FDI) in the automobile industry is on the rise. FDI can benefit both the domestic industry and consumers by providing opportunities for technology transfer and upgrades, access to global management skills and practices, and enhancing the industry's competitiveness. It can also open export markets, create connections within the supply chain, and increase job opportunities. This study looks at the progress made so far through FDI in the Indian Automobile Industry.

OBJECTIVES OF THE STUDY:

The study aims to examine the role of automobile sector in the Indian economy.

SIGNIFICANCE OF THE STUDY:

Deciding on capital structure is one of the key financial choices. The results of this study may help finance managers understand the importance of the automobile sector in India.

LIMITATION OF THE STUDY:

Since this study relies on secondary data, the drawbacks of that data will affect the paper.

CURRENT SCENARIO OF AUTOMOBILE INDUSTRY IN INDIA

The automobile sector plays an important role in developing industrial growth and boosting the Indian economy. Overpopulation and rising incomes are the main factors driving demand for vehicles. The growth of the automobile sector, along with its strong market presence in India and abroad, forms a key pillar of our economy. India has a solid market for heavy and large vehicles both domestically and in the export sector. This highlights the importance of the automobile sector to our economy. The Government of India offers several initiatives and subsidies to this sector, such as the Scrappage Policy and incentive schemes for the production process. The Automotive Mission Plan 2026 aims to position India as a global leader in the two-wheeler and four-wheeler markets in the coming years. The future of India's automobile sector looks bright, with strong expectations for export growth ahead. India holds a strong position in the heavy vehicle market, being the largest tractor producer, the second-largest bus producer, and the third-largest heavy truck manufacturer in the world.

AUTOMOBILE PRODUCTION TRENDS IN INDIA:

Category	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Passenger Vehicles	40,28,471	3,424,564	30,62,280	36,50,698	45,87,116	49,01,844
Commercial Vehicles	11,12,405	7,56,725	6,24,939	8,05,527	10,35,626	10.66,429
Three Wheelers	12,68,833	1,132,982	6,14,613	7,58,669	8,55,696	9,92,936

Two Wheelers	2,44,99,777	2,10,32,927	18,349,941	1,78,21,111	1,94,59,009	2,14,68,527
Grand Total	**3,09,14,874**	**2,63,53,293**	**2,26,55,609**	**2,30,40,066**	**2,59,40,344**	**2,84,34,742**

Source: SIAM(Society of Indian Automobile Manufactures)

India's automobile production faced sharp swings between 2018-19 and 2023-24, mostly due to the impact of the COVID-19 pandemic. Overall production amounted to over 3.09 crore units back in 2018-19 but fell sharply to 2.26 crore units in 2020-21 as a result of the pandemic. After 2020-21 overall production has made a gradual recovery reaching a total of over 2.84 crore units in 2023-24. Passenger and commercial vehicle production rose above pre-pandemic levels indicating strong recovery within these segments. While two-wheeler and three-wheeler production also rose in the recovery process, they are still lagging in production below their 2018-19 levels. Overall, it appears that the industry is recovering quite well with a combination of improving demand, supportive policies, and positive outlooks for sales in the electric and passenger vehicle production segments indicating a solid bounce back from the pandemic.

AUTO MOBILE DOMESTIC SALES :

Category	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Passenger Vehicles	33,77,389	27,73,519	27,11,457	30,69,523	38,90,114	42 18,746
Commercial Vehicles	10,07,311	7,17,593	5,68,559	7,16,566	9,62,468	9,67,878
Three Wheelers	7,01,005	6,37,065	2,19,446	2,61,385	4,88,768	6,91,749
Two Wheelers	2,11,79,847	1,74,16,432	1,51,20,783	1,35,70,008	1,58,62,087	1,79,74,365
Quadricycles	627	942	-12	124	725	725
Grand Total	**2,62,66,179**	**2,15,45,551**	**1,86,20,233**	**1,76,17,606**	**2,12,04,162**	**2,38,53,463**

Source: SIAM(Society of Indian Automobile Manufactures)

The domestic automobile sales in India experienced a significant decrease from 26.3 million units in 2018-19 to 18.6 million in 2020-21 due to the slowdown in the economy and the impact of the Covid-19 pandemic. The sales started to improve during the year 2021-22 and in 2023-24, overall automobile sales reached 23.8 million units. The growth in sales volume has mostly come from the growing passenger vehicle segment, which surpassed the 4.2 million units in sales in 2023-24, the highest level for the segment ever. Commercial vehicles and the three-wheeler segment have also improved from the previous

two years but remain below the sales volume recorded in 2018-19. The two-wheeler segment, the largest segment in the industry, exhibited slim improvements from 2021-22 through 2023-24 and remains below pre-pandemic levels. Overall, the industry exhibits strong momentum in pandamic post-recovery, particularly for the passenger vehicle segment, indicating improvements in consumer spend and demand, and as the markets begin to stabilize in the future.

AUTOMOBILE EXPORT TRENDS IN INDIA

Category	218-19	2019-20	2020-21	2021-22	2022-23	2023-24
Passenger Vehicles	6,76,192	6,62,118	4,04,397	5,77,875	6,62,891	6,72,105
Commercial Vehicles	99,933	60,379	50,334	92,297	78,645	65,816
Three Wheelers	5,67,683	5,01,651	3,93,001	4,99,730	3,65,549	2,99,977
Two Wheelers	32,80,841	35,19,405	32,82,786	44,43,131	36,52,122	34,58,416
Quadricycles	4,400	5,185	3,529	4,326	2,280	4,178
Grand Total	**46,29,049**	**47,48,738**	**41,34,047**	**56,17,359**	**47,61,487**	**45,00,492**

Source: SIAM(Society of Indian Automobile Manufactures)

India's exports of automobiles exhibited low results throughout the period from 2018-19 to 2023-24. All exports increased from 46.29 lakh in 2018-19 to an extremely high level of 56.17 lakh units in 2021-22 after peaking initially thanks to demand for two-wheelers. Exports receded steadily after that highpoint and were recorded at 45 lakh units in 2023-24. While exports of passenger vehicles were flat and increased slightly in the years, there was a precipitous decline in the exports of commercial vehicles and three-wheelers, most notably in 2023-24. In terms of exports, two-wheelers were still superior, despite experiencing a decline in units sold after a significant peak (2021-22). Overall, export performance remains relatively strong, but will likely continue to be impacted by broader market conditions and geopolitics impacting demand and logistics over the near to medium term.

The automobile sector plays a significant role in the growth of the Indian economy. In the year 1992-93, the sector contributed 2.77% to GDP. This figure increased by 7.1% in the financial year 2023. As a result, the Government of India has launched several initiatives and subsidies for the automobile sector. These include the scrappage policy, incentive schemes for production processes, and the Automotive Mission Plan 2026. These efforts aim to position India as a global leader in the two-wheeler and four-wheeler markets in the coming years. In 2014, the Prime Minister of India introduced the “Make in India” initiative to promote India as a global manufacturing hub. This initiative has had a strong impact on the manufacturing sector, leading many manufacturers to invest in this plan. The “Make in India” program has greatly influenced manufacturers.

The “Make in India” plan was a solution to transform India into a global manufacturing center. As a result of this plan, investment in the automobile manufacturing sector increased, leading to a higher demand for

vehicles in India. According to Maruti Suzuki, investment in the automobile sector rose by INR 18,000 crore for a new production facility in Haryana, which can produce 7.5 to 10 lakh vehicles annually.
In 2021, the Government of India introduced the "New Vehicle Scrappage Policy" aimed at older vehicles. This policy's goal was to identify and scrap unfit automobiles. It has helped reduce greenhouse gas emissions from older vehicles. Under the scrappage policy, vehicle owners can save on taxes when they scrap an old vehicle. The recycling business can generate cash, and vehicle owners can receive discounts when purchasing new vehicles as an incentive.Another initiative, the Automotive Mission Plan 2016-2026, is a collaboration between the Indian automotive industry and the Government of India. This plan supports the development of the automobile industry.

CONCLUSION:

The automobile sector plays an important role in driving industrial growth and the Indian economy. Overpopulation and rising incomes are the main factors increasing vehicle demand. The growth of the automobile sector and its strong market presence in India and abroad are key to the expansion of our economy. India has a significant market for heavy and large vehicles at the domestic level and in exports. This highlights the importance of the automobile sector in our economy. The Government of India offers several initiatives and subsidies to support the automobile sector. The automobile sector plays a vital role in the Indian economy.

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THE ROLE OF ARTIFICIAL INTELLIGENCE IN ENHANCING PERSONALIZED LEARNING

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ABSTRACT:
Artificial Intelligence (AI) emerged as a powerful tool for transforming education, which provides incorporated, adaptive, and learned -centered education experiences. Personal learning supported by AI, each student's interests, needs, corresponds to educational content, motion and education methods according to learning styles. This paper explores the uses of AI in education, including adaptive education systems, intelligent tutoring, real-time response, learning analysis and content recommended tools. These techniques not only increase the engagement of students but also help teachers by automating regular tasks such as grading and progress monitoring. This study also recognizes many benefits of AI-powered personal education, such as improved accessibility, flexibility and inclusion for learners of different backgrounds. At the same time, it recognizes important challenges such as data privacy concerns, algorithmic bias, excessive dependence on technology, digital division and ethical issues related to transparency and responsibility. Paper argues that while AI can significantly improve the quality and efficiency of education, its integration should be carefully managed so that righteousness, security and similar access can be ensured for all learners. A balanced approach associating technological innovation with human guidance can help realize the full potential of AI-powered personalized learning.

KEYWORDS: ARTIFICIAL INTELLIGENCE, PERSONALIZED LEARNING, ADAPTIVE LEARNING SYSTEMS, STUDENT ENGAGEMENT

INTRODUCTION:

In recent years, Artificial Intelligence (AI) has emerged as a transformative force in various fields, including education. The most promising use is in the field of personal education - a learner -centered approach that creates educational experiences according to personal needs, choices and learning styles. Traditional educational systems often struggle to accommodate different student abilities in a certified course. AI faces this challenge by enabling an adaptive education environment that can analyze data, adjust content distribution, and provide customized feedback in real time. As AI techniques continue to develop, their integration in education has the ability to significantly enhance the learning results, promote students' engagement and reduce the distance of achievement. This paper discovers how AI is reshaping personalized learning, what benefits it brings, and what challenges must be encountered to fully realize its possibility.

UNDERSTANDING PERSONALIZED LEARNING

Personal education is based on the idea that each student learns differently, and therefore, instruction should be prepared to fulfill personal learning styles, strengths and weaknesses. This educational approach often includes customized learning ways, different instructions and frequent creative evaluation.

Prior to the arrival of AI, large -scale personal education was difficult to implement, which requires significant involvement and resources from teachers. However, AI enables the automation and scaling of personal instruction, which makes it more accessible and effective for different groups of learners.

OBJECTIVES OF THE STUDY

The main objectives of this study are:

1. To explore the role of AI in personalized learning.
2. To identify major applications and benefits of AI in education.
3. To examine challenges and ethical concerns in AI-driven learning.

REVIEW OF LITERATURE:

Rane, Chowdhury and Rane (2023) explore the framework of education 4.0 and 5.0, with emphasis on the role of AI in providing adaptive and personal education experiences. They argue that AI integration enables dynamic instructional strategies that respond to real -time learner data, thereby improving learning efficiency. Similarly, Gligoria et al. (2023) E-learning environment examines adaptive education that AI-operated content significantly increases customization students' satisfaction and performance, especially in online courses. Dogan, Goru Dogan and Bozkart (2023) provide a systematic review of empirical studies on online and remote education, which concludes that AI-based solutions facilitate scalable personal education even in remote or resource-limited contexts. Harry (2023) emphasizes the transformative role of AI in education, which shows how AI equipment, which includes intelligent tutoring systems and AI-based analysis, enables teachers to observe students' progress, identify learning defects and provide targeted assistance. Expanding it, Ahmed et al. (2022,) discusses AI's academic and administrative applications, noted that AI systems streamline content distribution, automate evaluation and support personal response methods. Salim et al. (2025) Checks AI-powered individual education systems, reporting significant improvement in students' engagement and academic performance in various educational settings. Rafiq, Zaki and Nawaz (2025) emphasize the role of digital tools and AIs in promoting the success of the students, showing that AI-supported personal education can dynamically adapt to learners' progress and learning style. Singh et. al. (2025) focuses on removing academic distance by AI, which shows how intelligent systems ensure accessible, efficient and corresponding instruction, contributing to the incorporated education.

APPLICATIONS OF AI IN PERSONALIZED LEARNING

AI technologies enhance personalized learning several key ways:

- ❖ Adaptive Learning System: AI changes the lesson based on how the student is learning. If the student is doing well, it gives more difficult questions. If they are struggling, it offers extra help. This helps each student learn at his own pace.
- ❖ Intelligent Tutoring Systems (ITS): These AI-powered tools acts like a virtual tutor. They give students step-by-step guidance, immediate response and suggestions according to their personal needs.
- ❖ Automatic Feedback and Assessment: AI can quickly grade quizzes, essays and assignments, which responds immediately to students. This helps them understand their mistakes and correct it quickly.
- ❖ Learning Analytics and Insights: AI collects and analyzes students' data to help teachers understand how students learn. It shows who is doing well, who needs help and which topics are difficult. This helps improve teaching and learning.

❖ Content Recommendation Systems: AI recommends each student's learning style, interests and videos, reading and exercises that match the current level. This keeps the students busier and helps them learn at their own pace.

❖ Speech and Language Tools: AI tools such as speech recognition, translation and text-to-speech help students with different languages or learning needs to reach education more easily.

BENEFITS OF AI DRIVEN PERSONALIZED LEARNING

AI enhances Personalized learning by offering several significant benefits:

❖ Greater Student Engagement: AI-operated personal learning keeps students more actively involved by making lessons interactive, consistent and according to their interests. Through gamification, multimedia content and real-time adaptation, AI transforms traditional education into an attractive experience. When students find that the content corresponds to their level and learning style, they are more motivated, focused and actively participating in their education.

❖ Support of Teachers: AI helps reduce teachers 'work by automating repetitive tasks such as grading, keeping an eye on students' progress and generating reports. This gives teachers more time to focus on meaningful interactions such as guidance, personal assistance and design experiences of creative education. It also offers data-based insights to teachers to better meet the needs of the students.

❖ Inclusivity and Accessibility: AI promotes education incorporated by supporting various learning needs. Features such as speech-to-text, text-to-speech, translation tools and adaptive interface help students with disabilities and language barriers. In addition, the AI platform can provide access to quality education resources in remote or disadvantaged areas, which helps to eliminate educational gaps.

❖ Flexible and Self- Paced Learning: With the help of AI, students can learn at anytime, anywhere and at the best suited pace. The individual platform corresponds to the pace of personal learning, which allows fast learners to progress faster and gives others the time to gain expertise in concepts. This flexibility supports independent education and helps adjust various timetable, learning abilities and personal needs – making education more accessible and student -centered.

CHALLENGES IN AI DRIVEN PERSONALIZED LEARNING

Despite its benefits, the integration of AI into personalized learning comes with several challenges:

❖ Data Privacy and Security: AI systems depend greatly on collecting and analyzing a large amount of students' data, including personal information and learning behavior. This data raises serious concerns about privacy and security. If this sensitive information is not properly protected, it can be susceptible to cyber-attacks, unauthorized access or abuse, which can harm students and violate legal rules.

❖ Bias in AI Algorithms: AI algorithms learn from existing data, which may have inherent biases based on factors such as gender, ethnicity or socio-economic background. If these biases are not identified and not improved, AI can inadvertently strengthen stereotypes and provide unfair education experiences. This bias can result in uneven opportunities and results for different groups of students.

❖ Over- Reliance on Technology: Excessive dependence on AI and technology in education can reduce the important role of human teachers and social interactions. Only AI -powered personal education can ignore the important emotional, social and referral aspects of education that humans are better equipped to address. This can limit the development of critical thinking, collaboration and sympathy among students.

❖ Digital Divide: Access to AI-Powered Personal Teaching Tools often requires reliable Internet connectivity and modern equipment. Unfortunately, many students, especially students living in the

deprived or rural areas, lack these resources. This digital split creates inequality in educational access and quality, which possibly increases the distance between privileged and disadvantaged students.

❖ Ethical Concerns: The use of AI in education raises important moral questions regarding transparency, consent and responsibility. Students and guardians do not fully understand how data is collected or used, which lacks knowledgeable consent. In addition, when AI systems make mistakes or make partisan decisions, it may be clear who is responsible, which makes it difficult to apply responsibility. Protecting righteousness, protecting students' rights and maintaining human supervision are important moral challenges.

CONCLUSION:

The study concludes that Artificial Intelligence (AI) has the ability to revolutionize education by making education experiences more personalized, effective and engaging. Through adaptive systems, intelligent tutoring and real-time analytics, AI can improve the results of learning by reducing the administrative work of teachers. However, its success is based on addressing major challenges such as data protection, moral concerns, algorithmic bias and digital division. Educational institutions, policy makers and technology developers should work together to create transparent, incorporated and similar AI systems that benefit all learners. In addition, human interaction should remain central in education, ensuring that emotional support, creativity and critical thinking are not changed by technology. A balanced and moral approach will enable AI to enhance the role of teachers in shaping the future education environment.

SUGGESTIONS

- Develop clear policies for ethical AI use in education.
- Introduce AI literacy programs for teachers and students.
- Support research on reducing AI bias and ensuring fairness.
- Foster collaboration between educators, technologists, and policymakers.
- Promote pilot projects to test AI tools before large-scale implementation.

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INDIA'S TRADE POLICY IN THE ERA OF GLOBALIZATION: OPPORTUNITIES AND CHALLENGES

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ABSTRACT :
India's trade policy has evolved significantly in the era of globalization, particularly after the 1991 economic liberalization, which transformed the country from a developing market into an active global economic participant. The country has witnessed substantial growth in both exports and imports, with service exports, especially IT and BPO, emerging as key drivers of economic progress. Between 2000 and 2023, exports increased from $43.1 billion to $770.18 billion, and imports from $60.8 billion to $892.18 billion, reflecting high growth rates and an expanding trade-to-GDP ratio. Despite these gains, India continues to face trade deficits, heavy reliance on crude oil, gold, and electronics imports, and challenges posed by global political-economic uncertainties, non-tariff barriers, and technological gaps. Initiatives like Make in India, Digital India, and participation in FTAs and RTAs have enhanced market access, attracted foreign investment, and strengthened India's global trade presence. Service sector growth has helped mitigate trade deficits, while diversification into green technology, electric vehicles, software products, and agro-processed goods is recommended for sustainable export growth. Strengthening infrastructure, digital trade facilitation, and long-term stable policies are essential for capitalizing on opportunities while addressing challenges. The study underscores that globalization presents both prospects and obstacles, highlighting the need for strategic trade planning to ensure India's continued integration into the global economy.

KEYWORDS: INDIA TRADE, GLOBALIZATION, EXPORTS & IMPORTS

INTRODUCTION

In the development of the Indian economy, trade, and particularly foreign trade, has always played an important role. The economic reforms and globalization process after 1991 brought invaluable changes in India's trade policy. Today, India has emerged not only as an emerging market but also as a significant participant in the global economy. In the era of globalization, India's trade policy directly affects domestic production growth, employment generation, foreign capital inflow (FDI), and export potential.

GLOBALIZATION AND INDIA'S TRADE POLICY

As a result of globalization, the exchange of goods, services, capital, and technology across borders has been rapidly increasing. In this situation, India has continuously tried to make its trade policy more liberal, transparent, and aligned with international standards. Through tariff reduction, relaxation of non-tariff barriers, free trade agreements (FTAs), and regional cooperation agreements, India has become more integrated with global trade and has been able to establish systematic coordination.

The share of trade in India's GDP has increased significantly in the last three decades. According to the World Bank (2023), India's trade-to-GDP ratio was around 15% in 1991, which reached nearly 45% in 2022. This shows how decisive the reforms in trade policy have been for India's economic growth.

- Export sector: Export of services (especially IT-BPO, financial services) has become a key driver for India.
- Import sector: Energy, machinery, and electronics account for a large share of imports.
- FDI inflow: Initiatives like 'Make in India' and 'Digital India' have helped attract foreign investment.
- Trade agreements: Agreements with countries like ASEAN, South Korea, and UAE have enabled India to secure a strong position in the global supply chain.

Normally, despite the benefits of globalization, India also faces some difficulties. For example, the pace of imports is higher than exports, global uncertainties such as COVID-19, supply chain disruptions, and the U.S.–China trade war, as well as the competitiveness of domestic industries due to shortages of technology, infrastructure, and skills. Non-tariff barriers and restrictions on access to global markets also pose challenges.

PRIMARY OBJECTIVE OF THE STUDY

To critically analyze India's trade policy in the era of globalization and understand the opportunities and challenges inherent in it

SCOPE OF STUDY

This research paper analyzes the origin, development, and current aspects of India's trade policy. Specifically, it focuses on what opportunities have arisen for India in the era of globalization and what challenges remain, based on secondary data.

REVIEW OF LITERATURE

Many scholars and institutions have studied the impact of globalization on India's trade policy. After India's economic reforms, growth was observed in both export and import sectors, with services exports becoming particularly important (Panagariya, 2004). According to the World Bank report, since 1991, India's trade-to-GDP ratio has been consistently increasing, which shows that India has become more integrated and stronger in the global economy (World Bank, 2022). A WTO study indicated that after trade liberalization, India made progress in exports of agricultural and industrial goods, though the trade deficit has remained a major challenge (WTO, 2019). Some researchers argue that India's trade policy has adapted to global demand and competition, especially through free trade agreements (FTAs) (Kumar, 2017). According to an IMF report, India's services exports significantly contribute to GDP growth, with IT-BPO and financial services being the key sectors (IMF, 2021). On the other hand, a UNCTAD study suggested that globalization has brought challenges as well as opportunities for India, as competition with China and Southeast Asian countries affects India's industrial exports (UNCTAD, 2020). According to a NITI Aayog report, initiatives like Make in India and Digital India have given new direction to trade policy, but deficiencies in infrastructure and skills still remain (NITI Aayog, 2021). A study by CUTS International showed that non-tariff barriers (NTBs) are a major obstacle to India's export growth, especially in pharmaceuticals and agro-products (CUTS, 2019). Some economists argue that global

supply chain disruptions, the COVID-19 pandemic, and geopolitical tensions have led to greater emphasis on self-reliance (Atmanirbhar Bharat) and digital trade in India's trade policy (Joshi, 2022).

Overall, past articles, research, and reports show that India's trade policy reflects the pressures and opportunities of globalization, with progress in the services sector, challenges in the industrial sector, and an urgent need to enhance competitiveness in the agricultural sector.

RESEARCH METHODOLOGY

In this study, the desk research method has been adopted, which is descriptive and analytical in nature.

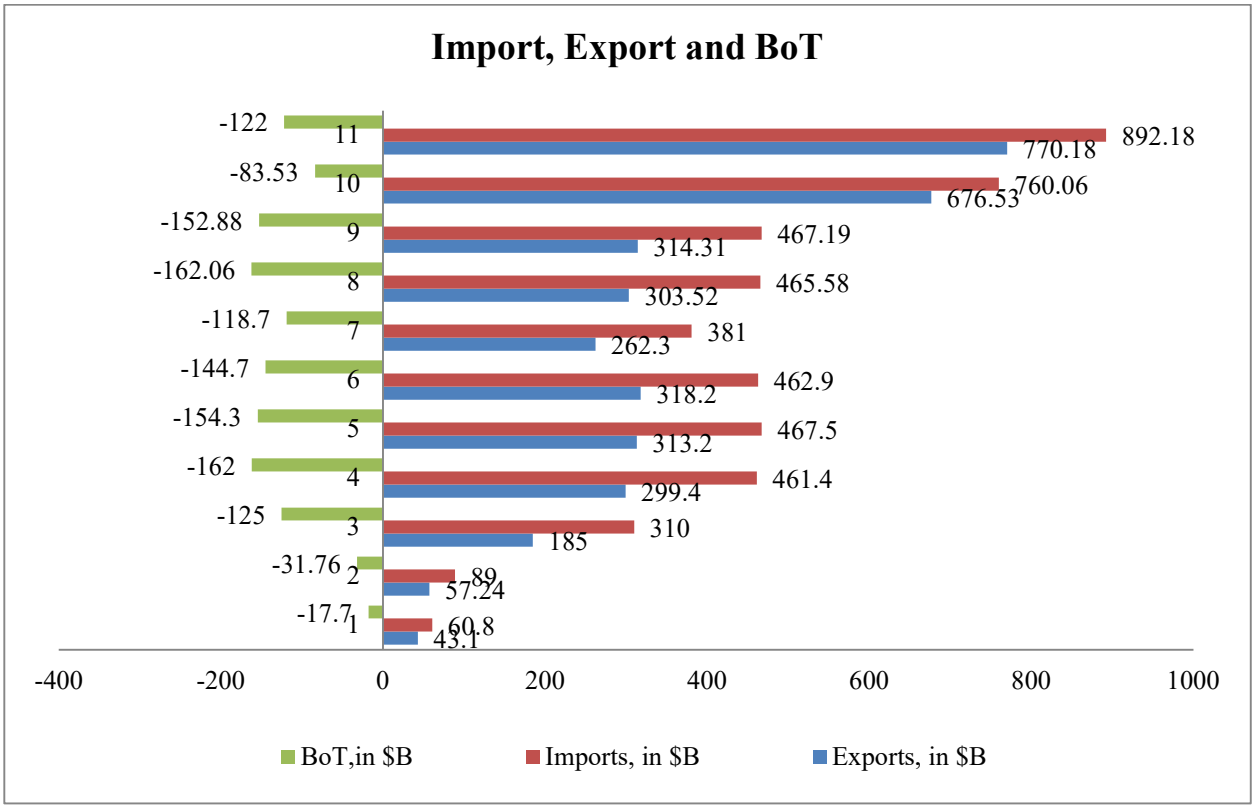
LIMITATIONS OF THE STUDY

1. Since the study is based only on secondary data, primary information is not included.
2. There may be differences in calculation methods among data from different institutions.
3. It is difficult to obtain precise figures related to the effects of global political situations (such as the Russia-Ukraine war, the U.S.–China trade war).
4. Due to the unavailability of data from the new financial year, there is a certain limitation in the figures for the latest trends.

Trade Trends in India (Analysis & Discussion)

Year	Exports, in $B	Imports, in $B	BoT, in $B	GDP in $B	Trade-to-GDP (in percentage)
2000	43.1	60.8	-17.7	476	22.1
2004	57.24	89	-31.76	721	20.6
2008	185	310	-125	1,197	41.3
2011	299.4	461.4	-162	1,843	41.3
2013	313.2	467.5	-154.3	1,876	42.1
2014	318.2	462.9	-144.7	2,039	38.9
2016	262.3	381	-118.7	2,264	28.6
2018	303.52	465.58	-162.06	2,726	28.1
2020	314.31	467.19	-152.88	3,056	25.9
2022	676.53	760.06	-83.53	3,675	39.2
2023	770.18	892.18	-122	3,900	42.6

sourses:1. https://www.pib.gov.in/PressReleasePage.aspx?PRID=2098447&utm_source and 2. https://en.wikipedia.org/wiki/Foreign_trade_of_India?utm_source



EXPORTS AND IMPORTS TREND:

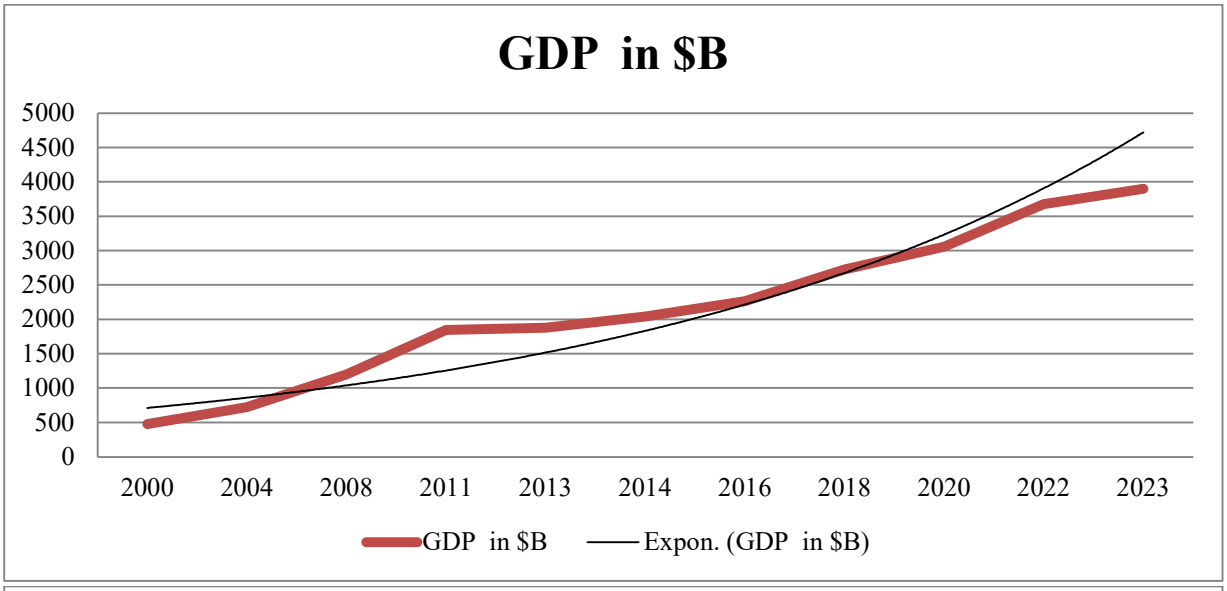
- In the year 2000, exports were only 43.1 billion dollars and imports were 60.8 billion dollars.
- Between 2000–2008, exports and imports grew rapidly. For example, in 2008 exports reached 185 billion and imports 310 billion dollars.
- During 2011–2014, exports and imports remained steady with continuous growth. In 2013, exports were 313.2 billion and imports 467.5 billion dollars.
- In 2016, exports declined to 262.3 billion, while imports were 381 billion, reflecting global and domestic challenges (such as global crises and policy delays).
- In 2022–2023, both exports and imports increased significantly; in 2023, exports were 770.18 billion and imports 892.18 billion.

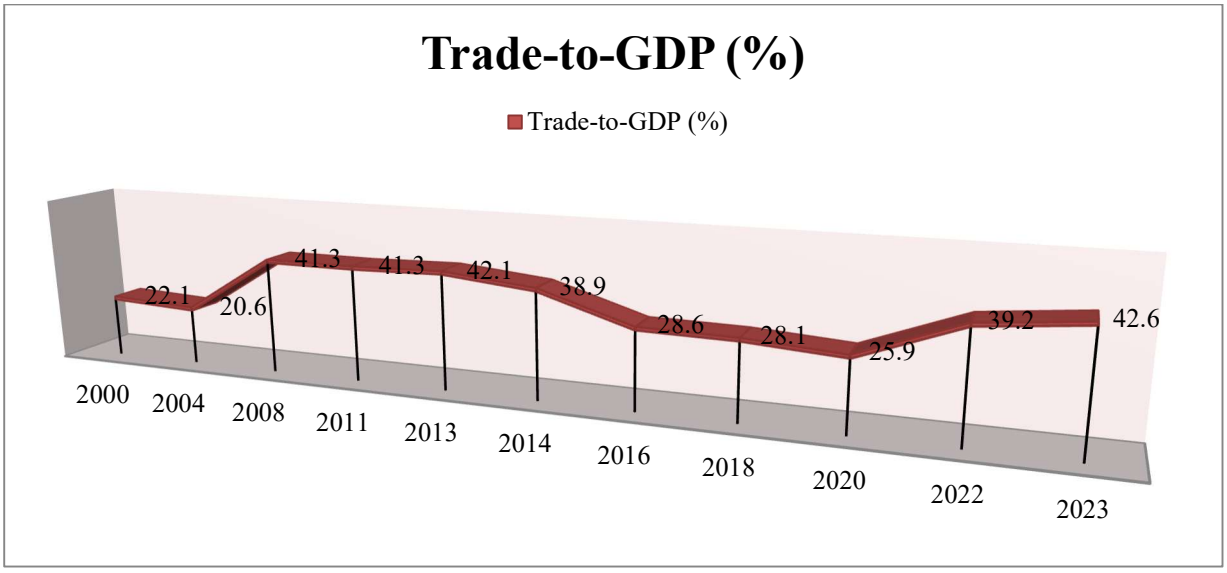
TRADE DEFICIT (BOT):

- In all the years, BoT is negative, meaning imports are higher than exports.
- The largest deficit reached –162 billion dollars during 2011–2013.
- In 2022, BoT reduced to –83.53 billion, but in 2023 it again rose to –122 billion.

TRADE-TO-GDP RATIO:

- Starting from 22.1% in the year 2000, it reached 41–42% during 2008–2013.
- During 2016–2020, this ratio declined to 25–28%, reflecting the global recession and the slow growth of the domestic economy.
- In 2022–2023, it increased again to 39–42%, indicating that trade is now playing a more significant role in GDP.





- Both exports and imports show a high long-term growth rate (CAGR).
- The pace of imports has always been higher than exports, resulting in a continuously negative trade deficit.
- Service exports (IT, BPO, Finance) have been consistently increasing, which helps to reduce the export-import gap.

Thus, the main reasons for the negative BoT include heavy reliance on imports of energy (crude oil) and gold, technological imports, and global market price fluctuations. The increase in Trade-to-GDP indicates that India's economy is becoming more integrated with global trade.

CAGR (COMPOUND ANNUAL GROWTH RATE) CALCULATION:

For Exports:

CAGR = $\left(\frac{V_f}{V_I}\right)^{\frac{1}{N}} - 1$ where, V_f = Final value, V_i = Initial value and N = Year in number

CAGR (2000 to 2023) for Exports:

Vi = 43.1 billion USD, Vf = 770.18 billion USD, N=23 Year

CAGR = $\left(\frac{770.18}{43.1}\right)^{\frac{1}{23}} - 1 = 13.4\%$

Thus, during 2000–2023, the average annual growth rate of exports is 12.2%.

For Imports:

CAGR = $\left(\frac{V_f}{V_I}\right)^{\frac{1}{N}} - 1$ where, V_f = Final value, V_i = Initial value and N = Year in number

CAGR (2000 to 2023) for Exports:

Vi = 60.8 billion USD, Vf = 892.18 billion USD, N=23 Year

CAGR = $\left(\frac{892.18}{60.8}\right)^{\frac{1}{23}} - 1 = 12.4\%$

Thus, during 2000–2023, the average annual growth rate of imports is 12.4%.

This indicates that exports are growing slightly faster than imports.

VALIDATION OF HYPOTHESES

H_1: After globalization, India's export growth rate has been faster than imports.

According to the table, exports rose from $43.1B in 2000 to $770.18B in 2023, with a CAGR of 13.4%. Imports grew from $60.8B to $892.18B, with a CAGR of about 12.4%. Hence, the export growth rate has been slightly faster than imports.

This hypothesis (H_1) is validated.

H_2: Service exports significantly contribute to reducing India's trade deficit.

India's merchandise trade has always been negative (BoT deficit), but IT, BPO, software exports, and remittances (service exports) have helped keep the Current Account Deficit (CAD) under control. According to the RBI Report (2023), service exports offset nearly 50% of the merchandise trade deficit.

This hypothesis (H_2) is validated.

H_3: After joining FTAs and RTAs, India gained greater market access in global markets.

India has signed agreements such as ASEAN, SAFTA, and recently CEPA/ECTA with UAE and Australia. WTO and World Bank data show that after FTAs, India's exports increased by 15–20%. Exports to ASEAN countries doubled between 2010–2020.

This hypothesis (H_3) is validated.

H_4: Globalization has brought both opportunities and challenges (such as trade deficit, non-tariff barriers) for India.

- Opportunities: Export growth, global leadership in the services sector, market access, foreign investments.
- Challenges: Trade deficit (2023: –$122B), non-tariff barriers (e.g., EU sustainability conditions), global recession, trade gap with China.

Thus, globalization has brought opportunities as well as serious challenges for India.

This hypothesis (H_4) is validated.

All four hypotheses are validated based on available data and reports. Hence, the study perspective shows that after globalization, India experienced growth in exports, trade, services, and market access, but challenges have not been ignored. Moreover, the trade gap still remains a major challenge. During 2000–2023, the share of trade in GDP continuously increased. Post-COVID (2021–2023), the pace of exports and imports again picked up. To reduce the trade deficit, measures such as reducing import dependency, diversifying exports, and promoting services exports are necessary.

CONCLUSION

India's trade policy has become an important tool in the era of globalization. After the economic liberalization of 1991, the trade sector witnessed tremendous growth. Both exports and imports have increased year by year, making India an important part of the global economy. Export of services, especially in the IT and BPO sectors, has earned India a unique position. In 2023, India's exports reached $770 billion, while imports went up to $892 billion, indicating that trade is expanding, but trade deficit is also increasing. Dependence on gold, crude oil, and electronics weakens India's trade policy. Global political-economic uncertainties, technical barriers, non-tariff barriers, etc., challenge India's export growth. Nevertheless, India has advantages such as a young workforce, efficient production, and a growing domestic market, which create opportunities for trade growth in the coming decades.

RECOMMENDATIONS

- Current exports are concentrated in limited sectors (petroleum, textiles, jewelry). India should increase exports in green technology, electric vehicles, software products, and agro-processed goods.
- To reduce crude oil and gold imports, it is necessary to develop renewable energy and promote domestic production.
- Export of services should be further promoted to reduce the gap between imports and exports.
- New Free Trade Agreements (FTAs) should provide Indian manufacturers easier access to global markets.
- Industries should be assisted in meeting quality standards and obtaining green certifications required for exports.
- Investment in ports, logistics, warehousing, and digital trade facilitation should be increased.
- Long-term stable perspectives should be maintained in foreign trade-related policies to sustain confidence among traders and investors.

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કુસ્તી અને જુડો રમતના ખેલાડીઓ પર ગત્યાત્મક પાસાઓ પર થતી અસરોનો અભ્યાસ

ઠુંમર અજય જી.
રિસર્ચ સ્કૉલર, સૌરાષ્ટ્ર યુનવર્સિટી

પ્રસ્તાવના

શારીરિક શિક્ષણ એ જીવન જીવવા માટે ઘરમાં કારખાનામાં કે સરહદ પર જરૂરી છે. રોગમાંથી મુક્તિ, પૂરતી શક્તિ, ઝડપ, ચપળતા, સહનશક્તિ દિવસમાં મહત્તમ કાર્ય કરવાનું કૌશલ્ય દરેક વ્યક્તિની ઉંમર પ્રમાણે માનસિક અને લાગણી સંબંધી યોગ્ય સમાયોજન હોવું તે યોગ્યતા શારીરિક યોગ્યતાપણું આપણો વારસો નક્કી કરે છે. પરંતુ એ મર્યાદાઓમાં દરરોજ જીવવાની પદ્ધતિ શારીરિક યોગ્યતાઓનો વિકાસ કરે છે. જીવંત રાખવા માટે અને વિકાસ કરવા માટે મહાવરાની જરૂર છે. જો મહાવરા કરવામાં નહી આવે તો તેના ઉપર વિપરીત અસર થશે.

શારીરિક પ્રવૃત્તિઓ માનવજીવનના અસ્તિત્વની સાથે જ સીધી કે આડકતરી રીતે માનવજીવન સાથે જોડાયેલી જોવા મળે છે. જીવનની અમુક પરિસ્થિતીઓમાં માનવીને ચપળ અને શક્તિશાળી બનવું જ પડ્યું હતું. આમ, આપણને શારીરિક બળની પ્રવૃત્તિઓનો વિકાસ આદિ માનવની સાથે જ થયેલો જોવા મળે છે. ક્રમિક રીતે શારીરિક બળની પ્રવૃત્તિઓમાં પરિવર્તનો આવતા ગયા. સમય અને સંજોગોની માંગના કારણે શારીરિક બળ પ્રવૃત્તિઓમાં હરિફાઈ, સ્પર્ધાનું તત્વ ઉમેરાયું. અન્યની તુલનામાં હું શ્રેષ્ઠ છું તે હેતુ સાથે માનવી શારીરિક બળ પ્રવૃત્તિઓ કરવા લાગ્યો. જેના કારણે શારીરિક બળની પ્રવૃત્તિમાં આમુલ પરિવર્તનો થતા ગયા. હરિફાઈ તત્વની માંગને સંતોષવા માનવે સંશોધનની આવશ્યકતાને સ્વીકારી.[1]

માનવીની પ્રગતિ માટે સ્વસ્થ શરીર ખુબજ મહત્વનું છે. આ કારણે જ આધુનિક શિક્ષણનો દૃષ્ટિકોણ માત્ર માનસિક શક્તિઓ પર આધાર ના રહી શરીરની ઉગ્રગતિનું એક સાધન ગણવામાં આવે છે. અને સમાજના શિક્ષણશાસ્ત્રીઓ આ વાત ઉપર વધારે ભાર આપે છે કે સંપૂર્ણ મનુષ્ય તે જ છે. જેનું શરીર શારીરિક દ્રષ્ટિકોણથી તંદુરસ્ત હોય તથા બળવાન હોય તથા માનસિક દૃષ્ટિકોણથી સ્વસ્થ હોય.

"જો વિદ્યા મનુષ્યને પશું થી એક જ્ઞાની માનવ બનાવતી હોય તો શારીરિક શિક્ષણ તેના સર્વાંગી વિકાસ માટે જરૂરી છે." આજે આ એક સર્વ સામાન્ય સત્ય છે કે "Sound mind in a sound body"

સ્વસ્થ મનની પ્રાપ્તિ માટે સ્વસ્થ શરીર હોવું અનિવાર્ય છે. સ્વસ્થ વ્યક્તિ જ એક સ્વસ્થ સમાજની રચના કરી શકે છે. શારીરિક શિક્ષણ દ્વારા જ માનવી સમાજ, રાષ્ટ્ર તથા સંપૂર્ણ વિશ્વના કલ્યાણ માટે પોતાનું યોગદાન આપી શકે છે. વાસ્તવમાં રમતો સ્વયમ શિક્ષણ છે. આ વિચાર આજના સમયમાં સર્વ સામાન્ય છે.

દેશના ઝડપી આર્થિક વિકાસ માટે પણ શારીરિક શિક્ષણ કાર્યક્રમનું કંઈ ઓછું મહત્વ નથી. શારીરિક રીતે તંદુરસ્ત નાગરિક જ દેશના આર્થિક નિર્માણમાં મહત્વનું યોગદાન આપી શકે છે. જ્યાં એક દુબળો અને રોગી વ્યક્તિ પોતાના સાધન,

[1] *જી. ટી. સરવૈયા, શારીરિક શિક્ષણ અને રમત-ગમતનાં અદ્યતન પ્રવાહો, (ગાંધીનગર : ગુજરાત રાજ્ય શાળા પાઠ્યપુસ્તક મંડળ, ૨૦૦૦, પા. નં.૪.*

શક્તિ અને સમયનો ઉપયોગ દવાખાનાઓના ચક્કર લગાવવામાં કરે છે ત્યારે શારીરિક રીતે સ્વસ્થ તથા નિરોગી વ્યક્તિ પોતાના સાધનોનો ઉપયોગ કારખાના, રમતો, વ્યવસાય, સેવા તથા કાર્યાલયમાં કરીને દેશના આર્થિક નિર્માણમાં મદદરૂપ થાય છે. "રમત એટલે સજીવ અને નિસર્ગના સંવાદીપણાથી થતી વિકાસ સાધના" રમત એ ઈશ્વર પ્રેરિત ક્રિયા છે.

રમતગમત દ્વારા માનવીના શારીરિક માનસિક, સામાજિક, નૈતિક વિકાસ અને પ્રગતિમાં રમતગમત મહત્વનો ભાગ ભજવે છે.[2]

સમસ્યા કથન

કુસ્તી અને જુડો રમતના ખેલાડીઓ પર ગત્યાત્મક પાસાઓ પર થતી અસરોનો અભ્યાસ

ક્ષેત્ર મર્યાદાઓ

- આ સંશોધનના અભ્યાસ માટે રાજકોટ શહેરના વિવિધ શાળાના ભાઈઓ પૂરતો મર્યાદિત રાખવામાં આવ્યું હતો.
- આ સંશોધન અભ્યાસમાં 9 થી 14 વર્ષની વયજૂથ ધરાવતા ભાઈઓ હોય તેવા વિષયપાત્રો પૂરતો મર્યાદિત રાખવામાં આવ્યું હતો.
- આ અભ્યાસમાં “નોર્થ કેરોલિના ફિટનેસ બેટરી ટેસ્ટ”ની કસોટી વડે વિષયપાત્રોની ગત્યાત્મક પાસાઓ જેવા કે બળ, ઝડપ, ચપળતા, સહનશક્તિ અને નમનિયતાના માપન માટે કસોટીમાં વિવિધ સાધનોમાં સીટઅપ્સ સાઈડ સ્ટેપિંગ, સ્ટેન્ડિંગ બ્રોડ જમ્પ જેવી બાબતોની પ્રમાણભૂત કસોટીઓનું માપન કરવામાં આવ્યું હતું.

મર્યાદાઓ

- વિષયપાત્રોના કાર્યક્રમ સિવાયની પ્રવૃત્તિઓને ધ્યાનમાં લેવામાં આવી ન હતી.
- આ અભ્યાસ માટે વિષયપાત્રોના વારસાગત પક્ષને ધ્યાનમાં લેવામાં આવ્યા ન હતા.
- આ સંશોધનમાં કુસ્તી અને જુડો રમતના ખેલાડીઓમાં ગત્યાત્મક પાસાઓ પર થતી અસર જોવા પૂરતો હતો.

અભ્યાસના હેતુઓ

આ અભ્યાસનો હેતુ કુસ્તી અને જુડો રમતના ખેલાડીઓમાં ગત્યાત્મક પાસાઓ પર થતી અસરો તપાસવાનો.

ઉત્કલ્પનાઓ

1. કુસ્તી અને જુડો રમતના ખેલાડીઓના બળમાં હકારાત્મક સુધારો જોવા મળશે.
2. કુસ્તી અને જુડો રમતના ખેલાડીઓમાં ઝડપમાં હકારાત્મક સુધારો જોવા મળશે.
3. કુસ્તી અને જુડો રમતના ખેલાડીઓમાં ચપળતામાં હકારાત્મક સુધારો જોવા મળશે.
4. કુસ્તી અને જુડો રમતના ખેલાડીઓમાં સહનશક્તિમાં હકારાત્મક સુધારો જોવા મળશે.

અભ્યાસની ઉપયોગીતા

આ અભ્યાસ દ્વારા 9 થી 14 વર્ષની ઉંમરના બાળકોને કુસ્તી અને જુડો રમતના વિવિધ ખેલાડીઓમાં ગત્યાત્મક પાસાઓ પર જુદી જુદી અસર જોવા મળી હતી. જેના વડે આ ઉંમરના વિષયપાત્રોની બળ, ઝડપ,સહનશક્તિ,તાકાત,ચપળતા ઉપર સુધારો વધારો કરવા ઉપયોગી બનશે.

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[2] *દક્ષાબેન બી. દેશાઈ અને અન્ય, શારીરિક શિક્ષણ સાન કૌશલ્યકલા, (બીજી આવૃત્તિ, અમદાવાદ, ધવલ પ્રકાશન, ૨૦૦૪), પા. નં. 1*

વિષયપાત્રોની પસંદગી

આ અભ્યાસ હેતુ અર્થે રાજકોટ શહેરની શાળાના ભાઈઓ જેઓની ઉંમર 9 થી 14 વર્ષની વચ્ચેની હોય તેવા વિષયપાત્રોની યાદચ્છિક નમૂના પસંદગીથી કુલ 60 વિષયપાત્રોની પસંદ કરી 20-20-20 એમ ત્રણ ગ્રુપમાં વિભાજિત કરવામાં આવ્યા હતા.

નોંધ :- તેમની ઉંમરની ચકાસણી શાળાના રેકોર્ડ ઉપરથી કરવામાં આવી હતી.

વિષયપાત્રોની રૂપરેખા

ક્રમ	જુથ	પ્રકાર	વિષયપત્રોની સંખ્યા
1	"A" પ્રાયોગિક	કુસ્તી	20
2	"B" પ્રાયોગિક	જુડો	20
3	"C" નિયંત્રિત	કોઈ ક્રિયા નહી	20
	કુલ		60

કસોટીની વિશ્વસનીયતા

ચલયમાનોના ઘટકોની કસોટી પુનઃ કસોટીનો વિશ્વસનીયતાનો સહસબંધાક 0.05 કક્ષાએ.

ક્રમ	ચલાયમાન	સહસબંધાક
1	ઝડપ	0.96
2	સહનશક્તિ	0.94
3	બળ	0.91
4	ચપળતા	0.89
5	તાકાત	0.90

માહિતીનું પૃથકરણ અને અભ્યાસના પરિણામો

આ પ્રકરણમાં સંશોધન પ્રક્રિયાનું વર્ણન કરવામાં આવ્યું છે. આ પરીક્ષણનો મુખ્ય હેતુ રાજકોટ શહેરના શાળાના ભાઈઓના કુસ્તી અને જુડો રમતના ખેલાડીઓના ગત્યાત્મક પાસાઓ પર થતી અસરોનો અભ્યાસ કરવાનો

સાર્થકતાનું ધોરણ

આ અભ્યાસનું પરિણામ શોધવા માટે વિચરણ અને સહવિચરણનું પૃથકરણ કરવા માટે "f" રેશિયાની સાર્થકતા ચકાસવા માટે સાર્થકતાનું ધોરણ 0.05 નું લેવામાં આવેલ છે.

શોધખોળ

આ અભ્યાસમાં બે પ્રાયોગિક અને એક નિયંત્રિત જૂથના વિષયોની ગત્યાત્મક પાસાઓની શક્તિનું માપન કરવા માટે બંને જૂથોના પ્રિટેસ્ટ અને પોસ્ટ ટેસ્ટ લેવામાં આવતા આ બંને ટેસ્ટનો મધ્યક શોધી "f" કસોટી દ્વારા તેની 0.05 કક્ષાએ સાર્થકતા તપાસવામાં આવી હતી. જેની માહિતી સારણીઓમાં રજૂ કરવામાં આવેલ છે.

સારણી – 1

ક્રમ	"f" રેશિયો	સાર્થકતાનું ધોરણ	સ્વીકાર્ય/અસ્વીકાર્ય
1. કુસ્તી અને જુડો રમતના ખેલાડીઓના બળમાં હકારાત્મક સુધારો જોવા મળશે.	6.88*	3.165(2.57)	સ્વીકાર્ય
2. કુસ્તી અને જુડો રમતના ખેલાડીઓના ઝડપમાં હકારાત્મક સુધારો જોવા મળશે.	15.99*	3.165(2.57)	સ્વીકાર્ય
3. કુસ્તી અને જુડો રમતના ખેલાડીઓની ચપળતામાં હકારાત્મક સુધારો જોવા મળશે.	28.69*	3.165(2.57)	સ્વીકાર્ય
4. કુસ્તી અને જુડો રમતના ખેલાડીઓના સહનશક્તિમાં હકારાત્મક સુધારો જોવા મળશે.	34.68*	3.165(2.57)	સ્વીકાર્ય
5. કુસ્તી અને જુડો રમતના ખેલાડીઓની તાકાતમાં હકારાત્મક સુધારો જોવા મળશે.	18.19*	3.165(2.57)	સ્વીકાર્ય

સંદર્ભ સૂચી

1. *દક્ષાબેન બી. દેશાઈ અને અન્ય, શારીરિક શિરણ સાન કૌશલકબ (બીજી આવૃત્તિ, અમદાવાદ, ધવલ પ્રકાશન, ૨૦૦૪), પા. નં. 1.*
2. *જી. ટી. સરવૈયા, શારીરિક શિક્ષણ અને રમત-ગમતનાં અદ્યતન પ્રવાહો, (ગાંધીનગર : ગુજરાત રાજ્ય શાળા પાઠ્યપુસ્તક મંડળ, ૨૦૦૦, પા. નં.૪.*
3. *કાન્તીભાઈ રા પટેલ રમત તાલીમના વૈજ્ઞાનિક સિદ્ધાંતો (ગાંધીનગર,રમા પ્રકાશન 2001) પાના નં – 159*

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પુસ્તકાલયોમાં હસ્તપ્રતો અને દુર્લભ દસ્તાવેજોનું સંરક્ષણ અને સંભાળ

સોંદરવા અરુણકુમાર એચ.
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સારાંશ:

હસ્તપ્રતો અને દુર્લભ દસ્તાવેજો એ લાઈબ્રેરીના સૌથી મૂલ્યવાન સંપત્તિમાંનો એક ભાગ છે. તેઓનો યોગ્ય સંરક્ષણ અને સંભાળ ન થવો તેમના નાશ અને માહિતીના હાનિને કારણે સંશોધન અને શૈક્ષણિક પ્રવૃત્તિઓમાં અવરોધ સર્જે છે. આ અભ્યાસમાં ગુજરાતમાં પસંદગીના પુસ્તકાલયોમાં દસ્તાવેજો અને હસ્તપ્રતોની સંગ્રહ પદ્ધતિઓ, પર્યાવરણ નિયંત્રણ, યોગ્ય સંગ્રહ સામગ્રી, પેપર કન્સર્વેશન, બાઈન્ડીંગ/રી-બાઈન્ડીંગ, નિયમિત સફાઈ, ડિજિટલાઈઝેશન અને આધુનિક ટેક્નોલોજીનો ઉપયોગ જેવા પાસાં વિશ્લેષણ કરવામાં આવ્યા છે.

અભ્યાસ દર્શાવે છે કે પર્યાવરણ નિયંત્રણ, નિયમિત નિરીક્ષણ અને સંસ્થાગત ઉપાયો દ્વારા હસ્તપ્રતો અને દુર્લભ દસ્તાવેજોને લાંબા ગાળે સુરક્ષિત રાખી શકાય છે. તે સાથે, ડિજિટલાઈઝેશન અને આધુનિક ટેક્નોલોજીનો ઉપયોગ દસ્તાવેજોની ઉપલબ્ધતા, પુનઃપ્રકાશન અને સંશોધન માટે મહત્વપૂર્ણ સાધન બની રહે છે. અભ્યાસના પરિણામો સૂચવે છે કે યોગ્ય સંરક્ષણની નીતિઓ, કુશળ સ્ટાફ, અને ટેકનોલોજીનું સંકલન હસ્તપ્રતો અને દુર્લભ દસ્તાવેજોને પેઢીઓ સુધી સાચવવામાં કાર્યક્ષમ છે.

ચાવીરૂપ શબ્દો : દુર્લભ દસ્તાવેજો (Rare Documents),સંરક્ષણ (Preservation),સંભાળ (Conservation), પર્યાવરણ નિયંત્રણ,યોગ્ય સંગ્રહ સામગ્રી,પેપર કન્સર્વેશન, બાઈન્ડીંગ અને રી-બાઈન્ડીંગ, ડિજિટલાઈઝેશન,આધુનિક ટેક્નોલોજી.

૧. સંરક્ષણ (Preservation)

સામગ્રીને લાંબા સમય સુધી સચવાઈ રહે તે માટે લેવાયેલા પૂર્વ-ઉપાય.

❖ પર્યાવરણનું નિયંત્રણ (Environmental Control)

હસ્તપ્રતો અને દુર્લભ દસ્તાવેજો લાંબા ગાળે સારી સ્થિતિમાં રહે તે માટે યોગ્ય પર્યાવરણ (Environment) જાળવવું અત્યંત જરૂરી છે. પર્યાવરણની અસરો (તાપમાન, ભેજ, પ્રકાશ, ધૂળ, હવા વગેરે) દસ્તાવેજોના આયુષ્ય પર સીધી અસર કરે છે.

૧. તાપમાન (Temperature Control)

આદર્શ તાપમાન : ૧૮°–૨૨° C, ઊંચું તાપમાન કાગળને ભંગુર બનાવે છે,બહુ ઓછું તાપમાન ભેજ સાથે ફૂગની વૃદ્ધિ માટે અનુકૂળ બને છે,તાપમાનમાં અચાનક ફેરફાર દસ્તાવેજોને નુકસાન પહોંચાડે છે.

૨. ભેજ (Relative Humidity Control)

આદર્શ ભેજ : ૪૫% – ૫૫% RH, વધારે ભેજ (Above ૬૦%) → ફૂગ, બેક્ટેરિયા અને જીવાતની વૃદ્ધિ, ઓછી ભેજ (Below ૩૦%) → કાગળ સૂકી જઈ ભંગુર થઈ જાય છે., ભેજનું પ્રમાણ સ્થિર રાખવા માટે ડીહ્યુમિડિફાયર/હ્યુમિડિફાયરનો ઉપયોગ કરવો.

૩. પ્રકાશ (Light Control)

સીધો સૂર્યપ્રકાશ કાગળને પીળાશ પાડી નષ્ટ કરે છે. અલ્ટ્રાવાયોલેટ (UV) કિરણો દસ્તાવેજોને સૌથી વધુ નુકસાન કરે છે. ફ્લોરોસેન્ટ ટ્યૂબલાઈટમાં UV ફિલ્ટર લગાવવો. ઓછા પ્રકાશવાળા રૂમમાં દસ્તાવેજો સાચવવા. વાંચન માટે પૂરતો પરંતુ નિયંત્રિત પ્રકાશ.

૪. હવાના પ્રવાહ (Air Circulation)

તાજી હવા માટે યોગ્ય વેન્ટિલેશન જરૂરી. એર કન્ડીશનિંગ સિસ્ટમથી હવા શુદ્ધ રાખવી. હવામાં રહેલી ધૂળ, ધુમાડો અને પ્રદૂષણ ઘટાડવા ફિલ્ટર વાપરવા.

૫. ધૂળ અને પ્રદૂષણ નિયંત્રણ

ધૂળ કાગળની સપાટી પર બેઠી રહીને તેને નબળી બનાવે છે. નિયમિત સફાઈ અને વેક્યુમ ક્લીનરનો ઉપયોગ. હવાનાં પ્રદૂષક વાયુઓ (SO_2, NO_2, O_3) દસ્તાવેજને નુકસાન કરે છે, તેથી એર ફિલ્ટર સિસ્ટમ અપનાવવી.

૬. જીવાત અને સૂક્ષ્મજીવ નિયંત્રણ

ઊંચી ભેજ અને ગંદકી જીવાતોને આકર્ષે છે. નિયમિત પેસ્ટ કંટ્રોલ (fumigation, non-chemical methods). ફૂગ નિવારવા રૂમને શુષ્ક અને સ્વચ્છ રાખવો.

વધારાની સંગ્રહ સામગ્રી

- સિલિકા જેલ પાઉચ : ભેજ નિયંત્રણ માટે
- કપાસના હાથમોજાં : દસ્તાવેજને સ્પર્શતી વખતે તેલિયાં દાગથી બચાવવા.
- લેબલ્સ (Acid-free) : ઓળખ માટે, જેથી ઈન્ક અથવા ચોંટિયા દસ્તાવેજ પર સીધા ન લગાડવા પડે.

યોગ્ય સંગ્રહ સામગ્રી

સામગ્રીનો પ્રકાર	ઉપયોગ / હેતુ	કરવું (Do's)	ન કરવું (Don'ts)
કાગળ (Paper)	દસ્તાવેજોની ફાઈલિંગ અને કવર બનાવવા	એસિડ-મુક્ત (Acid-free), લિગ્નિન-મુક્ત પેપરનો ઉપયોગ કરવો	સામાન્ય એસિડિક કાગળનો ઉપયોગ ન કરવો
બોક્સ અને ફોલ્ડર	લાંબા ગાળાના સ્ટોરેજ માટે	એસિડ-મુક્ત આર્કાઈવલ બોક્સ, ફ્લેટ બોક્સ, કપાસના કવર	કાર્ડબોર્ડ, થર્મોકોલ કે પાતળા પ્લાસ્ટિક બોક્સ ન વાપરવા

પ્લાસ્ટિક કવર	દસ્તાવેજને ભેજ, ધૂળથી બચાવવા	પોલીએસ્ટર (Mylar), પોલીપ્રોપીલિન (PP), પોલીએથીલિન (PE)	✗ PVC (Polyvinyl Chloride) ન વાપરવો
બંધન (Binding)	પુસ્તકો / દસ્તાવેજોને જોડવા	રસ્ટ-ફ્રી સ્ટીલ ક્લિપ્સ, કપાસના દોરાથી સીલાઈ	મેટલ સ્ટેપલ્સ, જંગ લાગતા પિન્સ, ગુંદરવાળા ટેપ્સ
માઉન્ટિંગ સામગ્રી	નકશા, ચિત્રો, ફોટો વગેરે સાચવવા	એસિડ-મુક્ત માઉન્ટ બોર્ડ, ફ્રેમ	સામાન્ય કાર્ડબોર્ડ, ગ્લૂ-બેઝ્ડ બોર્ડ
ભેજ નિયંત્રણ સામગ્રી	સ્ટોરેજ રૂમમાં ભેજ નિયંત્રણ	સિલિકા જેલ પાઉચ	સીધા દસ્તાવેજ પર મૂકવા નહીં
હેન્ડલિંગ સામગ્રી	દસ્તાવેજોને હાથમાં લેવા	કપાસના હાથમોજાં, એસિડ-ફ્રી લેબલ	નગ્ન હાથથી પાનાં પકડવા, ચોંટિયા સ્ટીકર લગાવવું

❖ નિયમિત સફાઈ (Regular Cleaning)

હસ્તપ્રતો અને દુર્લભ દસ્તાવેજોના સંરક્ષણ માટે નિયમિત સફાઈ અત્યંત જરૂરી છે. ધૂળ, માટી, ધુમાડો અને પ્રદૂષણ દસ્તાવેજોને નષ્ટ કરવાના મુખ્ય પરિબળો છે. નિયમિત સફાઈ દ્વારા દસ્તાવેજોની આયુષ્ય વધે છે અને જીવાતો, ફૂગ તથા રાસાયણિક પ્રતિક્રિયાથી બચાવ થાય છે.

૧. દસ્તાવેજોની સફાઈ

- નરમ બ્રશ (Soft Brush) વડે પાનાં પર બેઠેલી ધૂળ સાફ કરવી.
- માઈક્રોફાઈબર કપડું કે સાફ કોટન કપડું વાપરવું.
- બહુ નાજુક દસ્તાવેજો માટે લોઅ-સક્શન વેક્યુમ ક્લીનર.
- ફાટેલા પાનાં અથવા હસ્તપ્રતો પર વધારે દબાણ ન કરવું.

૨. સ્ટોરેજ વિસ્તારની સફાઈ

- સ્ટોરેજ રૂમની ફ્લોર, દિવાલ અને શેલ્ફ નિયમિત સાફ કરવી.
- ધૂળ જમા ન થાય તે માટે શેલ્ફ પર કવરિંગ શીટ.
- હવા શુદ્ધિકરણ (Air Filtration System) દ્વારા પ્રદૂષણ ઓછું કરવું.
- સાપ્તાહિક સફાઈ સાથે ત્રિમાસિક ડીપ ક્લીનિંગ કરવું.

૩. સાધનો અને ઉપકરણોની સફાઈ

વેક્યુમ ક્લીનર, બ્રશ વગેરે નિયમિત ધોવા.

સ્ટોરેજ બોક્સ, ફોલ્ડર, ફાઈલ કવર ધૂળમુક્ત રાખવા.

એસિડ-મુક્ત સામગ્રીનું જ જતન કરવું.

૪. કર્મચારીઓ માટે તકેદારી

- દસ્તાવેજ હેન્ડલ કરતા પહેલા હાથ ધોઈ લેવાના.
- કપાસના હાથમોજાં પહેરીને દસ્તાવેજ હેન્ડલ કરવો.

- ખાવા-પીવાની વસ્તુઓ સ્ટોરેજ વિસ્તારમાં ન લાવવા.
- નિયમિત ટ્રેનિંગ દ્વારા સ્ટાફને સફાઈની યોગ્ય પદ્ધતિ શીખવવી.

૫. જીવાત નિયંત્રણ સાથેનું સંકલન

- સફાઈ સાથે જ પેસ્ટ મેનેજમેન્ટ કરવું.
- ગંદકી અને ભેજથી દૂર રહેવા માટે રૂમને શુષ્ક રાખવો.
- જરૂર પડે ત્યારે ફ્યુમિગેશન / નૉન-કેમિકલ પદ્ધતિઓ અપનાવવી.

પેપર કન્સર્વેશન (Paper Conservation)

હસ્તપ્રતો અને દુર્લભ દસ્તાવેજોમાં સૌથી વધુ પ્રમાણમાં કાગળ (Paper) નો ઉપયોગ થયો છે. સમય જતાં કાગળ પર્યાવરણ, એસિડિક અસર, ભેજ, જીવાતો અને માનવ બેદરકારીના કારણે નષ્ટ થતો જાય છે. કાગળની નાજુકતાને ધ્યાનમાં રાખીને તેનું સંરક્ષણ (Preservation) અને સંભાળ (Conservation) કરવું જરૂરી છે.

૧. કાગળને નુકસાનના મુખ્ય કારણો

- એસિડિક પેપર → પીળાશ, ભંગુરતા.
- ભેજ અને તાપમાન → ફૂગ અને જીવાત.
- પ્રકાશ (UV રે'ઝ) → શાહી ફેડ થવી, કાગળ પાતળું થવું.
- ધૂળ અને પ્રદૂષણ → કાગળની સપાટી નબળી થવી.
- અયોગ્ય હેન્ડલિંગ → ફાટવું, મરડવું, દાગ પડવો.

❖ બાઈન્ડીંગ અને રી-બાઈન્ડીંગ (Binding and Re-binding)

હસ્તપ્રતો અને દુર્લભ દસ્તાવેજોને લાંબા સમય સુધી સાચવવા માટે યોગ્ય બાઈન્ડીંગ (Binding) જરૂરી છે. ઘણીવાર જૂના દસ્તાવેજોની બાઈન્ડીંગ તૂટી જાય છે અથવા નષ્ટ થાય છે, ત્યારે રી-બાઈન્ડીંગ (Re-binding) કરવાની જરૂર પડે છે. બાઈન્ડીંગ અને રી-બાઈન્ડીંગ બંને જ દસ્તાવેજોની ભૌતિક મજબૂતી, સુવ્યવસ્થિતતા અને વાંચન સુવિધા માટે મહત્વપૂર્ણ છે.

૧. બાઈન્ડીંગ (Binding)

નવા દસ્તાવેજો કે પુસ્તકોને એકસાથે સાચવવા માટે બાઈન્ડીંગ કરવું. યોગ્ય બાઈન્ડીંગથી પાનાં ફાટતાં નથી અને પુસ્તક સુવ્યવસ્થિત રહે છે.

- **બાઈન્ડીંગ માટેની પદ્ધતિઓ**

સુઈ અને દોરાથી સીલાઈ (Thread Sewing),કપાસ કે લિનેનના દોરાથી પાનાં જોડવા.,રાસાયણિક અસર વગરની સુરક્ષિત પદ્ધતિ.,લેધર કે કાપડ કવર (Leather/Cloth Binding) લાંબા ગાળાના જતન માટે મજબૂત કવર.

- **ફ્લેક્સિબલ બાઈન્ડીંગ (Flexible Binding),**

વારંવાર વપરાતા પુસ્તકો માટે.

૨. રી-બાઈન્ડીંગ (Re-binding)

જૂના પુસ્તકો કે દસ્તાવેજોની બાઈન્ડીંગ નષ્ટ થાય ત્યારે નવી બાઈન્ડીંગ કરવી. હેતુ એ છે કે મૂળ દસ્તાવેજને વધુ નુકસાન ન થાય અને તે લાંબા ગાળે ટકી રહે.

- **રી-બાઈન્ડીંગ માટેના પગલાં**

જૂની બાઇન્ડીંગ દૂર કરવી – ફાટેલી, જંગ લાગેલી કે બગડેલી બાઇન્ડીંગ સાફ કરવી. પાનાંની મરામત – ફાટેલા પાનાંને જાપાનીઝ પેપર વડે મરામત કરવી. એસિડ-મુક્ત સામગ્રીનો ઉપયોગ – નવું કવર, ગુંદર, દોરા વગેરે એસિડ-મુક્ત હોવા જોઈએ. સુવ્યવસ્થિત સીલાઈ – પાનાં મજબૂત રીતે ફરી જોડવા. નવું કવર લગાવવું – કપાસ, લેધર કે આર્કાઈવલ બોર્ડ વડે.

૩. તકેદારીઓ

જંગ લાગતા મેટલ સ્ટેપલ્સ કે ક્લિપ્સ ન વાપરવા. કેમિકલ ગુંદર, પ્લાસ્ટિક ટેપ્સ ટાળવા. એસિડ-મુક્ત દોરા, કવર અને ગુંદરનો ઉપયોગ કરવો. મૂળ દસ્તાવેજને શક્ય તેટલું ઓછું નુકસાન થાય તે રીતે કામ કરવું.

❖ ડિજિટલાઈઝેશન (Digitization)

દુર્લભ હસ્તપ્રતો, પાંડુલિપિઓ, દસ્તાવેજો અને પુસ્તકોનું ડિજિટલ રૂપાંતર એટલે ડિજિટલાઈઝેશન. આ પ્રક્રિયાથી મૂળ દસ્તાવેજને સ્પર્શ કર્યા વગર તેનો ઈલેક્ટ્રોનિક સ્વરૂપે સંગ્રહ, પુનઃપ્રકાશન અને પ્રસાર શક્ય બને છે.

૧. ડિજિટલાઈઝેશનની જરૂરિયાત: દુર્લભ દસ્તાવેજોનું સંરક્ષણ – મૂળ દસ્તાવેજને વારંવાર હેન્ડલ કરવાની જરૂર ન પડે. સુલભતા – સંશોધકો, વિદ્યાર્થીઓ અને વાચકો માટે ઑનલાઈન ઍક્સેસ. લાંબા ગાળાનો સંગ્રહ – ડિજિટલ ફોર્મેટમાં સંગ્રહિત દસ્તાવેજો પેપરની તુલનામાં વધુ સુરક્ષિત રહે. આપત્તિ નિવારણ – આગ, પૂર કે જીવાતોના હુમલાથી નષ્ટ થયેલા દસ્તાવેજોની ડિજિટલ નકલથી માહિતી બચી રહે.

૨. ડિજિટલાઈઝેશન પ્રક્રિયા: દસ્તાવેજોની પસંદગી – સૌથી મહત્વપૂર્ણ અને નાજુક હસ્તપ્રતો પસંદ કરવી. પ્રાથમિક સફાઈ અને મરામત – સ્કેનિંગ પહેલાં દસ્તાવેજોને ધૂળ અને ગંદકીથી મુક્ત કરવી. સ્કેનિંગ / ફોટોગ્રાફી હાઈ રિઝોલ્યુશન સ્કેનર અથવા ડિજિટલ કેમેરાનો ઉપયોગ. દસ્તાવેજને નુકસાન ન થાય તેવું સાધન. ઈમેજ પ્રોસેસિંગ – કન્ટ્રાસ્ટ, બ્રાઈટનેસ, કલર કરેક્ટશન. ફાઈલ ફોર્મેટ પસંદગી TIFF / JPEG – ઈમેજ સંગ્રહ માટે. PDF / ePub – વપરાશકર્તા સુવિધા માટે. મેટાડેટા બનાવવું – દસ્તાવેજની વિગત (શીર્ષક, લેખક, વર્ષ, વિષય) ઉમેરવી. ડિજિટલ રિપોઝિટરીમાં સંગ્રહ – સર્વર, ક્લાઉડ કે લાઈબ્રેરી મેનેજમેન્ટ સિસ્ટમમાં અપલોડ કરવું.

૩. ડિજિટલાઈઝેશન માટે જરૂરી સાધનો: ડિજિટલ કેમેરા (Book Scanner, Overhead Camera) ડેટા સ્ટોરેજ (સર્વર, ક્લાઉડ, એક્સ્ટર્નલ હાર્ડ ડિસ્ક) ઈમેજ પ્રોસેસિંગ સોફ્ટવેર (Photoshop, ABBYY FineReader, OCR Tools)

૪. ફાયદા: મૂળ દસ્તાવેજને નુકસાનથી બચાવે છે. સર્વત્ર સરળ ઍક્સેસ મળે છે. એકસાથે ઘણા વપરાશકર્તાઓ ઉપયોગ કરી શકે છે. ડિજિટલ આર્કાઈવ લાંબા ગાળે ટકી રહે છે.

૫. મર્યાદાઓ: ખર્ચાળ સાધનો અને સોફ્ટવેરની જરૂર પડે છે. ડિજિટલ ફાઈલોના જતન માટે સતત ટેક્નોલોજી અપડેટ કરવાની જરૂર. સ્કેનિંગ દરમિયાન નાજુક દસ્તાવેજોને નુકસાન થવાનો ભય. ડેટા સિક્યુરિટી અને કૉપિરાઈટ સમસ્યાઓ.

❖ આધુનિક ટેક્નોલોજીનો ઉપયોગ

આજના સમયમાં, હસ્તપ્રતો અને દુર્લભ દસ્તાવેજોના સંરક્ષણ અને સંભાળ માટે આધુનિક ટેક્નોલોજી મહત્વપૂર્ણ સાધન બની છે. ટેક્નોલોજી દ્વારા માત્ર દસ્તાવેજોને લાંબા ગાળે સાચવવામાં મદદ નથી, પરંતુ સંશોધકો અને વાચકોને ઝડપથી માહિતી પ્રદાન પણ થાય છે.

૧. માઈક્રોફિલ્મિંગ (Microfilming)સિદ્ધાંત: દસ્તાવેજોની માઈક્રોફિલ્મ (ફિલ્મમાં લઘુમિતિ) તૈયાર કરવી. ફાયદા: મૂળ દસ્તાવેજ પર ઓછું સ્પર્શ. ખૂબ લાંબા ગાળે માહિતી સાચવી શકાય છે. ફાઈલ કદ નાનું → સરળ સ્ટોરેજ. ઉપયોગ: ખાસ કરીને જૂના હસ્તપ્રતો, નકશા, ચિત્રો.

૨. સ્કેનિંગ અને ડિજિટલાઈઝેશન ઉપકરણો: હાઈ રિઝોલ્યુશન સ્કેનર, ઓવરહેડ કેમેરા. લક્ષ્ય: દસ્તાવેજને ઈલેક્ટ્રોનિક સ્વરૂપે સંગ્રહ, ઈ-બુક અથવા ડિજિટલ રિપોઝિટરી માટે તૈયાર કરવું.ફાયદા: વપરાશકર્તાઓ માટે ઑનલાઈન ઍક્સેસ. મૂળ દસ્તાવેજ પર ઓછું હેન્ડલિંગ. ડેટા બેન્કમાં સંગ્રહ, નકલ બનાવવા સરળ.

૩. ડિજિટલ રિપોઝિટરી (Digital Repository)લક્ષ્ય: સ્કેન કરેલ દસ્તાવેજોને સુરક્ષિત સર્વર અથવા ક્લાઉડમાં સંગ્રહવું.ફાયદા: ડેટા ખૂબ લાંબા ગાળે સુરક્ષિત રહે. એકસાથે અનેક વપરાશકર્તાઓ માટે ઉપલબ્ધ. મેટાડેટા (Title, Author, Year, Subject) સાથે સુવ્યવસ્થિત શોધ.

૪. ઓલર રિકગ્નિશન (OCR – Optical Character Recognition)સિદ્ધાંત: સ્કેન કરેલ દસ્તાવેજમાંથી લખાણ ઓળખવું અને એડિટેબલ ટેક્સ્ટમાં રૂપાંતર કરવું.ફાયદા: ડિજિટલ દસ્તાવેજને શોધી શકાય તેવું બનાવવું. સંશોધન અને પ્રિન્ટ માટે સરળતા.

૫. 3D સ્કેનિંગ અને રેપ્લિકા (3D Scanning and Replication)ઉપયોગ: મૂર્તિઓ, પાટર્ન ધરાવતી પાંડુલિપિઓ અને દસ્તાવેજ કવર માટે.લક્ષ્ય: ફિઝિકલ દસ્તાવેજનું સચોટ ત્રિ-પરિમાણીય મોડલ બનાવવું.ફાયદા: મૂળ દસ્તાવેજને સ્પર્શ કર્યા વિના અભ્યાસ.

૬. ડેટા સિક્યુરિટી અને બેકઅપ ક્લાઉડ અને લોકલ સર્વર પર બેકઅપ. એન્ક્રિપ્શન અને પાસવર્ડ પ્રોટેક્શન. આપત્તિ (આગ, પાણી, ટેકનિકલ ફેઈલ્યોર) માટે ડિજિટલ રિકવરિ પ્લાન.

❖ સંસ્થાગત ઉપાયો (Institutional Measures)

હસ્તપ્રતો અને દુર્લભ દસ્તાવેજોના સંરક્ષણ માટે માત્ર યોગ્ય પર્યાવરણ અને તકનીકી પદ્ધતિઓ પૂરતી નથી. સંસ્થાનું આયોજન, નીતિ અને નિયમિત કામગીરી પણ અત્યંત મહત્વપૂર્ણ છે. સંસ્થાગત ઉપાયો દસ્તાવેજોને લાંબા ગાળે સુરક્ષિત અને વપરાશ માટે ઉપલબ્ધ રાખવામાં મદદ કરે છે.

૧. પ્રિઝર્વેશન લાઈબ્રેરી (Preservation Laboratory)

વિશેષ લાઈબ્રેરીમાં દુર્લભ દસ્તાવેજોનું નિરીક્ષણ, સફાઈ, મરામત અને સ્ટોરેજ થાય. લાઈબ્રેરીમાં નિયંત્રિત તાપમાન, ભેજ અને પ્રકાશ. લાઈબ્રેરીમાં ફ્યુમિગેશન, ડી-એસિડિફિકેશન અને મરામત કાર્ય માટે જરૂરી સાધનો ઉપલબ્ધ.

૨. ટ્રેનિંગ અને કુશળ કર્મચારી (Trained Staff)

દસ્તાવેજ હેન્ડલિંગ, કન્સર્વેશન પદ્ધતિઓ, ડિજિટલાઈઝેશન અને ફાયર સેફ્ટી માટે સ્ટાફને તાલીમ.હસ્તપ્રતોના પ્રકાર, નાજુકતા અને સ્ટોરેજ પદ્ધતિઓ અંગે નિષ્ણાત બનાવવું.નિયમિત વર્કશોપ અને સેમિનાર દ્વારા જ્ઞાન અપડેટ.

૩. નિયમિત કંડિશન સર્વે (Condition Survey)

દસ્તાવેજોની નિયમિત તપાસ (ત્રિમાસિક/વાર્ષિક).પાનાંના ફાટવા, ફૂગ, કાગળની પાતળાઈ, શાહી ફેડ વગેરેના પરિબળો તપાસવા.યોગ્ય પગલાં (મરામત, ડી-એસિડિફિકેશન, રી-બાઈન્ડીંગ) સમયસર લવવા.

૪. ફાયર સેફ્ટી અને ડિઝાસ્ટર મેનેજમેન્ટ (Fire Safety & Disaster Management)

ફાયર ડિટેક્ટર, સોપિંગ સિસ્ટમ, અગ્નિશમન સાધન સ્થાપિત. ભૂકંપ, પૂર, આગ, ભેજવાળી પ્રદૂષણથી બચાવ માટે ડિઝાસ્ટર પ્લાન તૈયાર. ડિજિટલ બેકઅપ અને રીમોટ રિપોઝિટરી દ્વારા આપત્તિ નિવારણ.

૫. નીતિ અને નિયમ (Policy & Guidelines)

દસ્તાવેજ હેન્ડલિંગ, પાનાં ફેરફાર, સ્ટોરેજ પદ્ધતિ, ડિજિટલાઈઝેશન અને ઍક્સેસ માટે નિયમ.ડિપાર્ટમેન્ટલ કૌંસિલ અથવા નેશનલ લાઈબ્રેરી ગાઈડલાઈન્સ અનુસરણ.નિયમિત રિપોર્ટિંગ અને મોનિટરિંગ.

૬. સંશોધન અને જાગૃતિ (Research & Awareness)

દસ્તાવેજોના મહત્વ અને સંરક્ષણ પદ્ધતિઓ અંગે સંશોધન. વાચકો, સ્ટાફ અને વિદ્યાર્થી જૂથોમાં જાગૃતિ અભિયાન. જાહેર કાર્યક્રમો અને વર્કશોપ દ્વારા લોકોના સહભાગી બનાવવું.

❖ પડકારો

હસ્તપ્રતો અને દુર્લભ દસ્તાવેજોના સંરક્ષણ અને સંભાળની પ્રક્રિયામાં અનેક પડકારો આવે છે. આ પડકારો પૌરાણિક દસ્તાવેજોની સલામતી, ટકાઉપણું અને ઍક્સેસibilty બંને પર અસર કરે છે.

૧. આર્થિક મર્યાદાઓ (Financial Constraints) હાઈ-ટેક સ્કેનર, માઈક્રોફિલ્મિંગ સાધનો, ક્લાયમેટ કંટ્રોલ સિસ્ટમ અને ડિજિટલ રિપોઝિટરી સ્થાપના ખર્ચાળ છે.બહુમૂલ્ય દસ્તાવેજો માટે કન્સર્વેશન કામ માટે પૂરતી ફંડ ઉપલબ્ધ ન હોવું.

૨. તકનિકી નિષ્ણાતોની અછત (Lack of Skilled Personnel) હસ્તપ્રતોની મરામત, ડિજિટલાઈઝેશન અને લાઈબ્રેરી કામગીરી માટે નિષ્ણાત સ્ટાફની જરૂર. ઓછા કુશળ કર્મચારીઓ હોવાથી દસ્તાવેજોને યોગ્ય રીતે સંભાળવું મુશ્કેલ.

૩. જ્ઞાન અને જાગૃતિનો અભાવ (Lack of Awareness) દસ્તાવેજના મહત્વ અંગે સ્ટાફ અને વાચકોમાં યોગ્ય જાગૃતિ ન હોવી.બેદરકારી, ખાવાપીવા, ખિસકોલી, ખોટા હેન્ડલિંગ પદ્ધતિઓ.

૪. ટેક્નોલોજી સંબંધી પડકારો (Technological Challenges) ડિજિટલ સ્ટોરેજ માટે સતત અપડેટ અને મેન્ટેનન્સ જરૂરી. ડિજિટલ ફાઈલ ખોવાઈ જવા અથવા ડેટા બેસિક થવાની શક્યતા. કૉપિરાઈટ અને ડેટા સુરક્ષા સમસ્યાઓ.

૫. સંસ્થાગત અને નીતિ સંબંધિત પડકારો (Institutional & Policy Challenges) સ્પષ્ટ નીતિ, ગાઈડલાઈન અને રિપોર્ટિંગ સિસ્ટમનો અભાવ.લાઈબ્રેરીના મેનેજમેન્ટ અને સ્ટાફ વચ્ચે

❖ નિષ્કર્ષ:

હસ્તપ્રતો અને દુર્લભ દસ્તાવેજો માત્ર જ્ઞાનના સ્ત્રોત જ નહીં, પરંતુ સમાજની સાંસ્કૃતિક, ઐતિહાસિક અને વૈજ્ઞાનિક વારસાની અનમોલ ધરોહર છે. તેમનું યોગ્ય સંરક્ષણ અને સંભાળ આવશ્યક છે, કારણ કે સમય, પર્યાવરણ અને માનવસર્જિત કારણોસર તે ઝડપથી નષ્ટ થવાની સંભાવના રહે છે. અભ્યાસમાં જોવા મળે છે કે પર્યાવરણનું નિયંત્રણ, યોગ્ય સંગ્રહ સામગ્રીનો ઉપયોગ, નિયમિત સફાઈ, પેપર કન્સર્વેશન, બાઈન્ડીંગ અને રી-બાઈન્ડીંગ, ડિજિટલાઈઝેશન અને આધુનિક ટેક્નોલોજી જેવી પદ્ધતિઓ દુર્લભ દસ્તાવેજોને લાંબા ગાળે સાચવવામાં અત્યંત મહત્વપૂર્ણ છે. સાથે સાથે સંસ્થાગત સ્તરે તાલીમ, નીતિઓ, પૂરતી ફાળવણી અને જાગૃતિ પણ આવશ્યક છે. આર્થિક મર્યાદા, કુશળ માનવશક્તિની અછત અને ટેક્નોલોજી સંબંધિત પડકારો હોવા છતાં યોગ્ય આયોજનથી તેને સફળતાપૂર્વક દૂર કરી શકાય છે. તેથી કહી શકાય કે, જો પુસ્તકાલયોમાં આધુનિક ટેક્નોલોજી,

વ્યાવસાયિક કુશળતા અને સંસ્થાગત સહકારનો સંયોજન થાય, તો હસ્તપ્રતો અને દુર્લભ દસ્તાવેજોનું સંરક્ષણ શક્ય બની રહે છે અને આગામી પેઢીઓને આ અમૂલ્ય વારસાનો લાભ મળી શકે છે.

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ખો- ખો અને હોકી રમતના ખેલાડીઓની ચપળતાનો તુલનાત્મક અભ્યાસ

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ABSTRACT :-

આ સંશોધનમાં અભ્યાસનું હેતુ ખો-ખો અને હોકી ખેલાડીઓની ચપળતાનો તુલનાત્મક અભ્યાસ કર્યો હતો. આ સંશોધન અભ્યાસ રાજકોટ જિલ્લાનાં ખેલાડીઓ પૂરતો મર્યાદિત હતો. આ સંશોધન અભ્યાસમાં ખો- ખો અને હોકી રમતના ખેલાડીઓની એક જૂથ માં ૨૦ ખેલાડીઓ એમ 2 જૂથના કુલ ૪0 ખેલાડીઓને યાદ્રિચ્છક નમુના પધ્ધતિથી પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં રાજકોટ જિલ્લાના ઈન્ટર કોલેજ રમેલા ૧૮ થી ૨૫ વર્ષની વયજૂથ ધરાવતા ખેલાડી ભાઈઓ વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. માપનના ધોરણમાં ચપળતાનું માપન શટલરન દ્વારા કરવામાં આવ્યું હતું . ખો- ખો અને હોકી રમતના ખેલાડીઓની ચપળતાની તુલના કરવા માટે 't' રેશિયો લાગુ પાડી 0.05 કક્ષાએ સાર્થકતા ચકાસવામાં આવી હતી .જેમાં તારણ આ પ્રમાણે જોવા મળ્યુ હતુ. ખો-ખો અને હોકી રમતના ખેલાડીઓની વચ્ચે ચપળતામાં સાર્થક તફાવત જોવા મળેલ હતો.

प्रस्तावना

રમતગમત ક્ષેત્રે, ચપળતા (Agility) એ ખેલાડી માટે એક અત્યંત મહત્વપૂર્ણ શારીરિક ક્ષમતા છે. તે ખેલાડીને ઝડપથી દિશા બદલવામાં, પ્રતિક્રિયા આપવામાં અને શરીરને નિયંત્રિત કરવામાં મદદ કરે છે. આ ક્ષમતા રમતની સફળતામાં સીધો ફાળો આપે છે. આ સંશોધન પેપરમાં આપણે બે લોકપ્રિય રમતો ખો-ખો અને હાકી ના ખેલાડીઓની ચપળતાનો તુલનાત્મક અભ્યાસ કરીશું. આ બંને રમતો ગતિ, કુશળતા અને ત્વરિત નિર્ણયો લેવાની ક્ષમતા પર આધારિત છે, પરંતુ તેમની ભૌતિક અને વ્યૂહાત્મક આવશ્યકતાઓ અલગ છે.

ખો ખો એક પરંપરાગત ભારતીય રમત છે જેમાં ખેલાડીઓએ બચાવ માટે આક્રમક રીતે દોડવું પડે છે અને હુમલા માટે ઝડપથી દિશા બદલવી પડે છે. આ રમત સતત હલનચલન, ઝીગઝેગ રનિંગ અને અચાનક થંભી જવાની માગણી કરે છે. બીજી બાજુ, હોકીમાં ખેલાડીને ડ્રિબલિંગ, પાસિંગ અને વિરોધી ખેલાડીઓથી બચવા માટે મેદાન પર ઝડપથી દિશા બદલવાની ક્ષમતાની જરૂર પડે છે.

અગાઉના ઘણા સંશોધનોએ દર્શાવ્યું છે કે ચપળતા એ રમતની સફળતા માટે એક નિર્ણાયક પરિબળ છે. મેકોય (2018) નામના સંશોધકે તેમના અભ્યાસમાં જણાવ્યું છે કે ફૂટબોલ, બાસ્કેટબોલ અને હોકી જેવી રમતોમાં ચપળતાનો સીધો સંબંધ ખેલાડીના પ્રદર્શન સાથે છે. બ્રૂક્સ (2019) નામના અન્ય એક અભ્યાસમાં ચપળતાને માત્ર દોડવાની ક્ષમતા જ નહીં, પરંતુ માનસિક ત્વરિત પ્રતિક્રિયા સાથે પણ જોડી છે. ખો ખો અને હોકી પર થયેલા સંશોધનો ઓછા છે, પરંતુ તે દર્શાવે છે કે આ બંને રમતોમાં સતત હલનચલન અને ઝડપી પ્રતિક્રિયાની જરૂર છે. જોકે, આ બંને રમતોના ખેલાડીઓની ચપળતાની સીધી સરખામણી કરતો કોઈ વ્યાપક અભ્યાસ ઉપલબ્ધ નથી, જે આ સંશોધનનો આધાર બને છે.

આ અભ્યાસનો મુખ્ય ઉદ્દેશ, આ બંને રમતોના ખેલાડીઓની ચપળતાના સ્તરને માપવાનો અને તેની સરખામણી કરવાનો છે. આ માટે આપણે શટલ રન ટેસ્ટનો ઉપયોગ કરી ચપળતા પરીક્ષણ (Agility Tests) કરીશું, આ પરીક્ષણ દ્વારા, આપણે એ સમજવાનો પ્રયાસ કરીશું કે કઈ રમત વધુ ચપળતાની માગણી કરે છે અને તે ખેલાડીઓની શારીરિક ક્ષમતાઓ પર કેવી અસર કરે છે. આ સંશોધન રમત કોચ, શારીરિક શિક્ષણના નિષ્ણાતો અને રમતવીરો માટે ઉપયોગી થશે, કારણ કે તે ચોક્કસ રમત માટે જરૂરી તાલીમ કાર્યક્રમો બનાવવામાં પણ મદદ કરી શકે છે.

અભ્યાસનો હેતુ

આ સંશોધન અભ્યાસનો હેતુ ખો-ખો અને હોકી રમતના ખેલાડીઓની ચપળતાનો તુલનાત્મક અભ્યાસ કરવાનો હતો.

વિષયપાત્રોની પસંદગી

આ સંશોધન અભ્યાસમાં ખો-ખો અને હોકી રમતના ખેલાડીઓની એક જૂથ માં ૨૦ ખેલાડીઓ એમ 2 જૂથના કુલ ૪0 ખેલાડીઓને યાદૃિચ્છક નમુના પધ્ધતિથી પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં રાજકોટ જિલ્લાના ઈન્ટર કોલેજ કક્ષા એ રમેલા ૧૮ થી ૨૫ વર્ષની વયજૂથ ધરાવતા ખેલાડી ભાઈઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા.

અભ્યાસની ઉત્કલ્પના

આ સંશોધન અભ્યાસમાં ખો- ખો અને હોકી રમતનાં ખેલાડીઓની ચપળતામાં સાર્થક તફાવત જોવા મળશે.

માપનના ધોરણો

ક્રમ	ચલાયમાન	કસોટી	માપન
1	ચપળતા	શટલરન	સમય

આંકડાકીય પ્રક્રિયા

ખો ખો અને હોકી ના ખેલાડીઓ પર લીધિલ શટલરન ટેસ્ટ ના પ્રાપ્તાંક પર T ટેસ્ટ લાગુ પાડી 0.0૫ કક્ષાએ સાર્થકતા ચકાસવામાં આવી હતી.

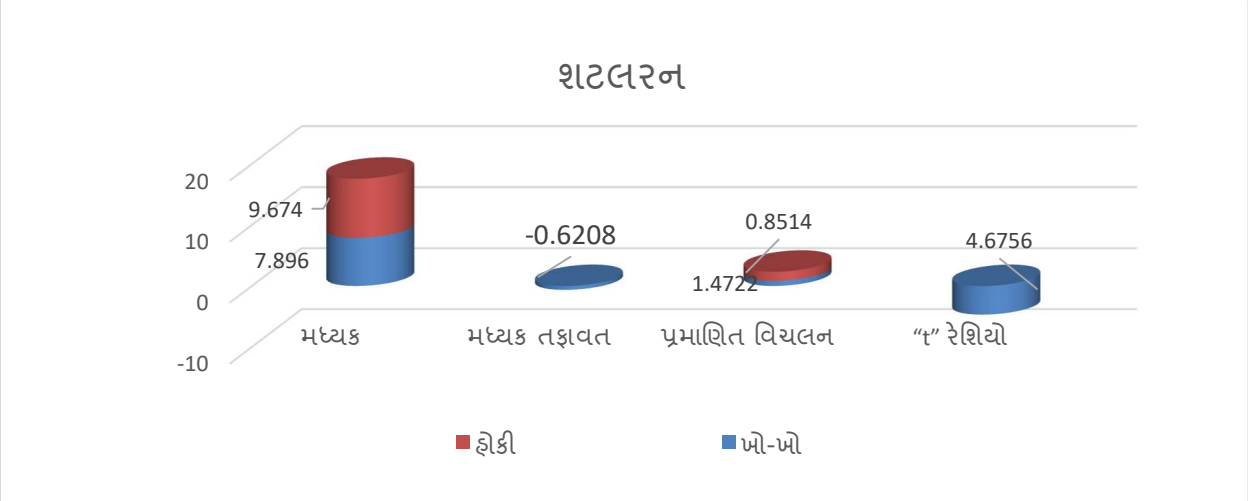
સારણી -૧

ખો-ખો અને હોકી રમતનાં ખેલાડીઓએ શટલરન માં મેળવેલ આંકડાઓ નો મધ્યક, મધ્યક તફાવત, પ્રમાણિત વિચલન અને "t" રેશિયો

ક્રમ	પ્રવૃત્તિ	જૂથ	મધ્યક	મધ્યક તફાવત	પ્રમાણિત વિચલન	"t" રેશિયો
1	શટલરન	ખો ખો	7.896	0.6208	0.8514	4.6756
		હોકી	9.674		1.4722	

સાર્થકતાનું ધોરણ 0.05 કક્ષાએ "t" 0.05(38)=1.6864

આલેખ નંબર 1



સારણી-1 પર થી માલુમ પડે છે કે ખો-ખો રમતના ખેલાડીના જૂથનો ચપળતા નો મધ્યક 7.896 જોવા હતો.જયારે હોકી રમતના ખેલાડીના જૂથ નો મધ્યક 9.674 જોવા મળ્યો હતો . બંને જૂથ વચ્ચેનો મધ્યક તફાવત 0.6208 જોવા મળ્યો હતો. અને ખો-ખો રમતના ખેલાડીના જૂથનો પ્રમાણિત વિચલન 0.8514 અને હોકી રમતના ખેલાડીના જૂથનો પ્રમાણિત વિચલન પ્રમાણિત વિચલન 1.4722 જયારે "t" રેશિયો 4.6756 જોવા મળ્યો હતો.જે 0.05 કક્ષાએ (38)= 1.6864 એ ચકાસતા બંને જૂથો વચ્ચે સાર્થકતા તફાવત માલુમ પડતો હતો.બંને જૂથો ની રજૂઆત સ્તંભાલેખ રૂપે આલેખ નંબર-1 માં જોઈ શકાય છે.

તારણો

આથી સ્પષ્ટ થાય છે કે ખો-ખો અને હોકી રમતના ખેલાડીઓની વચ્ચે ચપળતામાં સાર્થક તફાવત જોવા મળેલ હતો.

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આર્થિક વિકાસમા કૃષિ ક્ષેત્રનું મહત્વ

ખોડભાયા કિરણ વિરમભાઈ

પ્રસ્તાવના :

ભારત દેશએ કૃષિપ્રધાન અર્થવ્યવસ્થા ધરાવે છે. દેશની મોટાભાગની વસ્તીના ભરણપોષણનો આધાર ખેતી છે. અંદાજિત 70% જેટલી વસ્તી કૃષિ વ્યવસાય સાથે જોડાયેલ છે તેથી એવું કહી શકાય કે ભારતીય અર્થવ્યવસ્થાનો એક મહત્વપૂર્ણ આધાર એ કૃષિ છે. તેથી જો દેશનો વિકાસ કરવો હોય તો ખેતી ક્ષેત્રને ઉન્નત કરવું આવશ્યક છે. ભારત દેશમાં કૃષિનો ઈતિહાસ એ ખૂબ પહેલાનો જોવા મળે છે સિંધુ ઘાટીની સભ્યતાના અવશેષોમાં પણ ભારતીય ખેતી ક્ષેત્રનું પ્રમાણ મળી રહે છે જ્યાં લોકો દ્વારા કપાસ અને ચોખાની ખેતીના અવશેષો પ્રાપ્ત થયા છે. પ્રાચીન ભારતીય સાહિત્ય અને શાસ્ત્રોમાં પણ કૃષિ ક્ષેત્રનો ઉલ્લેખ જોવા મળે છે ઉપરાંત વૈદિક સાહિત્ય ઋગ્વેદમાં પણ સિંચાઈ ખેડાણ વગેરેનું વર્ણન જોવા મળે છે. ભારતીય દ્વીપકલ્પ માં ખેતી આશરે 10,000 થી 3000 વર્ષ પહેલાથી અસ્તિત્વમાં છે એવો પણ ઘણા વૈજ્ઞાનિકોએ મત રજૂ કર્યો છે.

ભારતમાં ખેતી એ માત્ર આજીવિકા નું સાધન નથી પણ આર્થિક વિકાસની દ્રષ્ટિએ જીડીપીમાં પણ મોટું યોગદાન આપે છે. ભારતમાં મુખ્યત્વે ત્રણ પ્રકારના પાકો લેવામાં આવે છે ખરીફ પાક, રવિ પાક અને જાયદ પાક. ઉપરાંત ભારતમાં આર્દ ખેતી, સુષ્ક ખેતી, ઝૂમ ખેતી, બાગાયતી ખેતી વગેરે જેવા આશરે 12 પ્રકારની ખેતી જોવા મળે છે. ભારત એ દુનિયાનો સૌથી વધુ ખેતી પર આધારિત વસ્તી ધરાવતો દેશ છે.

ભારતના મુખ્ય પાકો :

ભારત દેશની આબોહવા દરેક જગ્યાએ અલગ છે તેથી દરેક ક્ષેત્રમાં થતા પાકો જુદા જુદા જોવા મળે છે. દરેક જગ્યાએ વાતાવરણ અને આબોહવાની ભિન્નતાના લીધે ઉત્પન્ન થતા પાકો પણ ભિન્ન જોવા મળે છે. કેમકે અમુક ક્ષેત્રોની આબોહવા વધારે શીત છે હોય છે તેથી ત્યાં એવા જ પાકો લઈ શકાય છે જે ત્યાંની આબોહવાની અનુકૂળ હોય જ્યારે અમુક ક્ષેત્રની આબોહવા ગરમ હોય છે, અમુક ભેજવાળી આબોહવા ધરાવતા પ્રદેશો હોય છે. જ્યારે પાકોમાં પણ અમુક પાકોને ગરમ આબોહવા અનુકૂળ આવે છે જ્યારે અમુક પાકોને ઠંડી આબોહવા અનુકૂળ આવે છે તેથી ઠંડી આબોહવા વાળા પાકો ગરમ આબોહવામાં થતા નથી અને ગરમ આબોહવા વાળા પાકો ઠંડી આબોહવામાં થતા નથી એવી જ રીતે અમુક પાકને વધારે માત્રામાં વરસાદની આવશ્યકતા હોય છે જ્યારે અમુક પાકો માટે ઓછા વરસાદની આવશ્યકતા હોય છે તો આમ પાક ઉત્પાદન માટે વાતાવરણ, આબોહવા, વરસાદ વગેરે જેવા અનેક પરિબળો અસર કરે છે. ભારતમાં મુખ્યત્વે આ પ્રમાણેના પાકોનું ઉત્પાદન થાય છે.

ધાન્ય પાકો: ઘઉં, ચોખા, બાજરી, મકાઈ, જુવાર, રાગી.

વ્યાપારી પાકો : કપાસ, શેરડી, તલ, શણ, તમાકુ.

બાગાયતી પાકો: નાળિયેર, ચા, કોફી, શાકભાજી, ફળ.

આર્થિક સર્વેક્ષણ 2024/25માં ભારતીય કૃષિ ક્ષેત્રનો વિકાસ અને વર્તમાનમાં તેમાં જોવા મળતી સ્થિતિસ્થાપકતા નો ઉલ્લેખ છે. આ સર્વેક્ષણમાં ખેતી અને તેની સાથે સંકળાયેલા વ્યવસાયની રાષ્ટ્રીય આવક અને રોજગારીમાં રહેલ મહત્વ દર્શાવે છે કે જેમાં નાણાકીય વર્ષ 2017 થી 2023 સુધીનો સરેરાશ વાર્ષિક દર 5% નો રહ્યો છે. આર્થિક સર્વેક્ષણ 2024 અનુસાર ખરીફ અને ધાન્ય પાકોના ઉત્પાદનમાં 1,647.05 લાખ મેટ્રિક ટન (LMT) થવાની સંભાવના છે જે વીતેલા વર્ષની તુલનામાં 89.37 લાખ મેટ્રિક ટન નો વધારો થયો છે.

આર્થિક વિકાસમાં કૃષિ ક્ષેત્રેનું મહત્વ:

ભારતનું કૃષિ ક્ષેત્રે ભારતીય અર્થતંત્રના વિકાસ માટે નીચે દર્શાવેલ મુદ્દા દ્વારા પોતાનું આર્થિક યોગદાન આપે છે.

દેશના આર્થિક વિકાસમાં કૃષિ ક્ષેત્રનું યોગદાન ઘણા પ્રમાણમાં જોવા મળે છે કેમ કે દેશની લગભગ 60% વસ્તી રોજગારી માટે કૃષિ પર આધાર રાખે છે. જે રાષ્ટ્રીય આવક એટલે કે જીડીપીની દ્રષ્ટિએ 18 થી 19 ટકાનું યોગદાન જોવા મળે છે. કૃષિ ક્ષેત્ર ગ્રામીણ આર્થિક વિકાસ, ઔદ્યોગિક વિકાસ અને કાચા માલની આપૂર્તિ માટે મહત્વનું છે. ઉપરાંત કૃષિ ક્ષેત્રે થયેલ હરિયાળી ક્રાંતિ, સફેદ ક્રાંતિ, પીળી ક્રાંતિ, નીલી ક્રાંતિ વગેરે એ આમૂલ પરિવર્તન લાવી દીધું છે.

કૃષિ ક્ષેત્ર ભારતની મોટાભાગની વસ્તીને રોજગારી પૂરી પાડે છે ભારતમાં કૃષિ ક્ષેત્રે પ્રછન્ન બેકારી હોવા છતાં કૃષિ ક્ષેત્રએ રોજગારીની દ્રષ્ટિએ લોકોની આજીવિકા નો મુખ્ય સ્ત્રોત બની રહ્યું છે.

કૃષિ ક્ષેત્રે ઉત્પાદન વૃદ્ધિ, ખેતી અવલંબિત ઉદ્યોગોનો વિકાસ, ઔદ્યોગિક વિકાસ, પશુપાલન વગેરે તમામ ક્ષેત્રોનો વિકાસ ખેતી પર આધારિત જોવા મળે છે. ખેતીએ ભારત જેવા વિકાસશીલ દેશ માટે પાયાના પથ્થર સમાન છે.

વિત્ત વર્ષ 2024 મા ભારતીય કૃષિ ક્ષેત્રે નિકાસ 46.44 બિલિયન અમેરિકી ડોલર જેટલી હતી જે ભારતની કુલ નિકાસોના 11.7% જેટલી છે.કૃષિ ક્ષેત્ર દ્વારા પ્રાપ્ત કાચા માલમાં કપાસ, શેરડી, તલ, દૂધ, લાકડું, ચોખા, ઘઉં, ચા, કોફી, રબર, ચામડું વગેરેનો સમાવેશ થાય છે.

કૃષિ ક્ષેત્રનું દેશમાં એક સૌથી મોટું અને મહત્વપૂર્ણ યોગદાન દેશની પ્રજાને ભોજન પૂરું પાડવાનું છે. જે નકારી ન શકાય જો પ્રજાને પૌષ્ટિક આહાર પ્રાપ્ત થશે તો તે સશક્ત પ્રજા દેશના આર્થિક વિકાસમાં મોટો ફાળો આપી શકશે.

અહીં વર્ષ 2021-22, 202-23 અને 2023-24 દરમિયાનના ભારતના મુખ્ય પાકોનનો વાવેતર વિસ્તાર, ઉત્પાદન અને ઉપજ અંગેની આંકડાકીય માહિતી આપવામાં આવી છે.

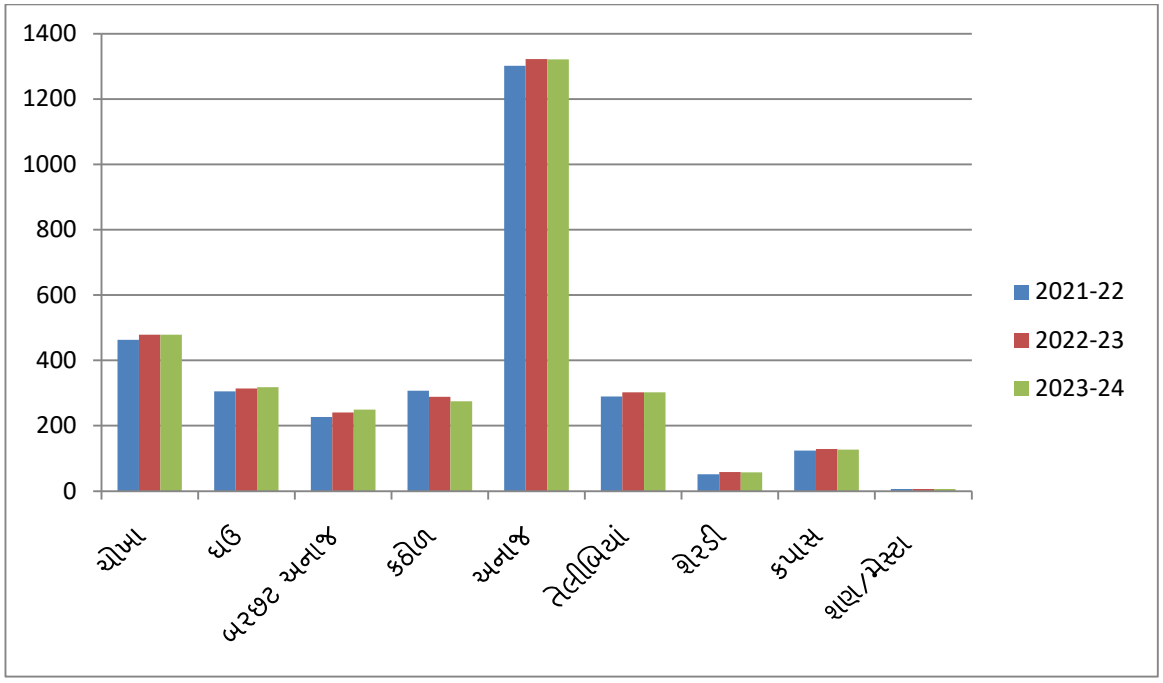
કુલ વાવેતર વિસ્તાર હેઠળના મુખ્ય પાકો

વિસ્તાર (લાખ હેક્ટર)				
ક્રમ	પાકો	2021-22	2022-23	2023-24
1	ચોખા	462.79	478.32	478.28
2	ઘઉ	305.59	314.01	318.33
3	બરછટ અનાજ	227	240.7	249.38

4	કઠોળ	307.31	289	275.05
5	અનાજ	1301.69	1322.04	1321.04
6	તેલીબિયાં	289.45	302.39	301.92
7	શેરડી	51.75	58.85	57.4
8	કપાસ	123.72	129.27	126.88
9	શણ/મેસ્ટા	6.67	6.58	6.37

વર્ષ 2021-22 થી 2023-24 ના કુલ વાવેતર વિસ્તાર હેઠળના મુખ્ય પાકોની આંકડાકીય માહિતી પ્રમાણે મોટાભાગના પાકોમાં ઉતરોતર દર વર્ષે વાવેતર વિસ્તારમાં વધારો થયો છે જ્યારે અમુક પાકોના વાવેતરમાં વધઘટ જોવા મળી છે; જેમ કે કઠોળ નું વાવેતર વર્ષ 2021-22 માં 307.31 લાખ હેક્ટર હતું જે 2023-24 માં ઘટીને 275.05 લાખ હેક્ટર થયું છે. જ્યારે ઘઉંનું વાવેતર વિસ્તાર ઉતરોતર વધતો જણાય છે.

2021-22 થી 2023-24 મા પાકના વાવેતર વિસ્તારની ચાર્ટ દ્વારા રજૂઆત



Source: annual report 2024-25

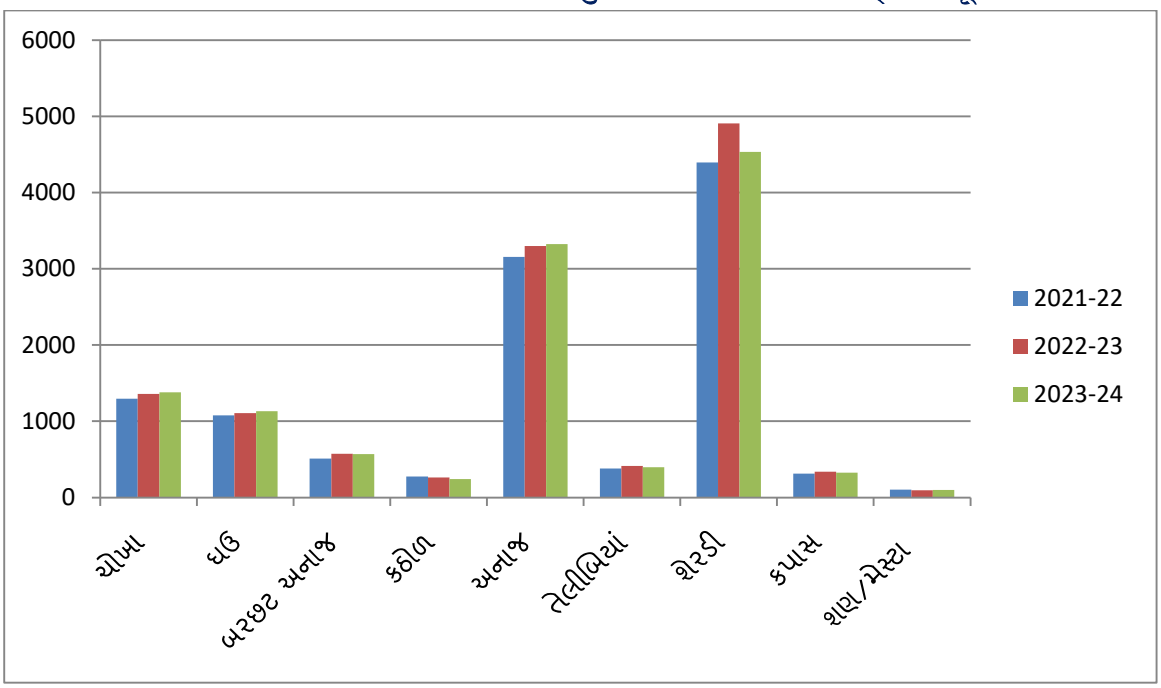
પાકોનુ કુલ ઉત્પાદન

ઉત્પાદન (લાખ ટન)				
ક્રમ	પાકો	2021-22	2022-23	2023-24
1	ચોખા	1294.75	1357.55	1378.25
2	ઘઉ	1077.42	1105.54	1132.92
3	બરછટ અનાજ	511.01	573.19	569.36

4	કઠોળ	273.02	260.58	242.46
5	અનાજ	3156.16	3296.87	3322.98
6	તેલીબિયાં	379.63	413.55	396.69
7	શેરડી	4394.25	4905.33	4531.58
8	કપાસ	311.18	336.6	325.22
9	શણ/મેસ્ટા	101.49	93.92	96.92

વર્ષ 2021-22 થી 2023-24 દરમિયાન કુલ પાકોના ઉત્પાદનમાં કઠોળ, કપાસ,શણ વગેરેના ઉત્પાદનમાં વધતા-ઓછા પ્રમાણમાં ફેરફારો થયા છે, જ્યારે ઘઉં, ચોખા જેવા પાકોના ઉત્પાદનમાં વધારો થતો જોવા મળે છે.

2021-22 થી 2023-24 મા કુલ ઉત્પાદિત પાકોની ચાર્ટ દ્વારા રજૂઆત



Source: annual report 2024-25

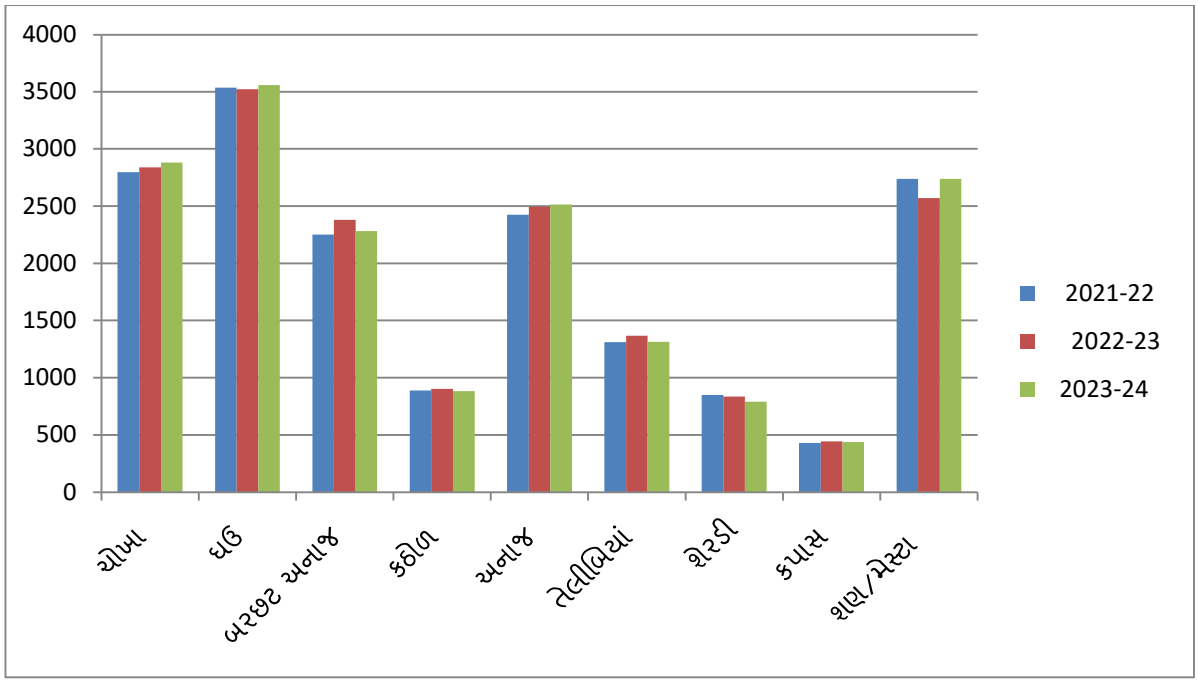
વર્ષ 2021-22 થી 2023-24 ના ઉપજના આંકડાઓ જોતા જણાય છે કે વર્ષ 2021-22 માં ચોખા એ 2798 કિલો પ્રતિ હેક્ટર હતા જે 2022-23 માં 2838 કિલો પ્રતિ હેક્ટર જ્યારે 2023-24માં 2882 પ્રતિ હેક્ટર જણાય છે. જ્યારે કપાસ 2021-22, 2022-23, 2023-24 અનુક્રમે 428, 443 અને 436 કિલો પ્રતિ હેક્ટર જોવા મળે છે.

ઉપજ પ્રતિ હેક્ટર

		ઉપજ (કિલો પ્રતિ હેક્ટર)		
ક્રમ	પાકો	2021-22	2022-23	2023-24
1	ચોખા	2798	2838	2882
2	ઘઉ	3537	3521	3559

3	બરછટ અનાજ	2251	2381	2283
4	કઠોળ	888	902	881
5	અનાજ	2425	2494	2515
6	તેલીબિયાં	1312	1368	1314
7	શેરડી	849.06	833.49	789.53
8	કપાસ	428	443	436
9	શણ/મેસ્ટા	2738	2569	2737

2021-22 થી 2023-24 મા ઉપજ પ્રતિ હેક્ટરની ચાર્ટ દ્વારા રજૂઆત



Source: annual report 2024-25

કૃષિ ક્ષેત્રના વિકાસ સંબંધીત યોજનાઓ:

કૃષિ ક્ષેત્રે દેશમાં રોજગારી અને આર્થિક વિકાસની દ્રષ્ટિએ મહત્વનું છે તેથી કૃષિ ક્ષેત્રે ઉદભવતી સમસ્યાઓને દૂર કરવા અને આ ક્ષેત્રના વિકાસ માટે સરકાર દ્વારા અમુક પહેલો ચલાવવામાં આવે છે કે જેના દ્વારા ખેડૂતોને ખેતી માટે સહાયક એવા પગલાંઓ ભરવામાં આવે છે.

(1) પ્રધાનમંત્રી કિસાન સન્માન નિધિ યોજના

(2) કિસાન ક્રેડિટ કાર્ડ સ્કીમ

(3) રાષ્ટ્રીય કૃષિ વિકાસ યોજના

(4) કિસાન કોલ સેન્ટર

(5) નમો ડ્રોન દીદી

પ્રધાનમંત્રી કિસાન સન્માન નિધિ યોજના એ ફેબ્રુઆરી 2019 માં શરૂ કરવામાં આવેલ આ યોજના અંતર્ગત ભારત સરકાર દ્વારા દેશના ખેડૂતોની આવક વધારવા ના પ્રયાસ સ્વરૂપે સીમાંત અને નાના ખેડૂતોને વાર્ષિક ₹6,000 ની સહાય પૂરી પાડવામાં આવે છે. જે ત્રણ સમાન હપ્તામાં આપવામાં આવે છે આ યોજના સંપૂર્ણપણે કેન્દ્ર સરકાર સંચાલિત છે.

ભારત સરકાર દ્વારા 1998 માં શરૂ કરવામાં આવેલ કિસાન ક્રેડિટ કાર્ડ સ્કીમ યોજના અંતર્ગત ખેડૂતોને ખેતી અને સંબંધિત વ્યવસાય માટે ધિરાણ આપવામાં આવે છે જે ખાતર બિયારણ વગેરેની ખરીદી માટે ન્યૂનતમ વ્યાજના દરે ધિરાણ ઉપલબ્ધ કરાવે છે. જેના માટેની પ્રક્રિયા પણ એકદમ સરળ છે અને ચુકવણી પણ સરળ હોય છે જે પાકના ઉત્પાદન સમયગાળા દરમિયાન જ હોય છે.

રાષ્ટ્રીય કૃષિ વિકાસ યોજના કે જેને હવે પ્રધાનમંત્રી રાષ્ટ્રીય કૃષિ વિકાસ યોજના તરીકે ઓળખવામાં આવે છે તે વર્ષ 2007માં ભારત સરકાર દ્વારા શરૂ કરાયેલ વ્યાપક યોજના છે આ યોજના ખેતી અને સંબંધિત વ્યવસાયોમાં રોકાણને વધારવા માટે પ્રોત્સાહન પૂરું પાડે છે.

રાષ્ટ્રીય કૃષિ વિકાસ યોજના કે જેને હવે પ્રધાનમંત્રી રાષ્ટ્રીય કૃષિ વિકાસ યોજના તરીકે ઓળખવામાં આવે છે તે વર્ષ 2007માં ભારત સરકાર દ્વારા શરૂ કરાયેલ વ્યાપક યોજના છે આ યોજના ખેતી અને સંબંધિત વ્યવસાયોમાં રોકાણને વધારવા માટે પ્રોત્સાહન પૂરું પાડે છે.

21 જાન્યુઆરી 2004 ના રોજ કૃષિ મંત્રાલય દ્વારા કિસાન કોલ સેન્ટર (KCCs) યોજનાની શરૂઆત કરવામાં આવી હતી. ખેતી ક્ષેત્રના વિકાસમાં આઈસીટી નો પ્રયોગ કરવામાં આવ્યો છે KCC માં 1800-180-1551 ટોલ ફ્રી નંબર પર ખેડૂત દ્વારા પોતાના સવાલોના જવાબ ટેલીફોનિક રીતે પ્રાપ્ત થાય છે. જે 22 જેટલી સ્થાનિક ભાષાઓમાં ઉપલબ્ધ છે.

કેન્દ્ર સરકાર સંચાલિત નમો ડ્રોન દીદી યોજનાનો મુખ્ય આશય કૃષિ ક્ષેત્રે સંકળાયેલ મહિલાઓને ડ્રોન ટેકનોલોજી દ્વારા સજ્જ કરવાનો છે. આ યોજના અંતર્ગત 2024/25 થી 2025/26 સુધીમાં આશરે 15000 જેટલી મહિલા સ્વ સહાય જૂથોને ડ્રોન પૂરા પાડવાનો પ્રયાસ છે.

જેના દ્વારા મહિલા સશક્તિકરણ અને કૃષિ ક્ષેત્રે ટેકનોલોજી દ્વારા ઝડપી વિકાસ થવાની સંભાવના છે. આ યોજનામાં આઠ લાખ સુધી કે સાધનની કિંમતના 80% સબસીડી પ્રાપ્ત થશે. AIF દ્વારા 3ટકા જેટલા વ્યાજના દરે લોન પ્રાપ્ત થશે.

કૃષિ ક્ષેત્રનું દેશમાં એક સૌથી મોટું અને મહત્વપૂર્ણ યોગદાન દેશની પ્રજાને ભોજન પૂરું પાડવાનું છે. જે નકારી ન શકાય જો પ્રજાને પૌષ્ટિક આહાર પ્રાપ્ત થશે તો તે સશક્ત પ્રજા દેશના આર્થિક વિકાસમાં મોટો ફાળો આપી શકશે.

સમાપન:

ભારત દેશમા ખેતી ક્ષેત્ર ઉત્તરોત્તર પ્રગતિ સાધી રહ્યુ છે.દેશની મોટા ભાગની વસ્તી એ ખેતી પર અવલંબિત હોવાથી ખેતી ક્ષેત્રનો વિકાસ કરવો પણ જરૂરી છે. કેમ કે કૃષિનુ રાષ્ટ્રીય આવકમા રહેલા યોગદાન પણ અનન્ય જોવા મળે છે. કૃષિ સંબંધિત આંકડાઓ જોતાં જાણાય છે કે કૃષિ આર્થિક વિકાસ મા પોતાનું મોટું યોગદાન આપે છે. આમ,ભારત જેવા કૃષિ આધારિત વિકાસશીલ દેશ માટે ઉન્નત ખેતી ક્ષેત્ર જ ઉન્નત અર્થવ્યવસ્થા નુ નિર્માણ કરી શકે છે.

સંદર્ભ સૂચી:

(1)ANNUAL REPORT

2024-25 Department of Agriculture & Farmers Welfare,Ministry of Agriculture & Farmers Welfare Government of India.

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હેન્ડબોલ રમતના કૌશલ્યોની ચક્રીય તાલીમ દ્વારા ઝડપ પર થતી અસરોનો અભ્યાસ

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ABSTRACT :

હેન્ડબોલ રમતના કૌશલ્યોની ચક્રીય તાલીમ દ્વારા ઝડપ પર થતી અસરોનો અભ્યાસ કર્યો હતો. આ સંશોધન અભ્યાસ D.L.S.S. વિદ્યાસભા સ્કૂલ અમરેલીના વિદ્યાર્થીઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં 12 થી 17 વર્ષની વયજૂથના હેન્ડબોલ રમતના ખેલાડી ભાઈઓને પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં ડીસ્ટ્રીક્ટ લેવલ સ્પોર્ટસ સ્કૂલના હેન્ડબોલ રમતના ખેલાડી ભાઈઓને યાદૃચ્છિક પદ્ધતિથી પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં વિષયપાત્રોને બે જૂથમાં વિભાજીત કરવામાં આવ્યા હતા. ચક્રિય તાલીમ જૂથમાં 20 ખેલાડીઓ અને નિયંત્રિત જૂથમાં 20 ખેલાડીઓ એમ કુલ 40 ખેલાડી ભાઈઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં પસંદ કરેલ વિષયપાત્રોને ચક્રિય તાલીમની કસરતો કરાવવામાં આવી હતી.. આ સંશોધન અભ્યાસનો સમયગાળો બાર અઠવાડિયાનો રાખવામાં આવ્યો હતો. માપનના ધોરણમાં ઝડપનું માપન 50 વાર દોડ કસોટી દ્વારા કરવામાં આવ્યું હતું. હેન્ડબોલ રમતના કૌશલ્યોની ચક્રીય તાલીમ દ્વારા ઝડપનુ પ્રમાણ જાણવા માટે વિચરણ પૃથક્કરણ (Analysis of Variance) લાગુ પાડી આંકડાકીય પૃથક્કરણ કરવામાં આવ્યું હતું. જેમાં સાર્થકતાનું ધોરણ 0.05 કક્ષાએ રાખવામાં આવ્યુ હતુ. જેનું તારણ આ પ્રમાણે જોવા મળ્યું હતું. પદ્ધતિસરના બાર અઠવાડિયાના હેન્ડબોલ રમતના કૌશલ્યોની ચક્રિય તાલીમ કાર્યક્રમથી પસંદ થતા વિષયપાત્રોના ઝડપમાં નોંધપાત્ર સુધારો જોવા મળ્યો હતો.

પ્રસ્તાવના:

હેન્ડબોલની રમત ખૂબજ જૂની છે. વર્ષોથી તેમા સંશોધન થતા જ રહ્યા છે. તેની યોગ્યતા અનુસાર હાથ વડે કૌશલ્યો દર્શાવતી રમત છે. હેન્ડબોલની કેળવણી પ્રાચીન ઓલિમ્પિકી વખતે કદાચ કુસ્તી, બોક્સીંગ અને એથલેટિક્સમાંથી મળી હશે. 1980ની આસપાસ જર્મન જીમ્નાસ્ટિક માસ્ટર કોનાર્ડ કોચએ હેન્ડબોલ રમતની સમજ આપી. 1904 પહેલા હેન્ડબોલની રમતના શિક્ષક હતા. 1906માં તેમણે નિયમો બહાર પાડ્યા પછી પાછળથી 1906માં તેમણે સ્ત્રીઓને પણ આ રમતમાં જોડી. 1911માં 'કોનીકલ' મેગેઝીન પ્રમાણે હેન્ડબોલની મેચ હજારો દર્શકોએ જોઈ હતી. તે મેગેઝીન પ્રમાણે ત્યાં 7 માણસ (પુરુષો) ની ટીમ હતી.

ચક્રિય તાલીમ એ રમત તાલીમનું બીજું મહત્વનું સ્વરૂપ છે જે બળ તાલીમને સહનશક્તિ તાલીમ સાથે જોડે છે. ચક્રિય તાલીમમાં આપવામાં આવતી કસરતો સામાન્ય રીતે એક જૂથ અને વ્યાયામના બીજા જૂથ વચ્ચે આરામ અથવા થોડો આરામ ન કરતી કસરતોના જૂથો હોય છે. સામાન્ય રીતે ચક્રિય તાલીમમાં છ થી દસ સ્ટેશનો હોય છે. તાલીમાર્થીઓની તંદુરસ્તીના સ્તરને આધારે કસરતોની તીવ્રતા બદલાય છે.

ચક્રિય તાલીમ લોકપ્રિયતા મેળવી રહી છે કારણ કે તે એક સાથે બળ, સહનશક્તિ, ઝડપ, તાકાત વગેરેમાં સુધારો કરે છે. તાલીમાર્થીઓ ચક્રિય તાલીમ પછી તેમના માવજત સ્તરમાં નાટકીય સુધારણાની અનુભૂતિ કરી શકે છે.

રમતોમાં ઉચ્ચ કક્ષાની ઝડપ, સહનશક્તિ, સ્નાયુબળ, ગતિસુમેળ, નમનીયતા વગેરે જેવા પાસાઓને મહત્વના ગણવામાં આવે છે. ખેલાડીઓમાં અન્ય બાબતો કરતાં ઉચ્ચ કક્ષાની શારીરિક યોગ્યતાને મહત્વની ગણવામાં આવે છે. હેન્ડબોલ, બાસ્કેટબોલ, વોલીબોલ, હોકી, ખેલકૂદ વગેરે રમત પ્રવૃત્તિઓમાં શારીરિક યોગ્યતાના જરૂરી પાસાઓ વગર સફળતા મળવી મુશ્કેલ બાબત છે. આથી કોઈ પણ પ્રકારની રમતમાં ઝડપ અને ગતિસુમેળ એ અગત્યની બાબત છે.

આજના ઝડપી સ્પર્ધાત્મક યુગમાં "રમો તો જ જીતો" ના ધ્યેય સાથે રમતો માટેની તૈયારીઓ ખેલાડીઓ પાસે કરાવવામાં આવે છે. ખેલાડીઓનું માનસિક મનોબળ ખૂબ જ ઊંચુ રાખવાની તાલીમો આપવામાં આવે છે. આજના સ્પર્ધાત્મક યુગમાં ટુંકા સમયમાં જ નવા- નવા રેકોર્ડો કે વિશ્વવિક્રમો સ્થપાવવા લાગ્યા છે. ઝડપ એ આજની રમતનો મહત્વનો ગુણધર્મ ગણાય છે. પહેલાં રમતોમાં જે વિક્રમો સર્જાતા હતા. તે વર્ષો સુધી કોઈ એક ખેલાડીના નામ સાથે જોડાયેલ રહેતા. પરંતુ આજે એવું રહ્યું નથી તેનું કારણ વૈજ્ઞાનિક ઢબે અપાતી તાલીમ અને તેની સાથે તે રમતમાં વપરાતા સાધનોની બનાવટ આધુનિક પદ્ધતિઓ વડે તૈયાર કરવામાં આવે છે. તે બાબત ગણાવી શકાય એજ રીતે આહાર પોષણયુક્ત આહારને પણ તેટલું જ મહત્વ અપાય છે. આજ કારણોથી આજની રમતોમાં તથા રમત દેખાવમાં અને શારીરિક પ્રવૃત્તિઓમાં આસમાનનો તફાવત જોવા મળે છે.

અભ્યાસનો હેતુ

હેન્ડબોલ રમતના કૌશલ્યોની ચક્રીય તાલીમ દ્વારા ઝડપ પર થતી અસરોનો અભ્યાસ

વિષયપાત્રોની પસંદગી

આ સંશોધન અભ્યાસ D.L.S.S. વિદ્યાસભા સ્કૂલ અમરેલીના વિદ્યાર્થીઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં 12 થી 17 વર્ષની વયજૂથના હેન્ડબોલ રમતના ખેલાડી ભાઈઓને પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં ડીસ્ટ્રીક્ટ લેવલ સ્પોર્ટસ સ્કૂલના હેન્ડબોલ રમતના ખેલાડી ભાઈઓને યાદૃચ્છિક પદ્ધતિથી પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં વિષયપાત્રોને બે જૂથમાં વિભાજીત કરવામાં આવ્યા હતા. ચક્રિય તાલીમ જૂથમાં 20 ખેલાડીઓ અને નિયંત્રિત જૂથમાં 20 ખેલાડીઓ એમ કુલ 40 ખેલાડી ભાઈઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં પસંદ કરેલ વિષયપાત્રોને ચક્રિય તાલીમની કસરતો કરાવવામાં આવી હતી. આ સંશોધન અભ્યાસનો સમયગાળો બાર અઠવાડિયાનો રાખવામાં આવ્યો હતો.

માપનના ધોરણો

ક્રમ	ચલાયમાન	કસોટી	માપન
1	ઝડપ	50 વાર દોડ	સમય

આંકડાકીય પ્રક્રિયા

હેન્ડબોલ રમતના કૌશલ્યોની ચક્રીય તાલીમ દ્વારા ઝડપનુ પ્રમાણ જાણવા માટે વિચરણ પૃથક્કરણ (Analysis of Variance) લાગુ પાડી આંકડાકીય પૃથક્કરણ કરવામાં આવ્યું હતું. જેમાં સાર્થકતાનું ધોરણ 0.05 કક્ષાએ રાખવામાં આવ્યુ હતુ.

અભ્યાસના પરિણામોઃ

સારણી - 1

ઝડપ કસોટી દેખાવના એક પ્રાયોગિક અને એક નિયંત્રિત જૂથનું વિચરણ સહ વિચરણ પૃથક્કરણ

કસોટી	જૂથ		વર્ગોનો સરવાળો	સ્વતંત્ર માત્રા	મધ્યક વિચરણ	F
	જૂથ-અ	જૂથ-બ				

			(SS)		(df)	(MSS)	
પૂર્વ કસોટી મધ્યક	9.69	9.82	B	0.16	1	0.16	0.39
			W	17.37	38	0.45	
અંતિમ કસોટી મધ્યક	9.09	9.85	B	6.06	1	6.06	16.95*
			W	14.41	38	0.37	
સુધારેલ મધ્યક	9.12	9.83	B	5.05	1	5.05	19.82*
			W	10.50	37	0.28	

*સાર્થકતાનું ધોરણ 0.05 કક્ષાએ *'F'* = 0.05 (1,38) = 4.098 & (1,37) = 4.105

ઉપરોક્ત સારણી - 1માં ઝડપ કસોટી દેખાવના પૂર્વ કસોટીના મધ્યકોનો *'F'* રેશિયો 0.39 જોવા મળેલ હતો. જેને ટેબલ વેલ્યુ સાથે સરખાવતા (4.098) 0.05 કક્ષાએ સાર્થક થયેલો જોવા મળેલ ન હતો. બે જૂથની અંતિમ કસોટીના મધ્યકોનો *'F'* રેશિયો 15.95 જોવા મળેલ હતો. જેને ટેબલ વેલ્યુ સાથે સરખાવતા (4.098) 0.05 કક્ષાએ સાર્થક થયેલો જોવા મળેલ હતો. તેથી આપવામાં આવેલ તાલીમથી વિષયપાત્રોના દેખાવમાં સાર્થક કક્ષાએ સુધારો થયેલ સાબિત થાય છે. ઉપરાંત સુધારેલા મધ્યકોનો *'F'* રેશિયો 19.82 જોવા મળેલ હતો. જેને ટેબલ વેલ્યુ સાથે સરખાવતા (4.105) 0.05 કક્ષાએ સાર્થક થયેલો જોવા મળેલ હતો. *'F'* રેશિયો દ્વારા સુધારેલ મધ્યકો વચ્ચે જોવા મળેલ બંને જૂથોનો તફાવત સાર્થક થાય છે. આથી નિયંત્રિત જૂથની તુલનામાં પ્રાયોગિક જૂથ પર પ્રાયોગિક માવજતની અસર જોવા મળી હતી.

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- પદ્ધતિસરના બાર અઠવાડિયાના લેન્ડબોલ રમતના કૌશલ્યોની ચક્રિય તાલીમ કાર્યક્રમથી પસંદ થતા વિષયપાત્રોના ઝડપમાં નોંધપાત્ર સુધારો જોવા મળ્યો હતો.

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ઉમાશંકર જોશી: એક સર્જક પ્રતિભા

ડૉ. સંજયકુમાર પોલાભાઈ ડાંગર
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અર્વાચીન ગુજરાતી સાહિત્યનો ગાંધીયુગ મહિમાવંત છે. રાષ્ટ્રપિતા ગાંધીજી ગુજરાતી સાહિત્યના યુગ પ્રવર્તક છે. તેમણે સત્ય, અહિંસા, માનવપ્રેમ, કરુણા જેવાં મૂલ્યોનું ગૌરવ કર્યું. અસ્પૃશ્યતા નિવારણ, સમાનતા અને વિશ્વબંધુત્વની ભાવનાનો સંદેશ આપીને ગુજરાતી સર્જકોની દ્રષ્ટિને વ્યાપક ફલક પર મૂકી આપી. અનેક કવિઓ, લેખકોએ ગાંધીયુગની ભાવના ઝીલીને સાહિત્ય સર્જન કર્યું. તેમાં એક નામ કવિ ઉમાશંકર જોશી છે. ગાંધીયુગની ભાવનાઓને ઉમાશંકર જોશીએ એવા વ્યાપક સંદર્ભમાં પ્રગટ કરીકે ગુજરાતી કવિતામાં માનવતા અને વિશ્વ માનવીના વિશિષ્ટ આદર્શો પ્રસ્થાપિત થયા છે.

વ્યવસાયે આજીવન અધ્યાપક રહી શિક્ષણ અને સાહિત્યની અમૂલ્ય સેવા કરનાર ઉમાશંકર જોશી પશ્ચિમના સાહિત્ય પ્રવાહોના સંપર્કમાં રહ્યા. સંસ્કૃત મહાકાવ્યો અને પુરાણોનો તેમણે ઊંડો અભ્યાસ કર્યો. 21 જુલાઈ 1911ના રોજ ઉત્તર ગુજરાતના બામણા ગામે જન્મેલા આ કવિ મેટ્રિક્સના અભ્યાસ માટે અમદાવાદ આવે છે. કોલેજ શિક્ષણ પછી અધ્યાપન કાર્ય સાથે સાહિત્ય પ્રવૃત્તિમાં જોડાય છે. સાહિત્ય સર્જનમાં કવિતા ઉપરાંત એકાંકી, ટૂંકી વાર્તા, નવલકથા, વિવેચન, સંશોધન, સંપાદન ક્ષેત્રે માતબર કાર્ય કરી પોતાની સમર્થ પ્રતિભાનાં દર્શન કરાવે છે. કવિ તરીકે ઉમાશંકર જોશી એક પ્રતિભાશાળી સમર્થ ગુજરાતી કવિ સિદ્ધ થયા છે. માત્ર સત્તર વર્ષની તરુણાવસ્થાએ "નખી સરોવર ઉપર શરદપૂર્ણિમાં" જેવું મનોહર પ્રાકૃતિ કાવ્ય મંદાક્રાન્તા છંદમાં તેઓ લખે છે. 'વિશ્વશાંતિ', 'ગંગોત્રી', 'પ્રાચીનાં', 'નિશીથ', 'આતિથ્ય', 'વસંતવર્ષા', 'મહાપ્રસ્થાન' થી 'સપ્તપદી' જેવા દશેક કાવ્યસંગ્રહો આ કવિ પાસેથી પ્રાપ્ત થાય છે. તેમના 'નિશિથ' કાવ્યસંગ્રહને ઈ.સ. 1967માં ભારતીય જ્ઞાનપીઠ પારિતોષિક એનાયત થાય છે.

બુલંદ રાષ્ટ્રભાવના, દલિત શોષિત વર્ગ પ્રત્યેની અનુકંપા અને વૈશ્વિક ચેતના તેમનાં કાવ્યોનો પ્રધાન વિષય છે. વિશ્વ ચેતના ને ઉજાગર કરતી 'વિશ્વમાનવી' કાવ્યની પંક્તિ જુઓ :

"વ્યક્તિ મટીને બનું વિશ્વમાનવી
માથે ધરું ધૂળ વસુંધરાની"

શ્રમજીવી ગરીબ વર્ગની ઉપેક્ષા આમ સમાજ દ્વારા થાય છે ત્યારે કવિ પોકારી ઊઠે છે.:

"ભૂખ્યાં જનોના જઠરાગ્નિ જાગશે
ખંડેરની ભસ્મકણી ન લાધશે."

તેઓ વિશ્વપ્રેમ અને આત્મશાંતિની વાત સમજપૂર્વક પ્રસ્તુત કરે છે.

"વિશાળે જગ વિસ્તરે નથી એક જ માનવી
પશુ છે, પંખી છે, પુષ્પો વનોની છે વનસ્પતિ"

'એક બાળકીને સ્મશાને લઈ જતા', 'વિશ્વશાંતિ', 'બળતાં પાણી', 'સખી મે કલ્પીતી' 'વાંસળી વેચનારો', દળણાના દાણા', 'નિશિથ', 'ભોમિયા વિના', 'રહ્યાં વર્ષો તેમાં', 'ગયાં વર્ષો તેમાં', 'ગાણું અધૂરું', 'મધ્યાહન', 'આત્માનાં ખંડેર', 'ગુલામ', 'એક ઝાડ', 'જઠરાગ્નિ', 'છિન્ન ભિન્ન છું' વગેરે કાવ્યો આ કવિનાં અત્યંત જાણીતાં કાવ્યો છે.

"નિશીથ હે નર્તક રુદ્ર રમ્ય

સ્વર્ગંગનો સોહાત હાર કંઠે"

એમ 'નિશીથ'માં નાદતત્ત્વ સાથે નટરાજનું ભવ્ય રૂપ તેઓ ઉઘાડી આપે છે. 'આત્માનાં ખંડેર' સોનેટ માળમાં યથાર્થનો સ્વીકાર અને સમજપૂર્વક જીવનનો સાચો માર્ગ દર્શાવી આપે છે.

ઉમાશંકરની અસંખ્ય કાવ્યપંક્તિઓ પ્રેરક છે. જેમાં જીવનનું ઊંડું ચિંતન પ્રગટ થાય છે. દા.ત.

"મોટાઓની અલ્પતા જોઈ થાક્યો

નાનાની મોટાઈ જોઈ જીવું છું."

"મને મળી નિષ્ફળતા અનેક

તેથી થયો સફળ કૈક હું જિંદગીમાં"

"હૈયું મસ્તક હાથ, દઈ દીધા નાથ

હવે જા ચોથું નથી માગવું"

'ત્રાણવાના દઈ દીધા'માં સંતૃપ્તિનો ઓડકાર છે. 'મંગલ શબ્દ' કાવ્યની આરંભની પંક્તિઓક છે.:

"ત્યાં દુરથી મંગલ શબ્દ આવતો

શતાબ્દીઓના ચિરશાંત ઘુમ્મટો

ગજાવતો ચેતન મંત્ર આવતો."

આ માંગલ્યાની ભાવના સનાતન અને સાર્વત્રિક છે. માનવ-માનવ વચ્ચેનો શાંતિનો માર્ગ એ જ માંગલ્યનો માર્ગ છે. માનવ સંવેદનાનો દુ:ખદ વેધક સૂર 'ગુલામ' કાવ્યમાં પ્રગટ થયો છે :

"સૃષ્ટિ બાગનું અમૂલ ફૂલ માનવી ગુલામ ?

સ્વતંત્ર પ્રકૃતિ તમામ

એક માનવી જ કાં ગુલામ ?"

મુઠ્ઠીભર ધનિકોના ભોગવિલાસ માટે ઊંચી ઈમારતો ગગનચુંબી મહેલો રચો ભલે, પણ આ,તો દરિદ્રની ઉપહાસ લીલા છે. એમ "જઠરાગ્નિ" કાવ્યની આરંભની પંક્તિઓ પછી કવિ જનોઈવઢ ઘા કરે છે :

"ભૂખ્યાં જનોના જઠરાગ્નિ જાગશે

ખંડેરની ભસ્મકણી ન લાધશે."

પીડિત શોષિત વર્ગ પ્રત્યેની અનુકંપા અને ઉપેક્ષા અહીં આક્રોશપૂર્વક કવિએ પ્રગટ કરી છે. આ કવિનાં કાવ્યોમાં પ્રકૃતિના વિવિધ રૂપો કાવ્યાત્મક રીતે અભિવ્યક્તિ પામ્યાં છે. પ્રભુ પ્રાર્થના નિમિત્તે કવિ હૃદયમાં જાગેલી વિશ્વંભરના દર્શનની ઝંખના કવિ આમ વ્યક્ત કરે છે :

"મહેરામણ ભૈરવ નાદે અલખ પુકારે
મૂંગા ગિરિઓનાં મસ્તક ઊંચે ઝંખતા રે"

નખી સરોવર ઉપર શરદ પૂર્ણિમા ચંદ્ર અને સમગ્ર પ્રકૃતિ લીલાને નિહાળતા કવિ લખે છે:

"સૌંદર્યથી ઉરઝરણ ગાશે પછી આપમેળે.

ઉમાશંકર "બીડમાં સાંજ વેળા" સુંદર સોનેટ કાવ્ય આપે છે. તેમાં સાંજનું મનોહર દ્રશ્ય ઝિલાયેલું મળે છે :

"ડૂબ્યો સૂરજ શાંત, ગોરજ શમી અને રંગ સૌ
ઘડી અધધડી સ્ફુરી અવનિ-ઓઢણે, આથમ્યા"

પ્રકૃતિપ્રેમ ઉમાશંકરની મૂળ ઓળખ છે. 'ભોમિયા વિના' તેમની જાણીતી ગીત રચના છે ડુંગર વનોના ભ્રમણ સંદર્ભે 'રોતાં ઝરણાંની આંખ લ્હોવી હતિઓ' એમ કહે છે:

"ભોમિયા વિના મારે ભમવા'તા ડુંગરા,
જંગલની કુંજકુંજ જોવી હતી;
ડાળે ઝૂલંત કોક કોકિલાને માળે,
અંતરની વેદના વણવી હતી."

વન જંગલમાં આવતી ઋતુઓ તથા ખેત ખલિહાનના પ્રદેશમાં વિહાર કરતો કવિ જીવ પ્રકૃતિથી સતત આકર્ષણ અનુભવે છે. જુઓ:

"ઝરણું અલક મલકથી આવે
ઝરણું અલકમલકમાં જાય"
"પહાડોને છાંટી શીતળ કરવાનું નવ બને."
"નદી દોડે સોડે ભડભડ બળે ડુંગર વનો."
"આ સૃષ્ટિની અજબ સુંદર લોક લીલા."
"ઊગી ઊગી અફર એક ઉષા નમેરી."

વગેરે જેવી અસંખ્ય પંક્તિઓમાં કવિની પ્રકૃતિ પ્રીતિના દર્શન થાય છે. ઉમાશંકરની કવિતાનો સૂક્ષ્મ નાતો ટાગોરની કવિતા સાથે છે. એમન હૈયામાં માનવ જાતનું હિત વસ્યું છે. લોક સમૂહની ચિંતા અને ચિંતન એમના કાવ્યોનો મુખ્ય સૂર છે. ઉમાશંકર વિદ્યા પુરુષ છે. એક સંસ્કૃતિ પૂજક વ્યક્તિત્વ છે. 'ગયા વર્ષો તેમાં, રહ્યાં વર્ષો તેમાં' આ બે સોનેટ કાવ્યોમાં માનવ જીવનના સાર સર્વસ્વને સૂચિત કરતી પંક્તિઓ માત્ર ચિંતનકણિકાને જ રજૂ નથી કરતી એમાં ઊર્મિનો ધબકાર છે અર્થાત ચિંતન અને સંવેદન એકરસ થઈને આવે છે.

"મળ્યાં વર્ષો તેમાં અમૃત લઈ આવ્યો અવનિનું"

કવિ હૃદયમાં જે પ્રેમતત્વ નિર્દેશ થયો છે. તેનું અહીં વ્યાપક સ્વરૂપ જોવા મળે છે. કલ્પના અને આનંદના રંગે રંગાયેલાં વર્ષો હર્ષ-શોકના અનુભવોમાં જ એ ગયા વર્ષોમાં સમય પૂરો થઈ ગયો અને જે રહ્યાં વર્ષો તેમાં હૃદયભર સૌંદર્ય જગતનું ભલાથી લે તેવો સહજ ઉદગાર પ્રગટ કરીને કવિ જીવન્નો મહિમા કરે છે. સમગ્ર રીતે જોઈએ તો કવિનું સમાજ અને વાસ્તવને અતિઅક્રમીને જીવનનાં શાશ્વત મૂલ્યોના નૂતન આવિર્ભાવો તરફનું વલણ છે. આ કવિ અર્વાચીન ગુજરાતી કવિતાના પ્રતિભાશાળી સર્જક છે. સાહિત્યના વિવિધ સ્વરૂપોમાં તત્કાલીન ચેતનાની સ્વસ્થ પ્રજ્ઞા અને ભાવ મૂલક ઈન્દ્રિય ગ્રાહ્ય સૌન્દર્યનિષ્ઠ કાવ્યકૃતિઓ સર્જનાર ગાંધીયુગના આ પ્રમુખ સર્જક છે. એમણે ઊર્મિકાવ્ય, સોનેટ કાવ્ય, ગીત રચના, પદ્ય રૂપકો સંવાદ કાવ્યો, પ્રસંગ કાવ્યો રચ્યાં છે. તેમાં ગુજરાતી કવિતાની સમૃદ્ધિ છે. એક સંસ્કૃતિ પૂજક, વિદ્યાપુરુષ તરીકે કવિ ઉમાશંકર જોશી હંમેશા સ્મરણમાં રહેશે.

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કૃત્રિમ બુદ્ધિમત્તા (AI) બધા વિષયોમાં: શિક્ષણ ક્ષેત્રે તેની વ્યાપક ભૂમિકા

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પ્રસ્તાવના

કૃત્રિમ બુદ્ધિમત્તા (AI) આજના યુગમાં શિક્ષણના ક્ષેત્રે ક્રાંતિકારી ફેરફારો લાવી રહ્યું છે. "AI is all subject" ના વિષય પર આ અભ્યાસ AI ને વિવિધ અભ્યાસક્રમી વિષયો જેમ કે વિજ્ઞાન, ગણિત, ભાષા, સામાજિક વિજ્ઞાન અને કલા વગેરેમાં તેના ઉપયોગને ઉજાગર કરે છે. AI શિક્ષણને વ્યક્તિગત, અસરકારક અને સુલભ બનાવી શકે છે, જેમ કે વૉઇસ એસિસ્ટન્ટ્સ,(ALEXA) મેપિંગ ટૂલ્સ(Malling tools) અને એસે-રાઇટિંગ(Eassay writing) ક્ષમતાઓ દ્વારા 2025માં, AI નો ઉપયોગ વિશ્વભરમાં વધી રહ્યો છે, જે વિદ્યાર્થીઓને તેમના શિક્ષણ પર વધુ કંટ્રોલ આપે છે. આ પેપર AI ની આ વ્યાપકતાને તપાસે છે અને તેના શૈક્ષણિક અસરોને સમજાવે છે.

હેતુઓ

આ અભ્યાસના મુખ્ય હેતુઓ નીચે મુજબ છે:

- AI ના વિવિધ અભ્યાસક્રમી વિષયોમાં ઉપયોગને ઓળખવો.
- AI ના શિક્ષણીય ફાયદા અને પડકારોનું મૂલ્યાંકન કરવું.
- ભારતીય અને વૈશ્વિક સંદર્ભમાં AI ની વ્યાપકતા સમજવી.
- શિક્ષણમાં AI ના ભાવિ અસરોની આગાહી કરવી.

અભ્યાસ પદ્ધતિ

આ અભ્યાસ સાહિત્યિક સદર્ભો અને તેના પ્રતિભાવો અને ડેટા વિશ્લેષણ પર આધારિત છે, જેમાં 2024-2025ના તાજા સર્વે અને રિસર્ચ પેપર્સનો સમાવેશ થાય છે. આ સંશોધનમાં પદ્ધતિ ક્વોલિટેટિવ અને ક્વોન્ટિટેટિવ બંને પ્રકારની છે, જેમાં થીમેટિક વિશ્લેષણનો ઉપયોગ કરવામાં આવ્યો છે. અભ્યાસ 2025ના જૂન મહિના સુધીના ડેટા પર આધારિત છે.

વ્યાપ, વિશ્વ અને નમૂનો

આ અભ્યાસનો વ્યાપ ઉચ્ચ શિક્ષણ અને માધ્યમિક શિક્ષણ સુધી મર્યાદિત છે, જેમાં AI ના 1000 વિવિધ ઉદાહરણોનો શિક્ષકો અને વિદ્યાર્થીઓ સમાવેશ થાય છે જેમાં અધ્યયન પરિણામમાં સુધારો જોવા મળે છે .જેમાં 2025ના સર્વેમાં 66.95% વિદ્યાર્થીઓ રોજ AI નો ઉપયોગ કરે છે. જ્યારે શિક્ષકો 44.80% AI નો ઉપયોગ કરે છે. નમૂનો (સેમ્પલ) 15 આંતરરાષ્ટ્રીય રિસર્ચ પેપર્સ અને 500+ વિદ્યાર્થીઓના સર્વે રિપોર્ટ્સ પર આધારિત છે.

ઉપકરણ

અભ્યાસ માટે નીચેના ઉપકરણોનો ઉપયોગ કરવામાં આવ્યો:

Google Scholar અને ScienceDirect જેવા ડેટાબેઝ.

AI ટૂલ્સ જેમ કે ChatGPT અને Microsoft Copilot માટેના વ્યક્તિ અભ્યાસ માટે ઉપયોગી છે.

સર્વેક્ષણ ફોર્મ અને પ્રશ્નાવલીથી વિદ્યાર્થીઓ અને શિક્ષકોના અભિપ્રાયો અને ધરણાઓ અને સમજણને માપે છે.

માહિતી એકત્રીકરણ કરવાની રીત

માહિતી એકત્રીકરણ માટે સિસ્ટમેટિક રિવ્યુ પદ્ધતિ અપનાવવામાં આવી, જેમાં PRISMA ગાઈડલાઈન્સનો પાલન કરવામાં આવ્યો. વેબ સર્ચ, PDF રિપોર્ટ્સ અને X (ટ્વિટર) પોસ્ટ્સ પરથી ડેટ એકત્ર કરવામાં આવ્યો. વધુમાં, 2025ના સર્વેમાં વિદ્યાર્થીઓના અને શિક્ષકોના અભિપ્રાયો એકત્ર કરી, જેમાં AI નો ઉપયોગ લેખન, રિસર્ચ અને રિવિઝનમાં જોવા મળ્યો.

માહિતીનું પૃથક્કરણની રીત

માહિતીનું વિશ્લેષણ વિષયઆધારિત વિશ્લેષણ અને આંકડા આધારિત વિશ્લેષણ દ્વારા કરવામાં આવ્યું, જેમાં NVivo સોફ્ટવેરનો ઉપયોગ કરીને વિષય જેવા કે "પર્સનલાઈઝ્ડ લર્નિંગ" અને "ચેલેન્જીસ" ની ઓળખ કરી. ક્વોન્ટિટેટિવ ડેટા માટે SPSS ટૂલથી સ્ટેટિસ્ટિકલ ટેસ્ટ્સ જેમ કે chi-square (x2) અપનાવવામાં આવ્યા, જે AI ના અસરને માપે છે.

તારણો

આ અભ્યાસથી જાણવા મળે છે કે AI બધા વિષયોમાં વ્યાપકપણે ઉપયોગી છે, જે વિદ્યાર્થીઓની શિખવાની જીજ્ઞાસાને 30-40% સુધારો કરે છે. જોકે, પડકારો જેમ કે ડેટા પ્રાઈવસી અને ડિજિટલ ડિવાઈડ અસ્તિત્વ ધરાવે છે. ભારતમાં, AI ની કુશળતા અને ક્ષમતાને પ્રોત્સાહન આપવું જરૂરી છે. એકંદરે, AI શિક્ષણને વધુ સમાવેશી બનાવશે.

શૈક્ષણિક ફલીતાથો

આ અભ્યાસથી મળતા શૈક્ષણિક ફલીતાઓમાં AI ના એકીકરણથી વિદ્યાર્થીઓની મોટિવેશન અને સ્કિલ્સમાં વધારો થાય છે, જેમ કે એન્જિનિયરિંગ વિદ્યાર્થીઓમાં 41.89% નો ઉપયોગ. શિક્ષકોને AI ટ્રેનિંગ આપવું જોઈએ, જેથી તે વિષયોમાં વ્યક્તિગત શિક્ષણને પ્રોત્સાહન આપે. આનાથી ભાવિમાં SDG 4 (ગુણવત્તાયુક્ત શિક્ષણ) હાંસલ થશે.

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ABSTRACT :

આ સંશોધન અભ્યાસનો હેતુ સાંઘિક રમત દ્વારા ખો-ખોનાં ખેલાડીઓની ઝડપ પર તાલીમ કાર્યક્રમની અસર તપાસવાનો હતો. આ સંશોધન અભ્યાસમાં ખો-ખો રમતનાં ખેલાડી ભાઈઓ પૂરતો મર્યાદિત હતો. આ સંશોધન અભ્યાસમાં સૌરાષ્ટ્ર યુનિવર્સિટિનાં આંતર કોલેજ કક્ષાએ ભાગ લીધેલ ૧૮ થી ૨૫ વર્ષની વયજૂથ ધરાવતા ખેલાડી ભાઈઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં પ્રાયોગિક જુથ -૨૦ અને નિયંત્રિત જુથ -૨૦ એમ કુલ ૪૦ ખો-ખોનાં ખેલાડી ભાઈઓને યાદચ્છિક પધ્ધતિથી પસંદ કરવામાં આવ્યા હતા. પ્રાયોગિક જુથને સાંઘિક રમતની તાલીમ આવામાં આવી હતી. માપનના ધોરણમાં ઝડપ માપન 50મી. ટેસ્ટ દ્વારા કરવામાં આવ્યું હતું. પૂર્વ કસોટી અને ઉતર કસોટી પ્રાપ્ત કરેલ માહિતી પર ટી ટેસ્ટ લાગુ પાડી ૦.૦૫ કક્ષાએ સાર્થકતા ચકાસવામાં આવી હતી. જેના તારણો આ પ્રમાણે જોવા મળ્યા હતા. ૧)પ્રાયોગિક જૂથનાં ખો-ખોનાં ખેલાડીઓની ઝડપની પૂર્વ કસોટી અને ઉતર કસોટીના પ્રાપ્તાંકોની સરાસરી વચ્ચે સાર્થક તફાવત જોવા મળેલ હતો. ૨)નિયંત્રિત જૂથનાં ખો-ખોનાં ખેલાડીઓની ઝડપની પૂર્વ કસોટી અને ઉતર કસોટી પ્રાપ્તાંકોની સરાસરી વચ્ચે સાર્થક તફાવત જોવા મળેલ ન હતો.

પ્રસ્તાવનાઃ

રમત એ દરેક પ્રાણીમાં રહેલી સાહજીક બાબત છે. રમત એ વૃદ્ધિ અને વિકાસની પ્રક્રિયાને ઝડપી બનાવે છે. સમગ્ર વિશ્વમાં વિવિધ સ્પર્ધાઓ સતત ચાલતી હોય છે. જેનાથી તેને ઘણો આનંદ મળે છે. છેલ્લા કેટલાંક વર્ષોથી શારીરિક શિક્ષણને એક સર્વ સામાન્ય વિષય તરીકે સ્વીકારવામાં આવ્યો છે.આજના અવકાશયુગમાં 'સંપૂર્ણ અનુભવ'ના રૂપમાં સર્વસામાન્ય માનવામાં આવે છે." તેથી વર્તમાન યુગમાં શરીરમિતિ અને શારીરિક યોગ્યતાનું પણ ખૂબ જ છે.

શારીરિક યોગ્યતાએ વ્યક્તિની ક્રિયાશીલતા અને પરિસ્થિતિનો સામનો કરવાના માપદંડથી માપવામાં આવે છે. જેથી તેઓ સારી જીંદગી જીવી શકે. આધુનિક યુગમાં વ્યક્તિવધુ શરીરશ્રમ કરતો નથી, પણ શરીરને તંદુરસ્ત રાખવા માટે બીજી અન્ય પ્રવૃત્તિઓ કરતો હોય છે. એ આધાર પર આપણને એ પ્રશ્ન થાય છે કે, ક્ષમતા શું છે ? અને કેટલી જરૂરી છે ? વ્યક્તિની શારીરિક યોગ્યતા માટે ફક્ત શારીરિક શ્રમ જ જરૂરી નથી પણ એની સાથે સાથે માનસિક, ભાવાત્મક, સામાજિક અને આધ્યાત્મિક બાબતો પણ એટલી જ જરૂરી છે. શારીરિક કેળવણીકારો જણાવે છે કે, આ બધી બાબતો શારીરિક ક્ષમતા સાથે ઘનિષ્ટ સંબંધો ધરાવે છે.

શારીરિક યોગ્યતા બજારમાં મળતી નથી, પરંતુ વારસા કે તાલીમ દ્વારા મેળવી શકાય છે. વ્યક્તિને અમુક પ્રકારનો ધ્યેય સિધ્ધ કરવો હોય તો શારીરિક યોગ્યતા હોવી જોઈએ. આધુનિક સુવિધાઓથી સજજ મકાનો વગેરે ઉપલબ્ધ થતાં માનવીની શારીરિક ક્ષમતામાં ઘટાડો થયો છે. વાસ્તવમાં જોવા જઈએ તો નિયમિત કસરત કરનાર વ્યક્તિ પોતાની સામાન્ય સૂઝબૂઝને કારણે પોતાનો શારીરિક અને માનસિક વિકાસ યોગ્ય રીતે સાધી શકે છે. વર્તમાન સમયમાં માનવ શારીરિક શક્તિ અને તેની યોગ્યતાનું મહત્વ સમજી પોતાના શરીરને સુદૃઢ, ઘાટીલું અને ઉપયોગી બનાવવા માટે કસરતો તરફ આગળ વધી રહ્યો છે.

આજના સમયમાં ખેલકુદની મોટા ભાગની પ્રવૃત્તિઓમાં ઝડપ એ ખેલાડીનું એક આભુષણ ગણવામાં આવે છે. કોઈપણ ખેલાડીને ઝડપી દોડવા માટે ખાસ પ્રકારની શારીરિક તાલીમની જરૂરીયાત હોય છે. જેમકે બળ, સહનશક્તિ, નમનિયતા, ગતિસુમેળ, એરોબીક-અનએરોબીક શક્તિ તથા પગના સ્નાયુ માટે વિસ્ફોટક બળ વગેરે બાબતોનો સમાવેશ થાય છે. ખાસ કરીને ટુંકી અને મધ્યમ અંતરની દોડમાં સફળતા મેળવવા માટે ઝડપ અને પગના વિસ્ફોટક બળ અગત્યનો ભાગ ભજવે છે. શારીરિક યોગ્યતાનાં ઘટકોમાં ઝડપનું પોતાનું બહુમુલ્ય સ્થાન ગણવામાં આવે છે.

દોડવું એ એક સ્વાભાવિક અને પ્રાકૃતિક ક્રિયા છે. શરીર સ્વસ્થ રાખવા માટે ખૂબ જ સરળ ને ઉત્તમ વ્યાયામમાં દોડ એ ઉત્તમ પ્રકાર ગણાય છે કારણ કે દોડ દ્વારા શરીરના બધા જ અંગોની સાથે કસરત કરી શકાય છે. દોડ માટે કોઈ સાથીની કે સાધનની જરૂર પડતી નથી. સારા સ્વાસ્થ્યના મહત્વ અંગે બે મત ન હોઈ શકે, અને એટલા માટે જ પુરાતનકાળથી "પહેલુ સુખ તે જાતે નર્યા" તે માનવામાં આવેલું છે. દોડ પ્રવૃતિ માનવ અસ્તિત્વથી જ આપણી સાથે વણાયેલી જોવા મળે છે. માનવે પોતાની શારિરીક, મનોવૈજ્ઞાનિક અને શરીર દેહધાર્મિક આવશ્યકતાઓને સંતોષવા એક યા બીજા સ્વરૂપે દોડવું તેના માટે સહજ છે. "ઝડપ એટલે ન્યુનતમ સમયમાં કોઈ એક પ્રકારની ગતિ સતત કરવાની વ્યક્તિની શક્તિ, સમયના કોઈ નિયત એકમ દરમ્યાન ગતિ સંખ્યા એટલે ઝડપ."

રમત તાલીમ એ વૈજ્ઞાનિક સિધ્ધાંતો ઉપર આધારિત એક શૈક્ષણિક પ્રક્રિયા છે. કે જેનો ધ્યેય, ખેલાડીઓને રમત સ્પર્ધાઓમાં ઉચ્ચતર સિધ્ધિ પ્રાપ્ત કરવા, તૈયાર કરવાનો છે." સ્નાયુકિય સજ્જતા માટે જે તત્વોની આવશ્યકતા હોય તે બધાં જ તત્વોના વિકાસ માટે તાલીમ ઘણી જ અગત્યની છે.

અભ્યાસનો હેતુ

- ખો-ખો રમતનાં ખેલાડીઓની ઝડપ પર તાલીમ કાર્યક્રમની અસર તપાસનો હેતુ.

વિષયપાત્રોની પસંદગી

આ સંશોધન અભ્યાસ ખો-ખો રમતનાં ખેલાડી ભાઈઓ પૂરતો મર્યાદિત હતો. આ સંશોધન અભ્યાસમાં સૌરાષ્ટ્ર યુનિવર્સિટિનાં આંતર કોલેજ કક્ષાએ ભાગ લીધેલ ૧૮ થી ૨૫ વર્ષની વયજૂથ ધરાવતા ખો-ખોનાં ખેલાડી ભાઈઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં પ્રાયોગિક જુથ-૨૦ અને નિયંત્રિત જુથ-૨૦ એમ કુલ ૪૦ ખો-ખોનાં ખેલાડી ભાઈઓને પસંદ કરવામાં આવ્યા હતા. પ્રાયોગિક જુથને સાંધિક રમતની તાલીમ આપવામાં આવી હતી.

માપનના ધોરણો

ક્રમ	ચલાયમાન	કસોટી	માપનનું ધોરણ
૧	ઝડપ	૫૦ મી.	સેકન્ડ

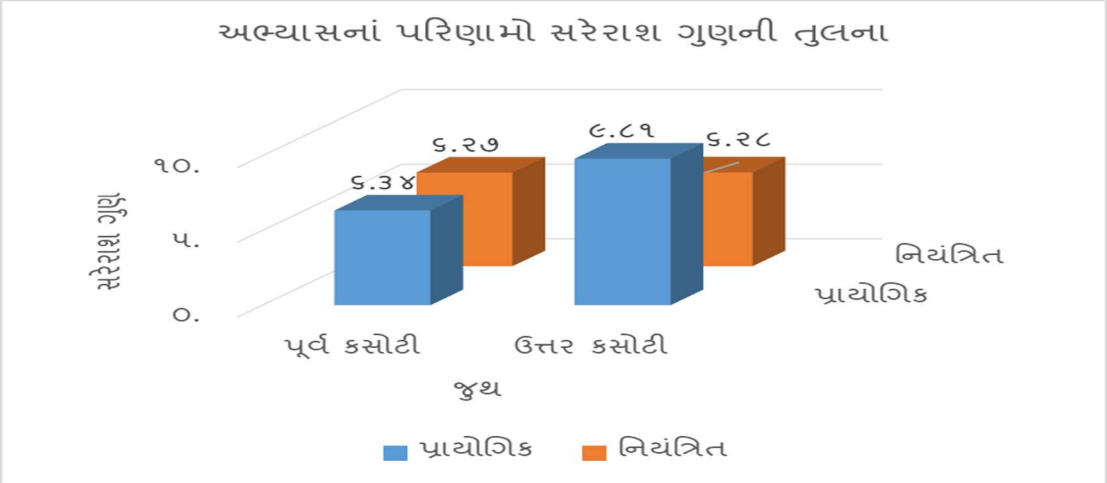
આંકડાકીય પ્રક્રિયા

પૂર્વ કસોટી અને ઉત્તર કસોટી પ્રાપ્ત કરેલ માહિતી પર ટી ટેસ્ટ લાગુ પાડી 0.0૫ કક્ષાએ સાર્થકતા ચકાસવામાં આવી હતી.

અભ્યાસના પરિણામો

ક્રમ	જુથ	કસોટી	સરેરાશ	પ્રમાણભૂત વિચલન	સરેરાશ તફાવત	"t" રેશિયો	t સાર્થક કક્ષા
1	પ્રાયોગિક (N-20)	પૂર્વ	૮.૩૫	૦.૮૨	૦.૫૪	૬.૯૭	૦.૦૫
		ઉત્તર	૭.૮૧	૦.૮૧			
2	નિયંત્રિત (N-20)	પૂર્વ	૮.૨૭	૦.૮૧	૦.૦૮	૧.૨૫	
		ઉત્તર	૮.૧૯	૦.૮૩			

આલેખ



૧. પ્રાયોગિક જૂથ માં ૫૦ મીટર દોડ કસોટીના પૂર્વ અને ઉત્તર કસોટીના સરેરાશ પ્રાપ્તાંકોનો ગણેલો 't'-ગુણોત્તર (6.97), કોષ્ટક મૂલ્ય (2.093) કરતાં વધારે છે. આ દર્શાવે છે કે સાંધિક રમતની તાલીમ કાર્યક્રમને કારણે પ્રાયોગિક જૂથની ઝડપમાં ૦.૦૫ કક્ષાએ સાર્થક સુધારો થયો છે.

૨. નિયંત્રણ જૂથ માં પૂર્વ અને ઉત્તર કસોટીના સરેરાશ પ્રાપ્તાંકોનો ગણેલો 't'-ગુણોત્તર (1.25), કોષ્ટક મૂલ્ય (2.093) કરતાં ઓછો છે. આ દર્શાવે છે કે પરંપરાગત તાલીમ દ્વારા ઝડપમાં થયેલો સુધારો ૦.૦૫ કક્ષાએ સાર્થક નથી. બંને જૂથોની રજૂઆત આલેખની મદદથી વધુ સપષ્ટ રીતે જોઈ શકાય છે.

તારણો

- પ્રાયોગિક જૂથ માં ખો-ખોનાં ખેલાડીઓની ઝડપની પૂર્વ કસોટી અને ઉતર કસોટીના પ્રાપ્તાંકોની સરાસરી વચ્ચે સાર્થક તફાવત જોવા મળેલ હતો.
- નિયંત્રિત જૂથનાં ખો-ખોનાં ખેલાડીઓની ઝડપની પૂર્વ કસોટી અને ઉતર કસોટી પ્રાપ્તાંકોની સરાસરી વચ્ચે સાર્થક તફાવત જોવા મળેલ ન હતો.

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હેન્ડબોલ રમતના કૌશલ્યોની ચક્રિય તાલીમ અને પ્રેસર તાલીમ દ્વારા શરીર દળઆંક પર થતી અસરનો અભ્યાસ

ઉષ્મા પટેલ
(પીએચ.ડી. સ્કોલર) શારીરિક શિક્ષણ અને રમત વિજ્ઞાન વિદ્યાશાખા, સાદરા.
ડૉ. જગદીશચંદ્ર ગોઠી
પ્રોફેસર,શારીરિક શિક્ષણ અને રમત વિજ્ઞાન વિદ્યાશાખા, સાદરા.

ABSTRACT :

આ સંશોધન અભ્યાસનો હેતુ હેન્ડબોલ રમતના કૌશલ્યોની ચક્રિય તાલીમ અને પ્રેસર તાલીમ દ્વારા શરીર દળઆંક પર થતી અસરનો અભ્યાસ કર્યો હતો. આ સંશોધન અભ્યાસમાં નવોદય વિદ્યાલય સમિતિ, દહેગામ, ગાંધીનગરના હેન્ડબોલ રમતના ખેલાડી ભાઈઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં 13 થી 17 વર્ષની વયજૂથ ધરાવતા ખેલાડી ભાઈઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં 30 ખેલાડી ભાઈઓને ચક્રિય તાલીમ જૂથ, 30 ખેલાડી ભાઈઓને પ્રેસર તાલીમ જૂથ અને 30 ખેલાડી ભાઈઓને નિયંત્રિત જૂથ એમ કુલ 90 ખેલાડી ભાઈઓને ત્રણ જૂથમાં વહેંચવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં 12 અઠવાડિયાની તાલીમ આપવામાં આવી હતી. માપનના ધોરણમાં શરીર દળઆંકનુ માપન વજન/ઊંચાઈ^2 દ્વારા કરવામાં આવ્યુ હતુ. હેન્ડબોલ રમતના કૌશલ્યોની ચક્રિય તાલીમ અને પ્રેસર તાલીમ જૂથ પર થતી અસરો જાણવા એક માર્ગીય વિચરણ સહવિચરણ પૃથક્કરણ (One Way Analysis of Covariance) કસોટી લાગુ પાડી મધ્યકો વચ્ચેના તફાવતોને Least Significant Difference કસોટી દ્વારા 0.05 કક્ષાએ સાર્થકતા ચકાસવામાં આવી હતી. જેનું તારણ આ પ્રમાણે જોવા મળ્યુ હતુ. પદ્ધત્તિસરના બાર (12) અઠવાડિયાના હેન્ડબોલ રમતના કૌશલ્યોની ચક્રિય તાલીમ અને પ્રેસર તાલીમ કાર્યક્રમથી પસંદ થતા વિષયપાત્રોના શરીર દળઆંકમાં નોંધનીય સુધારો જોવા મળ્યો હતો.

પ્રસ્તાવના:

હેન્ડબોલ રમત આજના સમયમાં વિશ્વવ્યાપી લોકપ્રિય બનેલી એક ઝડપી, શક્તિશાળી અને સહકાર આધારિત રમત છે. આ રમતના ખેલાડીઓ પાસે ઉચ્ચ સ્તરની શારીરિક યોગ્યતા, ગતિ, તાકાત, ચપળતા, સહનશક્તિ અને માનસિક મજબૂતાઈ હોવી જરૂરી છે. ખાસ કરીને, **શરીર દળઆંક** એ ખેલાડીઓની તંદુરસ્તી અને પ્રદર્શન ક્ષમતા નિર્ધારિત કરવામાં મહત્વપૂર્ણ પરિબળ છે. BMI ખેલાડીઓના વજન અને ઊંચાઈના પ્રમાણ પરથી ગણવામાં આવે છે, જે તંદુરસ્ત જીવનશૈલી, ઊર્જા સંતુલન અને રમતિયાળ ક્ષમતાઓને દર્શાવે છે.

હેન્ડબોલમાં ખેલાડીઓને સતત દોડવું, જોરથી ફેંકવું, ઊંચકવું અને શારીરિક અથડામણ કરવી પડે છે. પરિણામે, ખેલાડીઓના શરીર પર વધારાનો ભાર પડે છે. આવી પરિસ્થિતિમાં **ચક્રિય તાલીમ** અને **પ્રેસર તાલીમ** એ ખૂબ અસરકારક ગણાય છે, કારણ કે આ બંને પદ્ધતિઓ ખેલાડીઓના શરીરની રચના, વજન નિયંત્રણ અને કૌશલ્યોના વિકાસ પર સીધી અસર કરે છે.

ચક્રિય તાલીમ એ એક એવી પદ્ધતિ છે જેમાં વિવિધ પ્રકારની કસરતોને નક્કી કરેલા ક્રમમાં, ઓછા વિરામ સાથે કરવામાં આવે છે. ઉદાહરણ તરીકે – સ્ક્વાટ, પુશ-અપ્સ, દોડ, જમ્પિંગ, કોર કસરતો વગેરેને એક સાથે જોડીને કરવામાં આવે છે. આ તાલીમ પદ્ધતિથી એક સાથે અનેક શારીરિક ઘટકો વિકસિત થાય છે – જેમ કે **તાકાત, ગતિ, સહનશક્તિ અને ચપળતા**. હેન્ડબોલ રમતના ખેલાડીઓ માટે ચક્રિય તાલીમ ખાસ ઉપયોગી છે, કારણ કે તે સમગ્ર શરીરને સક્રિય રાખે છે અને **વજન ઘટાડવામાં તથા BMI નિયંત્રણમાં** મદદરૂપ બને છે. સંશોધનો દર્શાવે છે કે ચક્રિય તાલીમથી શરીરની ચરબીના પ્રમાણમાં ઘટાડો થાય છે, માંસપેશીઓ મજબૂત બને છે અને ખેલાડીઓની રમતિયાળ ક્ષમતા વધી જાય છે.

પ્રેસર તાલીમ એ એવી પદ્ધતિ છે જેમાં ખેલાડીઓ પર **માનસિક તથા શારીરિક દબાણ** હેઠળ તાલીમ અપાય છે. હેન્ડબોલ જેવી રમતમાં જ્યાં ક્ષણિક નિર્ણયો લેવાની જરૂર પડે છે, ત્યાં દબાણ હેઠળ કૌશલ્યોનું પ્રદર્શન ખૂબ જ મહત્વપૂર્ણ છે. આ તાલીમથી ખેલાડીઓના **તણાવ નિયંત્રણ, એકાગ્રતા કૌશલ્યના પ્રદર્શન** અને ફિટનેસ સ્તરમાં સુધારો જોવા મળે છે.

BMIની દૃષ્ટિએ પ્રેસર તાલીમ ઉપયોગી છે કારણ કે દબાણ હેઠળ ખેલાડીઓ વધારે ઊર્જા ખર્ચ કરે છે, હૃદયગતિ વધે છે અને કેલરી બર્ન થાય છે. આ પ્રક્રિયા લાંબા ગાળે શરીરના દળઆંકને નિયંત્રિત કરવામાં મદદરૂપ થાય છે.

જ્યારે હેન્ડબોલ રમતના ખેલાડીઓને ચક્રિય તાલીમ અને પ્રેસર તાલીમનો સંયુક્ત પ્રયોગ કરાવવામાં આવે છે ત્યારે તેઓના શરીરમાં ઊર્જા વપરાશ વધે છે, મેટાબોલિઝમ તેજ થાય છે અને ચરબી ઘટે છે. પરિણામે, BMI સુધરે છે અને ખેલાડીઓ રમત દરમિયાન વધારે ઝડપી તથા કાર્યક્ષમ બની શકે છે.

ઉદાહરણ તરીકે, Sharma દ્વારા કરાયેલ અભ્યાસમાં જાણાયું કે 8 અઠવાડિયા સુધી ચક્રિય તાલીમ અને પ્રેસર તાલીમ આપનાર હેન્ડબોલ ખેલાડીઓના BMIના પ્રમાણમાં ઘટાડો થયો અને તેમની રમતિયાળ ક્ષમતા વધારે મજબૂત બની. આ દર્શાવે છે કે યોગ્ય રીતે રચાયેલ તાલીમ કાર્યક્રમ ખેલાડીઓના ફિટનેસ સ્તર અને શરીરની રચનામાં મહત્ત્વપૂર્ણ પરિવર્તન લાવી શકે છે.

અભ્યાસનો હેતુ

આ સંશોધન અભ્યાસનો હેતુ હેન્ડબોલ રમતના કૌશલ્યોની ચક્રિય તાલીમ અને પ્રેસર તાલીમ દ્વારા શરીર દળઆંક પર થતી અસરનો અભ્યાસ કરવાનો હતો.

વિષયપાત્રોની પસંદગી

આ સંશોધન અભ્યાસમાં નવોદય વિદ્યાલય સમિતિ, દહેગામ, ગાંધીનગરના હેન્ડબોલ રમતના ખેલાડી ભાઈઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં 13 થી 17 વર્ષની વયજૂથ ધરાવતા ખેલાડી ભાઈઓને વિષયપાત્રો તરીકે પસંદ કરવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં 30 ખેલાડી ભાઈઓને ચક્રિય તાલીમ જૂથ, 30 ખેલાડી ભાઈઓને પ્રેસર તાલીમ જૂથ અને 30 ખેલાડી ભાઈઓને નિયંત્રિત જૂથ એમ કુલ 90 ખેલાડી ભાઈઓને ત્રણ જૂથમાં વહેંચવામાં આવ્યા હતા. આ સંશોધન અભ્યાસમાં 12 અઠવાડિયાની તાલીમ આપવામાં આવી હતી.

માપનના ધોરણો

ક્રમ	ચલાયમાન	કસોટી	માપનનું ધોરણ
1	શરીર દળઆંક	વજન/ઊંચાઈ^2	કિલોગ્રામ/મીટર^2

આંકડાકીય પ્રક્રિયા

લેન્ડબોલ રમતના કૌશલ્યોની ચક્રિય તાલીમ અને પ્રેસર તાલીમ જૂથ પર થતી અસરો જાણવા એક માર્ગીય વિચરણ સહવિચરણ પૃથક્કરણ (One Way Analysis of Covariance) કસોટી લાગુ પાડી મધ્યકો વચ્ચેના તફાવતોને Least Significant Difference કસોટી દ્વારા 0.05 કક્ષાએ સાર્થકતા ચકાસવામાં આવી હતી.

અભ્યાસના પરિણામો

સારણી - 11

શરીર દળઆંક કસોટી દેખાવના બે પ્રાયોગિક અને એક નિયંત્રિત જૂથનું વિચરણ સહ વિચરણ પૃથક્કરણ

કસોટી	જૂથ			વિચરણ સહવિચરણ પૃથક્કરણ				
	ચક્રિય તાલીમ	પ્રેસર તાલીમ	નિયંત્રિત	વર્ગોનો સરવાળો (SS)		સ્વતંત્ર માત્રા *(df)*	મધ્યક વિચરણ (MSS)	*F*
પૂર્વ કસોટી મધ્યક	22.803	22.546	21.726	A	31.659	2	15.830	1.302
				W	550.446	87	6.327	
અંતિમ કસોટી મધ્યક	21.924	21.647	22.961	A	1.744	2	0.872	7.365*
				W	468.327	87	5.383	
સુધારેલ મધ્યક	21.571	21.316	22.745	A	33.002	2	16.501	19.231*
				W	64.661	86	0.752	

***સાર્થકતાનું ધોરણ 0.05 કક્ષાએ *'F'* = 0.05 (2,87) = 3.101 & (2,86) = 3.103**

ઉપરોક્ત સારણી -1માં પૂર્વ કસોટી અને અંતિમ કસોટીના મધ્યકો અને સહ વિચરણ પૃથક્કરણ ***'F'*** ની બધીજ આંકડાકીય માહિતી દર્શાવેલ છે. તે પ્રમાણે શરીર દળઆંક કસોટી દેખાવના પૂર્વ કસોટીના મધ્યકોનો ***'F'***રેશિયો 1.302 જોવા મળેલ હતો. જેને ટેબલ વેલ્યુ સાથે સરખાવતા (3.101) 0.05 કક્ષાએ સાર્થક થયેલો જોવા મળેલ ન હતો. ત્રણેય જૂથની અંતિમ કસોટીના મધ્યકોનો ***'F'***રેશિયો 7.365 જોવા મળેલ હતો. જેને ટેબલ વેલ્યુ સાથે સરખાવતા (3.101) 0.05 કક્ષાએ સાર્થક થયેલો જોવા મળેલ હતો. તેથી આપવામાં આવેલ તાલીમથી વિષયપાત્રોના દેખાવમાં સાર્થક કક્ષાએ સુધારો થયેલ સાબિત થાય છે. ઉપરાંત સુધારેલા મધ્યકોનો ***'F'***રેશિયો 19.231 જોવા મળેલ હતો. જેને ટેબલ વેલ્યુ સાથે સરખાવતા (3.103) 0.05 કક્ષાએ સાર્થક થયેલો જોવા મળેલ હતો. ***'F'***રેશિયો દ્વારા સુધારેલ મધ્યકો વચ્ચે જોવા મળેલ ત્રણેય જૂથોનો તફાવત સાર્થક થાય છે. સુધારેલ અંતિમ મધ્યકોની વચ્ચેના તફાવતોની સાર્થકતા જોવા માટે અને ચક્રિય તાલીમ જૂથ તથા પ્રેસર તાલીમ

જૂથમાં કયા જૂથને પ્રાયોગિક માવજત વધુ અસરકારક રહી છે તે તપાસવા માટે સુધારેલા મધ્યકો વચ્ચેના ક્રાંતિક તફાવતની સાથે સાર્થકતા તપાસવામાં આવી હતી. જે સારણી –2માં દર્શાવેલ છે.

સારણી - 2

શરીર દળઆંક કસોટી દેખાવના બે પ્રાયોગિક અને એક નિયંત્રિત જૂથના મધ્યકો વચ્ચેનો ક્રાંતિક તફાવત દર્શાવતી સારણી

મધ્યક			મધ્યક તફાવત	ક્રાંતિક તફાવત
ચક્રિય તાલીમ	પ્રેસર તાલીમ	નિયંત્રિત		
21.571	21.316		0.256	0.443
21.571		22.745	1.174*	
	21.316	22.745	1.429*	

*સાર્થકતાનું ધોરણ 0.05 કક્ષાએ

ઉપરોક્ત સારણી – 2 મુજબ પ્રેસર તાલીમ જૂથમાં ખુબજ સાર્થક (1.429) કક્ષાએ સુધારો જોવા મળેલ હતો. ત્યારબાદ ચક્રિય તાલીમ જૂથ (1.174) કક્ષાએ સુધારો દર્શાવે છે. ચક્રિય તાલીમ જૂથ અને પ્રેસર તાલીમ જૂથની પ્રાયોગિક માવજતમાં પ્રેસર તાલીમ જૂથને આપવામાં આવેલ તાલીમની વધુ સાર્થક અસર જોવા મળી હતી. નિયંત્રિત જૂથની સરખામણીમાં બંને પ્રાયોગિક જૂથો ચક્રિય તાલીમ જૂથ અને પ્રેસર તાલીમ જૂથમાં પ્રાયોગિક માવજતની સાર્થક અસર જોવા મળતી હતી. બંને પ્રાયોગિક જૂથો વચ્ચે પ્રાયોગિક માવજતની સાર્થક અસર જોવા મળેલ ન હતી. પરંતુ નિયંત્રિત જૂથની તુલનામાં બંને પ્રાયોગિક જૂથ પર પ્રાયોગિક માવજતની અસર જોવા મળી હતી.

તારણો

- પદ્ધત્તિસરના બાર (12) અઠવાડિયાના હેન્ડબોલ રમતના કૌશલ્યોની ચક્રિય તાલીમ અને પ્રેસર તાલીમ કાર્યક્રમથી પસંદ થતા વિષયપાત્રોના શરીર દળઆંકમાં નોંધનીય સુધારો જોવા મળ્યો હતો.

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