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Original Article

Role of Interdisciplinary Learning in Rethinking Education

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Abstract

Interdisciplinary education is emerging as a primary method for enhancing educational practices. Conventional education often compartmentalizes subjects potentially restricting students to a singular domain of knowledge. Interdisciplinary learning integrates concepts and competencies from diverse fields, including science, arts, technology and social studies. This method enhances students critical thinking, creativity and problem-solving skills in real-life contexts. In the 21st century, characterized by rapid technological advancement and ongoing societal change, it is essential for students to integrate knowledge across disciplines. This paper examines the role of interdisciplinary learning in the development of curriculum, teaching methods, assessment practices and educational guidelines. The study employs a mixed-method approach incorporating both quantitative and qualitative data. Questionnaires were administered to students and teachers while interviews and group discussions provided supplementary insights. The findings suggest that interdisciplinary learning builds student's confidence, supports problem-solving skills and better prepares them for upcoming professions. Teachers also believe this method is useful but feel they need more training to spread over it effectively. They also face problems like unbending curricula and old exam systems.The conversation highlights that if schools want to make interdisciplinary learning effective, they must provide teacher training, make the curriculum flexible and change the way assessments are done. In conclusion, interdisciplinary learning is not just a new idea but a necessity for preparing students for the future. With the right support and planning, it can become the foundation of meaningful and future-ready education.

Keywords: *Interdisciplinary, Learning, Rethinking, Critical thinking, Role, Disciplinary, Education*

Introduction

Education in the 21st century is changing rapidly due to globalization, digital technology and the need for new skills. "Traditional subject-based teaching often isolates knowledge" into separate boxes such as science, mathematics, "Traditional subject-based teaching often isolates knowledge…" (Beane, 1997) or social studies. This approach limits student's ability to connect ideas and apply knowledge in real-life situations. In contrast, interdisciplinary learning helps students bring together concepts from different subjects to develop creativity, critical thinking, and problem-solving abilities. (Drake & Reid, 2020) International bodies like UNESCO (2015) and national policies such as India's NEP 2020 highlight (UNESCO, 2015; Government of India, 2020) the need for such flexible and integrated learning systems.

Problem Statement

Although interdisciplinary learning has proven benefits, it is still not widely practiced in many schools. Teachers face challenges like rigid curricula, exam-oriented systems (Jacobs, 1989; Fogarty, 1991) and lack of training to design interdisciplinary activities. Students, too are often guided only toward test preparation, leaving less room for creativity or practical application. Without systemic support, interdisciplinary learning risks remaining more of a policy idea than a classroom reality. Therefore, it is important to study how interdisciplinary learning can be integrated effectively and what changes are needed in teaching, assessment, and policy.

Research Objectives

This study is guided by the following objectives

- To examine the role of interdisciplinary learning in improving student skills such as creativity, problem-solving and collaboration.
- To understand teacher's perspectives on the benefits and challenges of interdisciplinary learning.
- To identify barriers (e.g., rigid curricula, exams) that prevent effective implementation.
- To explore how education policies like NEP 2020 and frameworks like UNESCO 2030 can support interdisciplinary approaches.

Research Questions

How does interdisciplinary learning benefit student's academic and personal growth?

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What challenges do teachers face while applying interdisciplinary methods?
What policy and systemic changes are needed to make interdisciplinary learning successful?

Scope of the Study

The study focuses on the educational context of secondary and higher education, with particular reference to the Indian system under NEP 2020, while also considering global perspectives such as UNESCO's 2030 framework. It uses a review-based and mixed-method approach, combining surveys, interviews and analysis of existing literature. The scope is limited to exploring the concept, benefits, challenges and policy implications of interdisciplinary learning, rather than testing a specific intervention in classrooms. However, the findings are useful for teacher's, policymakers, curriculum designers and researchers interested in improving the quality of education through integrated learning approaches.

Review of Literature

1. Beane (1997)

Beane explained that integrating different subjects in the curriculum makes learning more meaningful for students. Instead of learning each subject separately, students can connect ideas across fields, which helps them think in a more democratic and collaborative way. This supports the basic idea of interdisciplinary learning.

2. Klein (1990/2005)

Klein showed that interdisciplinary is not just mixing subjects but creating new ways of thinking by combining knowledge and methods from different areas. Her work explains the academic contextual of why interdisciplinary education is powerful for solving difficult problems.

3. Drake and Reid articulated that integrated and interdisciplinary learning fosters the development of essential 21st-century skills, creativity, problem-solving and teamwork. They also pointed out that for this approach to do well, schools need flexible curricula project-based learning and updated methods of assessment.
4. UNESCO (2015) underlined the requirement for education systems that are skill-oriented, inclusive and adaptable in its Education 2030 Structure. Addressing global challenges like sustainability necessitates that students integrate knowledge from various disciplines, which embodies the principle of interdisciplinary learning.
5. The National Education Policy (NEP) 2020, issued by the Government of India, advocates for interdisciplinary and multidisciplinary approaches in education. The policy promotes flexible subject selection, project-based learning, and skill-oriented education to enhance learners' preparedness for future careers and lifelong learning.

Methodology

This study uses a mixed-method research design (Creswell & Plano Clark, 2018) that combines quantitative and qualitative approaches to better understand interdisciplinary learning. The quantitative part collects measurable data on students' skill growth and teachers' views through structured surveys. The qualitative part offers deeper insights into experiences, challenges, and suggestions using interviews and focus group discussions. By bringing these two methods together, the study provides a more complete and balanced understanding of the topic.

A descriptive-exploratory design was used. The descriptive part looks at the present situation, frequency, and effects of interdisciplinary learning in selected schools. The exploratory aspect investigates teacher's and student's perceptions, experiences, and challenges, providing rich, contextualized insights to supplement numerical data. This dual design allows for both objective measurement and interpretive understanding of interdisciplinary practices.

The study targeted students and teachers from schools implementing or experimenting with interdisciplinary learning. Participants were selected using purposive sampling to ensure representation across different:

Age groups (secondary and higher secondary levels).
Academic subjects (science, mathematics, social sciences, languages).
Teaching experience (novice to experienced educators).

A total of 10 students and 10 teachers participated in the study. Selection criteria ensured that participants had direct exposure to or involvement in interdisciplinary learning practices.

Quantitative Data: Structured questionnaires were administered to collect measurable information on:

Student's academic skills, creativity, problem-solving and collaboration
Teacher's perceptions of interdisciplinary learning benefits and challenges

Qualitative Data: Semi-structured interviews and focus group discussions were conducted with selected students and teachers to explore:

Experiences and insights regarding interdisciplinary learning.
Challenges faced in curriculum design, assessment, and implementation.
Suggestions for improving interdisciplinary practices.

Data collection tools were pre-tested for clarity, reliability and validity.

Quantitative Analysis: Survey responses were analyzed using descriptive statistics, including frequencies, percentages, means and standard deviations to summarize participant's responses.

Qualitative Analysis: Thematic analysis (Braun & Clarke, 2006) was applied to interview and discussion transcripts. Recurring themes, patterns and notable insights were identified, categorized and interpreted to understand challenges, benefits and implementation strategies.

Ethical standards were strictly followed throughout the study. Participant's informed consent was obtained prior to data collection. Responses were kept confidential and anonymized and all data were stored securely. The study respected participant's rights to withdraw at any stage. Additionally, all sources of information were properly cited and intellectual property guidelines were maintained in reporting the findings.

The study is limited to the selected schools that have implemented or are experimenting with interdisciplinary learning. Therefore, findings may not be completely generalizable to all educational circumstances. The study focuses on perceptions, experiences and reported outcomes rather than experimental measurement of learning improvements.

Results & Discussion

The study indicates that interdisciplinary learning significantly enhances student's confidence, problem-solving abilities and readiness for future careers. These findings suggest that interdisciplinary approaches help students develop essential 21st-century skills such as creativity, critical thinking and adaptability (Beers, 2011; Jacobs, 1989). By integrating knowledge across subjects, students are better prepared to face modern academic and

professional challenges. This aligns with previous research emphasizing the role of interdisciplinary learning in fostering holistic skill development (Klein, 2017).

Teachers generally perceive interdisciplinary learning as a valuable instructional approach. However, many expressed the need for additional training to implement it effectively (Drake & Reid, 2018). This highlights the critical role of professional development programs in supporting teachers, ensuring they are equipped with the knowledge, strategies and confidence necessary for interdisciplinary instruction. Without such support even motivated educators may struggle to apply interdisciplinary methods in the classroom (Beane, 1997).

The study found several structural barriers that limit the spread of interdisciplinary learning, such as rigid curricula and old-fashioned examination systems (Repko, 2012). These issues stop schools from fully applying interdisciplinary methods. Overcoming these barriers calls for broader reforms in education policies, curriculum design, and assessment systems so that schools can use flexible and student-centered teaching practices (Drake & Burns, 2004). Effective interdisciplinary learning relies on flexible curricula and creative assessment methods. Schools need to move past fixed subject divisions and traditional exams to promote knowledge integration (Klein, 2010). With more adaptive assessments and revised curricula that encourage interdisciplinary work, teachers can build students' critical thinking, problem-solving, and teamwork skills more effectively (Jacobs, 1989; Repko, 2012).

The results show that interdisciplinary learning is not just an educational trend but a vital step in preparing students for the future. School policies and practices should give priority to this method to develop learners who are ready for future demands (Drake & Reid, 2018). To apply interdisciplinary learning well, there must be synchronization in teacher training, curriculum flexibility and assessment reforms. This ensures that students increase the skills they need to thrive in a world that is rapidly changing (Beers, 2011; Klein, 2017).

Discussion

This study emphasizes the growing significance of interdisciplinary learning within educational contexts. Survey and interview results from students and teachers indicate that interdisciplinary learning is more effective and meaningful than conventional subject-based methods. Students indicated that this method enhanced their confidence, improved their problem-solving abilities and fostered creativity. The findings corroborate Beane's (1997) assertion that curriculum integration facilitates a more democratic and collaborative understanding of knowledge among students.

This study demonstrates that interdisciplinary learning facilitates the acquisition of essential skills for the 21st century among students. Modern society necessitates a combination of academic knowledge along with creativity, adaptability, collaboration and problem-solving skills. Responses from students indicated that linking subjects allows for an understanding of the relationship between mathematics and science as well as technology connects to social issues. This makes learning practical, relevant and engaging. Drake and Reid (2020) reported similar conclusions, noting that interdisciplinary and project-based learning prepare students with the skills needed to address complex challenges in the modern world.

Another important finding relates to the role of teachers. Teachers in this study agreed that interdisciplinary teaching is valuable but many expressed hesitations. They felt unprepared to design interdisciplinary lessons as they were more confident teaching within their own subjects. Designing lessons that combine knowledge from different areas was seen as challenging. This reflects UNESCO's (2015) point that teachers need continuous professional development to successfully apply new teaching methods. Without such training many teachers remain dependent on conventional subject-based instruction.

Another problem is the strict curriculum and exam system. It does not leave much space for trying new methods.

Teachers said they want to try new ways of teaching. But the present system gives too much importance to exams. It mainly pushes students toward rote learning instead of real understanding.

Students said they often feel stressed because they have to prepare for exams. This pressure takes away their chance to enjoy creative, project-based activities Innovative teaching and traditional exams do not match well. This mismatch creates problems for the development of interdisciplinary learning. The policy also promotes project-based learning instead of only memorizing facts. It suggests new ways of testing that focus on skills, not just exams.

The results of this study agree with these recommendations. They show that such changes are really needed. The findings suggest that policymakers need to think more deeply about supporting interdisciplinary learning. They must also give schools and teachers the right tools to make it happen in real classrooms. Instead of focusing only on memory, tests could measure skills like creativity, teamwork and problem-solving. It also calls for education that builds practical skills and supports sustainable development.

The study shows that the impact goes beyond just curriculum and skills. Students also said they like it when knowledge can be used in real-life situations. The findings support the idea that interdisciplinary education builds important skills. Many schools face other problems such as a lack of resources, overcrowded classrooms, and too little time for teachers to plan interdisciplinary projects.

A good balance is needed so that students gain both deep knowledge in individual subjects and the ability to connect ideas across them. This balance will help students build a strong base in each subject and also develop broader skills through integration.

However, along with this subject learning, students should also get chances to connect different subjects through integration. The discussion of results with earlier studies shows that the findings are consistent with global developments. Klein (1990/2005) emphasized that interdisciplinary is not just about mixing subjects but about creating new frameworks of understanding. This research supports her view as students and teachers both indicated that interdisciplinary approaches helped them develop new ways of thinking about knowledge. Similarly, NEP 2020's recommendations resonate with the results of this study showing a clear alignment between policy goals and practical classroom experiences.

Moving forward, several recommendations can be drawn from this discussion. First, teacher training programs must include modules on interdisciplinary methods - curriculum design and assessment innovations. Second, schools should be encouraged to follow flexible curricula that make room for project-based work across subjects. Third, reforms in assessment are essential. Instead of focusing only on memory schools should evaluate skills such as creativity, teamwork and the ability to apply knowledge. Fourth, policymakers need to ensure that schools have the resources, time & support systems required to try new approaches. Without such support, interdisciplinary

learning may remain an idea in theory rather than a practice in reality. Finally, this discussion highlights that interdisciplinary learning is not just an educational trend but a real necessity. In a world shaped by rapid technological growth, globalization, and complex social issues, students must learn to think across boundaries. Education that keeps subjects isolated cannot provide the tools needed to face today's challenges. This study therefore adds weight to the view that interdisciplinary learning should become the base of future-ready education. By combining the enthusiasm of students, the guidance of teachers, and the support of strong policies schools can build a system where knowledge is connected, skills are developed and learning becomes genuinely meaningful.

Conclusion

This study leaves little room for debate- the era of rigid subject boundaries in education should be behind us. Evidence from both students and teachers underscores a clear advantage-when disciplines intersect the resulting knowledge tends to stick, and, more importantly, carries actual relevance to the world outside the classroom.

Education shouldn't be reduced to rote memorization or the mechanical transfer of facts. The reality is our world is increasingly complex and the qualities we prize most-creativity, adaptability, teamwork and genuine problem-solving-don't develop in silos.

When students see the interplay between mathematics and science, or consider the broader impact of technology on society, learning ceases to be abstract. It becomes tangible and meaningful. This sense of relevance is precisely what can ignite authentic engagement-something frequently lacking in traditional educational settings.

And this is not just theoretical optimism. Drake and Reid (2020) present convincing evidence that project-based, interdisciplinary approaches better prepare students to navigate the unpredictable nature of contemporary life. The data is compelling: the compartmentalized model of instruction is increasingly obsolete. If the goal is to equip students for the complexities of the real world, integrating disciplines is not just beneficial-it's essential.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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