CHAPTER 20

EDUCATION

Doctoral Theses

01. AMAN KUNJ ANAND
Development of Tribal Women`s Education: Historical Study on Jharkhand.
Supervisor: Prof. D. Parimala
Th 29003

Abstract

This thesis is a modest attempt to explore and understand the historical trajectory of the development of tribal women's education in Jharkhand. It adopts a historical research methodology to trace the development of tribal women's education across distinct socio-political epochs; from the colonial period to the post-independence till contemporary period. The study is grounded in a critical understanding of how educational development among tribal women has been a product of the region`s broader economic, cultural, and political transformations and its impact on tribal societies. It situates tribal women within these evolving historical contexts, examining how their identity, agency, and access to education have been shaped by various structural and systemic forces. This thesis demonstrates that early colonial interventions initiated profound transformations within tribal society, producing long-term marginalization and reshaping gender relations, particularly to the disadvantage of tribal women. It reveals persistent contradictions between the post-independence state's welfare commitments and the actual outcomes of development in the region. These historical and structural changes are shown to be dialectically linked to the evolution of tribal women's education. The study traces the shift from traditional to institutionalized education and highlights how inconsistent policies and prolonged neglect of tribal women's education characterized much of the post-independence period. Although targeted programs introduced around the turn of the twenty-first century generated limited improvements, major obstacles such as infrastructural deficits, linguistic barriers, gender discrimination, and socio-economic marginalization remain. Using an intersectional framework, the thesis explains how gender, ethnicity, class, geography, and political agency jointly shape educational outcomes. Overall, it concludes that despite gains in enrolment and literacy, structural inequalities continue to constrain transformative educational possibilities for tribal women in Jharkhand.

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1. Introduction 2. Review of Literature 3. Research Methodology 4. Historical Foundations of Women's Modern Education in India 5. Historical Changes in Jharkhand & its Impact on Tribal Societies 6. Colonial Development of Tribal Women's Education in Jharkhand 7. Development of Tribal Women's Education: Development Postindependence 8. Conclusion.

02. DEDHWAL (Nisha)
Caste as an Institution: Exploring Contemporary Trajectories
Supervisors: Dr. Seema Sarohe and Prof. Poonam Batra
Th 29004

Abstract

Caste is a system of privileges, humiliation, and lived realities; a system without which it is difficult to think of India. There are multiple prisms to understand contours of caste. The contemporary trajectories of caste bring the focus upon modern forms of inequality; the multiple ways in which caste maintains its sanctity in every facet of public and private life. The growing number of Dalit writings - majorly life narratives, biographies, autobiographies, have offered an epistemological challenge to the existing 'caste-blindness' in mainstream academia. The rationale of the study indicates the need and importance of exploring the factors that pose an epistemological challenge to the theoretical conceptualization that remained largely ignorant of non-brahminical perspectives on caste. The need to develop critical frames of understanding caste, presents challenges of enquiring new forms of knowledge production, involving gender-caste-class intersectionalities. The purpose of the research is located in understanding the 'lived experiences' of Scheduled Caste Learners (SCLs) who made it to university spaces of knowledge production. Foregrounding the idea that higher education spaces can also be the space of conflict, resistance, and reconstruction of socially just world, SCLs enrolled in undergraduate/post graduate/PhD level courses in Delhi University, were chosen as the participants of the given study via purposive sampling. Using interpretivist qualitative research framework and through narrative approach, the research engaged with participants through in-depth individual semi-structured interviews. The narratives were analysed through which major themes emerged focusing on epistemology of social exclusion and ways of assertion and resilience. The social machinery of oppression focusing on encounters with caste inherently involving humiliation and trauma highlighted the impact on identity formation of the participants. Although Dalit means 'broken' it also manifests being resilient, as the stories of aversion and suffering inherently included the emancipatory ways of resistance and survivorship. Identity assertion, as an emerging theme of analysis, allowed to explore 'Dalit-subject formation' challenging the traditional notions of Dalits as passive victims. The interpretative engagement with caste, has offered insights to challenge caste epistemicide in mainstream feminist theories, establishing the need of creating space for Dalit literature in academia having significantly unique emancipatory epistemologies.

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1. Introduction Caste as Review of Literaturea Social Construct: Historical and Contemporary Trajectories 2. Theoretical Framework 3. Methodology 4. Theoretical Framework 5. Caste Based Discrimination: The Dalit Angst 6 Caste Contemporaneity and Ways of Assertion: Claiming Dignity 7. Conclusion.

03. DONSEL (Tenzin)
Teachers` Understanding of their Role in Maintaining Tibetan Diglossia: A Study of Refugee Education
Supervisor: Dr. Latika Gupta
Th 29005

Abstract

The Tibetan refugee community has organized itself politically by establishing administrative structures in exile. More than 60 schools for Tibetan refugee children have been established in India and the medium of instruction at the primary level is Tibetan in all these schools. Tibetan is a diglossic language. I undertook the study to investigate the underlying ideas, frameworks, and perspectives with which Tibetan

teachers teach language to their students in refugee schools located in the Indian states of Himachal Pradesh and Uttarakhand. I interviewed teachers using a blend of projective technique and life history method. Teachers' articulations were drawn to capture their understanding of the aims of language teaching, their perceptions of learners in exilic conditions and their views on children's home language. For children, two discursive tasks designed to understand the interface between languages and how children negotiate and make meaning of their everyday lives, shaped by migration, media and local languages. The discourse analysis method was used to analyse the teachers' and children's responses. The study found that the teachers overwhelmingly stress the preservation of Tibetan language and culture as the primary goal for language education. A major finding is that teaching Tibetan has not centred on the functions of language but rather on a larger political cause of the construction of refugee identity. The teachers also insist on the use of ancient script as an integral part of a high-order variety of Tibetan. In this process of identity and political assertion, the principles of curriculum theory, child development and learning take a back seat. The child as a learner and her context remain unacknowledged in the curriculum

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1. Introduction 2. Theoretical Framework 3. Review of Related Literature 4. Methodology 5. Analysis and Interpretation (Part I) Refugee Teachers' Discourse Findings, recommendations and suggestions. 6. Analysis (Part II) A Refugee Child in a Diglossic School Ethos References and Appendices. 7. Tibetan Refugee Teacher: At the Crossroads Between Professional and Communal.

04. KAJAL

Exploring Socially Responsible Science Education (SRSE) at Secondary level in Indian Rural Context.

Supervisor: Dr. Sunita Singh

Th 29006

Abstract

Science plays an important role in deriving practices and dispositions that prepare people for a wider context. However, science curricula often ignore the ethical, social, and environmental impacts of scientific knowledge and practices (Kyle, 1999; Hodson, 2003; Calado, et al. 2015; Cross & Price, 2016; & Bencze et al. 2020). Similarly, Fusch (2023) describes Socially Responsible Science Education (SRSE) as guiding students to see themselves as active members of society, using their scientific knowledge to address real-life issues that affect their lives, communities, and the environment. In India, with its vast population and diverse cultural and social backgrounds, these gaps present significant challenges, especially in rural areas where unique socio-scientific concerns need to be addressed. This study seeks to emphasize a vision of science education that draws on critical perspectives that place science education within its ethical, social, and environmental context to promote SRSE. The focus is on studying the potential of SRSE in secondary schools (GHS, GGIC, and GIC) in rural areas of eastern Uttar Pradesh. This study investigates the integration of SRSE in classrooms situated in the STEPWISE framework (Science & Technology Education Promoting Wellbeing for Individuals, Societies & Environments). The data collected through purposive sampling from two rural areas of eastern districts. The research has a multi-phase design with a preliminary study. Phase 1 includes textbook analysis, classroom observations, FGD with students, and teacher interactions to identify context-specific socio-scientific concerns. In Phase 2, resources for workshops and reflection sheets of selected

issues were developed and validated through consultations with experts. Phase 3 involved interaction with students and interviews with science teachers and teacher educators. This study presents the possibilities for SRSE in rural settings, by providing students to explore real-world issues relevant in their local context, thereby making science teaching and learning more meaningful for the learners.

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1. Towards a Responsible Approach in Science Education 2. Theoretical Foundations and Review of Literature 3. Method and Methodology 4. Understanding the Context and Status of Science Education in Rural Eastern Uttar Pradesh: A Preliminary Study 5. Voices from the Field: A Critical Qualitative Analysis of Science Education Practices and possibilities of STEPWISE 6. Findings, the Opportunities for SRSE through STEPWISE Pedagogy, Reflections and Future Directions for SRSE Bibliography. Appendices.

05. KANIKA

Technology based Pedagogical Practices in English Language Learning at Senior Secondary Level: A TMTBLT Approach.

Supervisor: Dr. M. Rajendran

Th 29007

Abstract

School field trips are essential for the comprehensive development of students. This effectively immerses students in experiential learning outside the confines of the classroom. Field visits constitute immersive events that offer authentic social interactions to enhance comprehension of an idea (National Education Policy, 2020). The approach fosters critical thinking and individual concept development through direct engagement with social, cultural, environmental, and historical contexts. A literature review encompasses a thorough examination of all existing research pertinent to a specific issue. It is particularly crucial in defining the overarching study domain, elucidating the concepts associated with the issue, clarifying its aims, providing information about the methodologies, and integrating the research processes, findings, and conclusions. It simultaneously serves to concretize the cognitive processes utilized by researchers. Research methodology denotes the systematic framework for executing research, encompassing the strategies, procedures, and instruments employed to gather and analyze data pertinent to the research objectives, investigating issues and finding solutions by using scientific methods is the aim of research. This four chapter is organized into four sections. The first section provides an examination obtained from a questionnaire distributed to teachers. The second section provides qualitative observations derived from focus group discussions (FGDs) with students in Grades VI to X, enhancing the comprehension of student viewpoints. The third and fourth sections analyze data from interviews with school administrators and museum directors, offering a comprehensive backdrop of the educational landscape. The findings disclosed important and meaningful insights regarding the educational significance of field visits. This chapter delineates the major findings, succeeded by comments, conclusions, and recommendations for subsequent research. The study encompasses the educational consequences, principal suggestions, and its limits

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1. Introduction 2. Review of Related Literature 3. Methodology 4. Data Analysis and Interpretation 5. Major Findings. Discussion. References. Appendices.

06. KAUR (Simerpreet)
Contextual Gaming Approach with Formative Assessment on Students' Digital Citizenship Behaviour and Awareness.
Supervisior: Dr. Pinkal Chaudhari
Th 29008

Abstract

The widespread accessibility of technology has significantly transformed the educational landscape, underscoring the urgent need to foster awareness and responsible online behaviour among students. This study is experimental in nature and examines the effectiveness of integrating a contextual gaming approach with formative assessment to enhance students' digital citizenship behaviour and awareness. The research is based on a digital learning game called WiseUp, developed by the researcher. The WiseUp game is structured around the Common Sense Media (CSM) Digital Citizenship Curriculum. Formative assessment allows targeted feedback, reflective tasks and progress tracking to promote ongoing learning and self-evaluation. A quasi-experimental design was employed with Class 8 students of two different government-aided schools, who were assigned to experimental and control groups. The experimental group engaged with the WiseUp game, whereas the control group received traditional instruction about digital citizenship. Both groups completed pre-tests and post-tests to assess changes in their behaviour and awareness. The findings indicate that the integration of a contextual gaming approach with formative assessment was found effective for strengthening digital citizenship education.

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1 Digital Citizenship: Historical Development, Frameworks and Contexts 2. Conceptual Framework and Theoretical Underpinning 3. Research Methodology 4. WiseUp: Design and Implementation.5 Data Analysis and Interpretation 6. Consolidation and Discussion of Key Findings and Researcher's Reflections. Bibliography.

07. KAUSHIK (Megha)
Outcome-Based Education: Global Discourses and Policies.
Supervisior: Prof. Ashish Ranjan
Th 29009

Abstract

Over the past four decades, Outcome-Based Education (OBE) has emerged as a prominent reform movement in higher education worldwide. Grounded in the principle that educational processes should be organised around clearly articulated student learning outcomes, OBE has been adopted across diverse national contexts, including Australia, South Africa, the United States, East and Southeast Asia, the European Union, and more recently, India. Internationally, OBE has been promoted as a mechanism to enhance accountability, transparency, competency-based learning, and quality assurance in higher education. At the same time, global experiences reveal significant complexity, uneven implementation, and, in certain contexts, partial retreat from the model. In India, the adoption of OBE must be understood within a broader trajectory of higher-education reforms aimed at quality enhancement, curricular restructuring, and alignment with global standards. Learning outcomes have gradually been positioned as a central organising principle for undergraduate programmes, most visibly through the Learning Outcomes-based Curriculum Framework (LOCF). The LOCF seeks to restructure undergraduate

curricula around explicitly defined learning outcomes, graduate attributes, and curriculum standards aligned with contemporary policy expectations. This study adopts a qualitative interpretive research design and is conducted in two stages. The first stage traces the historical emergence of OBE in higher education through an analysis of publicly available international policy documents. Using discourse-oriented analytical techniques, the study identifies dominant discourses in OBE policy documents in the global context and examines how these are translated and recontextualised within the Indian higher-educational context. The second stage involves a field-based inquiry to explore teachers' perspectives on OBE within higher-education institutions. The findings indicate that dominant discourses of accountability, performance, flexibility, and quality assurance were anchored in Policy documents. These discourses also shape the Indian higher-education policy landscape at the macro level and extend into the micro-level realities of influencing teachers' interpretations, beliefs, and pedagogic practices.

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1. Introduction 2. Review of Related Literature 3. Research Methodology 4. Historical Discursive Analysis of OBE 5 Discursive Analysis of Global and National Policy Context 6. Teachers' Perspectives on OBE Reflections 7. Conclusion. Bibliography.

08. MALO (Sanjib)
Literacy Practices in Home and School: An Ethnographic Study of Tea Tribes Children in Assam.
Supervisor: Dr. Geeta Rai
Th 29010

Abstract

Since independence, India has prioritised widespread literacy as a means to address educational inequality through sustained policy initiatives. Despite these efforts, the absolute number of non-literate individuals remains alarmingly high, particularly among marginalised communities. One such group is the Tea Tribes community of Assam, whose literacy rate is estimated at only 23%. The Annual Status of Education Report (Rural) 2024 further indicates that many children from marginalised backgrounds fail to attain grade-level reading proficiency. While existing research often attributes poor literacy outcomes to home-related factors, such accounts overlook the crucial role of school-based literacy practices—especially for children who depend almost entirely on formal schooling for literacy development. Grounded in socio-cultural perspectives of literacy and the conceptual construct of language proficiency and power relations, this ethnographic study investigates literacy practices within the home and school contexts of Tea Tribes children in Assam. Data were collected through participant observation, photography, informal conversations, and semi-structured interviews with teachers, children, and parents at a government lower primary school in Assam. The findings reveal a significant disconnect between home and school literacy practices. School literacy is treated as a technical and neutral skill, characterised by monolingual, decontextualised instruction in Assamese and a heavy reliance on textbooks. In contrast, children's homes are rich in linguistic and socio-cultural resources that support meaningful everyday literacy practices. However, the school's failure to recognise and build upon these resources renders classroom literacy instruction disengaging and ineffective, contributing to poor reading and writing outcomes as well as early school dropout. The study argues for bridging the home-school divide by reimagining literacy as a social practice. It recommends recognising home language as a pedagogical resource, integrating children's funds of knowledge, adopting multilingual and culturally responsive pedagogies, reforming assessment practices, and strengthening policy support for early-grade multilingual education.

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1. Introduction 2. Theoretical Framework 3. Review of Related Literature 4. Research Methodology 5. The School Profile. 6. Home Environments of Tea Tribes Children 7. School Literacy Practices 8. Findings of the Study 9. Discussion and Conclusion.

09. प्रिया कुमारी

विद्यार्थियों का शैक्षिक, सामाजिक एवं राजनीतिक चिंतन : एक अध्ययन।

निर्देशक : प्रो. सुस्मितो लखयानी

Th 29011

सारांश

यह शोध "विद्यार्थियों का शैक्षिक, सामाजिक एवं राजनीतिक चिंतन : एक अध्ययन" विद्यार्थियों के विचारों और दृष्टिकोण को समझने पर आधारित है। शोधकर्ता प्रिया कुमारी ने यह अध्ययन इस धारणा के आधार पर किया कि मनुष्य के सामाजिक विकास में विद्यार्थी जीवन अत्यंत महत्वपूर्ण होता है। इसी अवधि में औपचारिक शिक्षा व्यक्ति के व्यक्तित्व का निर्माण करती है तथा उसके सामाजिक, शैक्षिक और राजनीतिक दृष्टिकोण को प्रभावित करती है। विद्यार्थी अपने परिवार, विद्यालय, समाज, राजनीति और आसपास की परिस्थितियों से प्रभावित होकर अपने विचार विकसित करते हैं। अध्ययन का मुख्य उद्देश्य कक्षा 11वीं और 12वीं के विद्यार्थियों के सामाजिक, शैक्षिक एवं राजनीतिक चिंतन को समझना था। इसके लिए विद्यार्थियों द्वारा लिखित स्वनिर्मित रचनाओं और लेखों का विश्लेषण किया गया। शोध में यह जानने का प्रयास किया गया कि विद्यार्थी विभिन्न सामाजिक, राजनीतिक और शैक्षिक मुद्दों को किस प्रकार देखते हैं, उनके विषय-चयन के आधार क्या हैं तथा उनके विचारों का निर्माण किन परिस्थितियों से होता है। शोध की प्रकृति गुणात्मक (Qualitative) रखी गई और वर्णनात्मक शोध विधि का उपयोग किया गया। अध्ययन में दिल्ली के केवल सरकारी विद्यालयों की कक्षा 11वीं और 12वीं के कला संकाय (मानविकी) के विद्यार्थियों को शामिल किया गया। विद्यार्थियों से उनके आसपास की समस्याओं और सरोकारों पर लेख लिखवाए गए, जिन्हें शोध के आँकड़ों के रूप में ग्रहण किया गया। लेखों के विश्लेषण से यह निष्कर्ष प्राप्त हुआ कि विद्यार्थी समसामयिक और संवेदनशील विषयों के प्रति सजग हैं। उन्होंने अपने लेखन में विश्लेषणात्मक एवं आलोचनात्मक चिंतन का परिचय दिया। वे केवल समस्याओं पर चिंता व्यक्त नहीं करते, बल्कि उनके समाधान और सकारात्मक परिवर्तन की आवश्यकता पर भी विचार करते हैं। अध्ययन से स्पष्ट हुआ कि विद्यार्थियों का चिंतन उनके सामाजिक परिवेश और दैनिक जीवन की घटनाओं से गहराई से प्रभावित होता है तथा उनमें समाज के प्रति जागरूक और उत्तरदायी दृष्टिकोण विकसित हो रहा है।

विषय सुची

1. प्रस्तावना एवं शोध औचित्य 2. सम्बंधित साहित्य का अध्ययन 3. शोध विधि एवं प्रक्रिया 4. विश्लेषण शोध परिचचा 5. निष्कर्ष एवं सुझाव.

10. राजकुमार

सामाजिक, सांस्कृतिक एवं शैक्षिक विश्दीकरण : सस्पोल के संदर्भ में एक अध्ययन।

निर्देशक : प्रो. संदीप कुमार

Th 29012

सारांश

प्रस्तुत शोध लद्दाख के लेह जिले में स्थित सस्पोल गांव के सामाजिक, सांस्कृतिक एवं शैक्षिक सरोकारों का एक गहन नृवंशविज्ञानी (Ethnographic) विश्लेषण प्रस्तुत करता है । सस्पोल की विशिष्ट भौगोलिक स्थिति, जलवायु और प्राचीन रेशम मार्ग पर इसकी अवस्थिति ने यहाँ की संस्कृति को एक अद्वितीय स्वरूप प्रदान

किया है । इस शोध की प्रकृति गुणात्मक एवं विश्लेषणात्मक है । शोध के उद्देश्यों की प्राप्ति के लिए नृवंशविज्ञानी उपकरणों जैसे— सहभागी अवलोकन असंचरित साक्षात्कार, क्षेत्र टिप्पणियाँ, अनौपचारिक संवाद और केन्द्रित समूह परिचर्चा का प्रयोग किया गया है । शोधकर्ता ने आंकड़ों के एकत्रीकरण के लिए केवल विद्यालय जैसे औपचारिक संस्थानों तक ही स्वयं को सीमित नहीं रखा, बल्कि घरों, स्थानीय दुकानों, कृषि क्षेत्रों और `गोम्पा` (मठ) जैसे विविध परिवेशों में जाकर स्थानीय लोगों के साथ जीवंत अंतःक्रिया की है। शोध के निष्कर्ष यह उजागर करते हैं कि सस्पोल में शिक्षा केवल चारदीवारी के भीतर चलने वाली प्रक्रिया नहीं है, बल्कि यहाँ शैक्षिक, सामाजिक और सांस्कृतिक क्षेत्रों के बीच एक अटूट अंतर्संबंध विद्यमान है, जो प्रत्यक्ष रूप से बच्चों के `बचपन` और उनकी वैचारिक अस्मिता को निर्मित कर रही है । वर्तमान समय में आधुनिकता, लोकतांत्रिक मूल्यों और संचार क्रांति के तीव्र विस्तार ने यहाँ के पारंपरिक ढांचे में स्पष्ट बदलाव उत्पन्न किए हैं । । शोध यह अनुशंसा करता है कि भविष्य की शैक्षिक नीतियों और पाठ्यक्रम निर्माण में सस्पोल जैसी विशिष्ट भौगोलिक और सांस्कृतिक पहचान वाले क्षेत्रों की स्थानीय आवश्यकताओं को प्राथमिकता दी जानी चाहिए। शिक्षा को केवल वैश्विक मानकों तक सीमित न रखकर उसे स्थानीय ज्ञान परंपराओं और नवीन तकनीकी संभावनाओं के साथ एकीकृत करना अनिवार्य है । मुख्यबिंदु: सस्पोल (लेह), नृवंशविज्ञान, समाजसांस्कृतिक संरचना, शैक्षिक सरोकार, संचार क्रांति ।

विषय सुची

1. प्रस्तावना 2. सैद्धांतिक परिप्रेक्ष्य 3. सामाजिक-सांस्कृतिक संदर्भों के नजरिए से सस्पोल 4. शैक्षिक स्थितियों के संबंध में सस्पोल 5. सस्पोल में बाल्यावस्थाः सरोकारऔर विकासात्मक पहलू 6. निरंतरता एवं बदलाव का परिदृश्य 7. परिचर्चा, निष्कर्ष, एवं शैक्षिक निहितार्थ.

11. SINGAL(Pooja)
Practicing Critical Literacy in Indian Classrooms: Possibilities and Challenges.
Supervisor: Prof. Jyoti Kohli
Th 29013

Abstract

Despite achieving near-universal enrollment in primary education, the issue of providing 'quality' education to all remains a huge challenge in India. NEP 2020 highlights the 'literacy crisis' in the country with nearly five crore children lacking in basic reading and writing abilities. Educationists correlate this crisis with 'narrow conceptions of literacy' held by the teachers and the corresponding 'traditional pedagogic culture' with text-centric, exam-centric and teacher-centric classes. Stemming from Freire's ideas of education as the process of 'conscientization', Critical Literacy approaches encourage students to use language to question their everyday world, interrogate the relationship between language, power and larger sociopolitical systems by making them examine different kinds of 'texts' for potential issues and to consider actions that can be taken to promote social justice. This study has been conceptualized as a qualitative research to explore the possibilities and challenges of using critical literacy as a pedagogical framework for teaching language and literacy in elementary classes in India. Situated in a teacher education programme offered by a Delhi University college, the study conducted in three phases involved designing and negotiation of an intervention aimed at developing understanding of critical literacy among pre-service teachers (PSTs) for using it as a pedagogical framework in elementary classrooms. The data for the analysis has been collected from multiple sources- summative assignments, reflective journals, classroom observations and plans made by the PSTs. Findings of the research suggest an evolving understanding of critical literacy among PSTs with their positive engagement with practices of critical literacy such as, their own abilities to analyse the texts from socio-political lens, abilities to select and use alternative texts for exploring themes around the ideas of

diversity and social justice, willingness to discuss difficult topics with students, ways of engaging students with the prescribed 'texts' with a critical stance and so on.

Contents

1. Introduction 2. Review of literature. 3. Methodology 4. Data Representation and Analysis 5. Summary and Conclusion. Bibliography.

12. YADAV (Archana)
Impact of Augmented Reality on Mathematics Learning: Studying Generation Alpha Screenagers Using Multiple Baseline Design.
Supervisor: Prof. (Dr.) Vinod Kumar Kanvaria
Th 29014

Abstract

The present study investigated the impact of Augmented Reality (AR)–based interventions on mathematics learning among learners across six geographically diverse regions of Haryana—rural, semi-rural, urban, semi-urban, remote, and highly remote. The researcher integrated both quantitative and qualitative methods to collect data and analyse learners' performance, engagement, and self-efficacy across four age groups (2-14 years of age) employing a explanatory sequential multiple baseline design. The augmented reality- based intervention comprised of mathematics instructions tailored to each group's curriculum. Data collection involved pre-tests, post-tests, observation checklists, classroom observations, semi-structured interviews, focused group discussions, and Likert-scale questionnaires. The data collection procedure unfolded in five phases- baseline assessments, staggered roll out of the AR intervention, concurrent observations and interviews, post-intervention assessments, and data consolidation. The findings of the study indicate that learners exposed to augmented reality intervention demonstrated statistically significant advances in mathematical conceptual understanding, arithmetic fluency, and spatial reasoning as compared to those in baseline phases. The statistical analysis using paired t-tests revealed marked gains in post-test performance across all age groups ($p < 0.05$), with the strongest effects observed in Group C (ages 8–10). Regression analysis showed that AR use accounted for substantial variance in achievement scores, independent of region. The qualitative thematic analysis revealed that augmented reality based interventions led to increased learner engagement, peer learning, motivation, and classroom interaction, with teachers reporting that AR tools assisted explanations of abstract mathematical concepts. These results demonstrate how augmented reality technology may support experiential and competency-based learning, which is in alignment with the National Curriculum Framework (NCF) 2023 and the National Education Policy (NEP) 2020. The study also offers practical suggestions for curriculum developers, educators, and policy makers on how to strategically incorporate augmented reality into mathematics instruction for long-term impact.

Contents

1. Introduction 2 Review of Related Literature 3. Research methodology. 4. Data, Data Analysis and Interpretations 5. Findings 6. Discussion 7. Recommendations and Conclusion 8. Summary.