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A REVIEW OF THE MODERN METHODS OF RESEARCH IN EDUCATION AND EMERGING TRENDS

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Abstract

The concept of research is defined by different researchers and scholars in different ways Cooper and Schindler (2018) define research as a systematic inquiry aimed at providing information to solve managerial problem. This definition emphasizes the practical application of research in solving real problems and highlights the importance of research in decision making processes. Saunders et al. (2019), defines research as a process people engage in to learn in a systematic way and expand their knowledge. The emphasis here is on learning in a structured manner. Creswell and Creswell (2017) defined research as a series of actions taken to analyze the data in order to understand the problem in a better way. The research in education has practiced a noteworthy conversion pertaining to the advancements in artificial intelligence, learning analytics, educational data mining and digital technologies. The modern methods of research have comparatively transformed into the novel system which has become mandatory for the researchers to adopt, learn and apply in order to align with the contemporary trends. Contemporary researchers employ innovative methodologies to address complex educational challenges and improve learning outcomes. This review paper examines the latest research methods in education and evaluates their applications, advantages, and limitations. Through a systematic review of recent literature, this paper identifies major methodological trends including artificial intelligence assisted research, learning analytics, mixed-methods research, digital ethnography, design-based research and participatory action research.

Keywords: *Educational research, Artificial Intelligence, Learning Analytics, Educational Data Mining, Mixed Methods Research, Design-Based Research, Digital Ethnography.*

INTRODUCTION:-

Various research findings indicate that these emerging approaches augment the accuracy, efficiency and practical relevance of research in education. The paper concludes that future

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educational research will increasingly integrate interdisciplinary, technology-driven methodologies while maintaining ethical and methodological rigor.

Educational research plays a crucial role in understanding the learning processes, improving instructional practices and framing new educational policies. Traditional research methodologies such as surveys, experiments, and case studies have contributed significantly to educational knowledge. However, rapid technological advancements and the proliferation of digital learning environments have necessitated the development of innovative research methods capable of addressing increasingly complex educational phenomena (Selwyn, 2024).

The expansion of online learning platforms, [AI] artificial intelligence and big data technologies has created new opportunities for educational researchers. Recent studies indicate that machine learning algorithms can accurately identify patterns in student achievement, engagement, and learning trajectories (Holmes et al., 2022). Contemporary methodologies enable researchers to analyze and monitor learner behaviors in real time and create deeper insights into educational processes. Hence, the educational research has evolved from descriptive approaches to data-intensive and technology-enhanced methodologies (Siemens and Baker- 2023).

The latest methods of research in education, the methodological foundations, applications and implications for future educational research and practice are discussed further.

The Objectives of this review are:

1. To identify the latest research methods used in educational research.
2. To examine the applications of emerging methodologies in educational settings.
3. To analyze the advantages and limitations of contemporary research approaches.

Methodology: - A literature review is appropriate for synthesizing existing knowledge and identifying emerging trends within a research domain (Creswell & Creswell, 2023). This study adopted a systematic literature review approach as follows.

Data Sources

Relevant literature was collected from the authentic sources.

- Peer-reviewed journal articles, books and conference proceedings published between 2020 and 2025.
- Research published between 2020 and 2025.

The selected studies were analyzed using through content analysis. Emerging methodological trends were identified, categorized and compared based on their educational applications, strengths and limitations.

Review of Emerging Research Methods in Education

Artificial Intelligence-Assisted Research

Artificial intelligence has become a powerful tool in educational research. AI technologies facilitate automated literature reviews, qualitative data coding, predictive modeling and sentiment analysis (Luckin, 2023). Machine learning algorithms are being widely used by the researchers to identify patterns and predict student performance. The efficiency in searching the related literature and systematic reviews is enhanced and improved by the AI tools such as Educational Applications, Student performance prediction, Analysis of learning behavior, Automated assessment, Content analysis of learner feedback, Improved tutoring systems etc.

Learning analytics involves collecting and analyzing learner-generated data to improve educational outcomes (Siemens and Baker, 2023). Educational researchers increasingly utilize AI-based tools to conduct systematic literature reviews, analyze the qualitative interviews and examine learner-generated content. Natural Language Processing (NLP) methods have been effective in analyzing discussion forums, reflective journals and open-ended survey responses.

Educational Data Mining (EDM) utilizes the process by applying statistical and machine-learning techniques to identify meaningful patterns in educational data through various applications. In the contemporary methodologies, Learning Analytics (LA) and Educational Data Mining (EDM) have attracted substantial scholarly attention. Baker and Inventado (2021) highlight the role of EDM in developing predictive models capable of forecasting student achievement, dropout risk, and learning behavior.

Recent studies suggest that learning analytics provides valuable insights into learners' academic performance and online behavior (Reimann-2022). . Learning analytics focuses on collecting, analyzing and interpreting learner data to understand and optimize learning processes, whereas EDM emphasizes the discovery of hidden patterns within educational datasets through computational techniques (Siemens and Baker, 2023).

Mixed Methods Research:- Mixed methods research combines quantitative and qualitative techniques within a single investigation. This approach enables researchers to obtain a comprehensive understanding of educational phenomena (Creswell and Creswell, 2023). This includes Common Designs and Convergent Parallel Design. Research evidence suggests that explanatory sequential and convergent mixed methods designs are particularly effective in educational settings because they facilitate triangulation, improve validity and strengthen interpretation (Creswell and Creswell, 2023).

Qualitative and quantitative data are collected simultaneously and integrated during analysis where in the Quantitative findings firstly are collected and subsequently explained through qualitative investigations.

Digital Ethnography:- The Digital ethnography, also known as ethnography examines interactions in online educational environments (Kimmons and Veletsianos, 2024).

With the virtual classrooms and social media platforms forming the central components of education, researchers utilize digital ethnography to study learner engagement, collaboration and identity formation. Digital ethnography extends traditional ethnographic methods into virtual environments, enabling researchers to investigate social interactions, identity construction and knowledge-sharing practices within digital learning communities (Pink et al., 2016).

Applications are •Online learning communities •Virtual classrooms •Social media interactions •Digital collaboration platforms.

Design-Based Research:- A number of studies have successfully applied DBR to curriculum development, technology-enhanced learning, teacher professional development, and instructional design (Anderson and Shattuck, 2012).

Design-Based Research (DBR) is an intervention-oriented methodology that integrates educational theory and practice through iterative cycles of design, implementation, evaluation, and revision (Wang and Hannafin -2023).

Phases of DBR involve 1.Problem Identification 2.Intervention Design 3.Implementation 4.Evaluation 5.Refinement. The applications of the DBR are •Curriculum innovation •Technology integration •Instructional design and •Educational software development.

DBR is especially useful for addressing the practical educational challenges besides creating theoretical knowledge.

Participatory Action Research:- The PAR contributes not only to knowledge generation but also to participant empowerment and professional development (McTaggart et al., 2019). Participatory Action Research (PAR) is a collaborative inquiry conducted with the active participation of stakeholders, including teachers, students and community members (Kemmis et al., 2021). Unlike conventional research approaches, PAR seeks both knowledge generation and social change.

Educational Applications of PAR are •School improvement initiative •Community-based education •Teacher professional development •Inclusive education programs •Facilitates sustainable educational improvements.

Computational Social Science:- CSC combines computational methods with educational inquiry. Machine learning, natural language processing and network analysis to study educational interactions and learning behaviors are used by the researchers. Analysis of the Applications are • Analysis of the Student discussion, • Analysis of the social network •Collaborative learning patterns and •Prediction of academic performance.

This methodology is very important as educational data become increasingly complex and huge.

Findings and Discussion: The review identified several important trends in contemporary educational research.

Finding 1: Growing Integration of Artificial Intelligence

The literature demonstrates a substantial increase in AI-assisted educational research. AI technologies are transforming data analysis procedures and enabling researchers to handle vast datasets efficiently (Luckin, 2023).

Finding 2: Expansion of Data-Driven Research

Learning analytics and educational data mining have become central methodologies in educational investigations. Researchers increasingly rely on learner-generated data to understand educational processes and improve instructional interventions (Siemens and **Baker, 2023).**

Finding 3: Immense Use of Mixed Methods

Recent studies reveal that mixed methods research remains the preferred approach for investigating complex educational phenomena due to its ability to integrate quantitative precision with qualitative depth (Creswell and Creswell, 2023).

Finding 4: Rise of Digital Research Environments

The transition toward online learning environments has encouraged greater adoption of digital ethnography and virtual data collection techniques (Kimmons and Veletsianos, 2024).

Finding 5: Emphasis on Practical Impact

Design-Based Research and Participatory Action Research emphasize solutions to real-world educational problems, bridging the gap between theory and practice (Wang and Hannafin, 2023; Kemmis et al., 2021).

Implications for Educational Research

The findings suggest that future educational researchers should develop competencies in:

1. Artificial Intelligence applications 2.Learning analytics 3.Data visualization 4.Mixed-methods research design 6.Educational data mining and 7.Digital research ethics.

Teacher Education Institutions and Institutes of Higher Learning should revamp the research methodology, research curricula, include and equip with these emerging approaches.

CONCLUSION:-

Educational research is undergoing a paradigm shift characterized by the integration of technological innovations and interdisciplinary methodologies. Emerging approaches such as Artificial Intelligence-assisted research, learning analytics, educational data mining, mixed methods research, digital ethnography, design-based research and participatory action research provide powerful tools for understanding the educational phenomena. Though these methodologies enhance the depth, accuracy and relevance to the research findings while addressing contemporary educational challenges but the educational researchers must adopt the innovative methodologies while maintaining rigorous ethical and scientific standards. Very less attention has been given to understand how the technology-driven methodologies can be integrated with participatory and human-centered approaches to deal with ethical, pedagogical and contextual concerns. This gap highlights the need for comprehensive reviews that critically examine the evolving methodological scenario of the educational research and identify the directions for future development in methodologies.

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