Hybrid Learning Vs Fully Remote Learning

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Abstract

In this study, the relative efficacy of entirely remote and blended learning in computer science education is investigated. Higher education institutions have embraced blended (hybrid) models, which combine in-person instruction with online platforms, as well as fully remote learning environments supported by Zoom, Google Classroom, and Microsoft Teams, in response to the swift digital change of higher education. The choice of instructional method has a major impact on student engagement, skill development, and academic achievement in computer science programs, where lab sessions, collaborative projects, and programming practice are crucial. The study uses survey data gathered from undergraduate computer science students in an analytical and descriptive research style. To assess how the two models differ in terms of learning results, satisfaction levels, and communication efficacy, statistical approaches including percentage analysis, mean score comparison, standard deviation, and independent sample t-tests are suggested. According to preliminary results, entirely remote learning gives flexibility, accessibility, and enhanced digital collaboration abilities, but hybrid learning delivers better practical exposure, peer interaction, and rapid teacher feedback. However, in completely remote settings, problems like poor internet connectivity, less in-person monitoring, and communication breakdowns are more noticeable. The study comes to the conclusion that by fusing the advantages of both traditional and digital learning settings, a well-designed hybrid model might provide a well-rounded approach to computer science education.

***Keywords**: Blended learning, online learning, computer science education, student engagement, academic performance, educational technology, and hybrid learning.*

Introduction

Traditional teaching paradigms have changed as a result of the introduction of digital technologies into higher education. Learning outcomes are greatly impacted by instructional

delivery modalities in computer science education, where programming, system design, and laboratory experience are crucial. While fully remote learning depends solely on digital communication and virtual surroundings, hybrid learning blends classroom instruction with online resources. In order to provide remote training, tools like Zoom, Google Classroom, and Microsoft Teams have become essential. Institutions have been forced to assess the efficacy of these models due to the shift to distant learning, particularly following global upheavals. This study presents a descriptive comparison of entirely remote and hybrid learning strategies in computer science departments.

Review of Literature

According to earlier research, hybrid learning improves student engagement by allowing for direct communication and quick feedback. Due to the combination of teaching methodologies, researchers contend that blended models promote improved knowledge retention. Fully remote learning research, on the other hand, places more emphasis on cost-effectiveness, flexibility, and the development of technology skills. But there have also been complaints of problems including poor supervision, technical difficulties, and decreased peer engagement. Comparative descriptive studies are particularly needed in computer science education, according to the literature currently in publication

Objectives

1. In order to explain the features of fully remote and hybrid learning in computer science education.
2. To evaluate the degree of student involvement in the two types of instruction.
3. To investigate how entirely remote and blended learners differ in their academic achievement.

Research Methodology

1. The research design used in this study is descriptive.
2. Population: Students pursuing undergraduate degrees in computer science
3. Students make up the sample (60 hybrid and 60 fully remote).
4. Method of Sampling: Basic random sampling
5. Likert scale-based structured questionnaire as a data collection tool.

Analysis of Data Method

Percentage Analysis

1.Level of Student Satisfaction

Learning Mode	Highly Satisfied	Satisfied	Neutral	Dissatisfied	Total
Hybrid Learning	28 (46.7%)	20 (33.3%)	7 (11.7%)	5 (8.3%)	60 (100%)
Fully Remote Learning	22 (36.7%)	18 (30.0%)	10 (16.7%)	10 (16.6%)	60 (100%)

2. Improvement in Academic Performance

Learning Mode	Significant Improvement	Moderate Improvement	No Change	Total
Hybrid Learning	30 (50%)	20 (33.3%)	10 (16.7%)	60 (100%)
Fully Remote Learning	24 (40%)	18 (30%)	18 (30%)	60 (100%)

3.Communication Effectiveness

Learning Mode	Very Effective	Effective	Less Effective	Total
Hybrid Learning	32 (53.3%)	18 (30%)	10 (16.7%)	60 (100%)
Fully Remote Learning	20 (33.3%)	22 (36.7%)	18 (30%)	60 (100%)

Analyzing Descriptively

Participants of Student

Face-to-face interaction and hands-on lab sessions led to increased levels of engagement among hybrid learning students. Although fully remote learners valued flexibility, there were occasionally communication lapses.

Academic Achievement

In particular, programming and lab-based disciplines showed somewhat better academic achievement among hybrid learners, according to mean score comparison.

The Efficiency of Communication

In hybrid classes, questions could be directly answered. The dependability of the internet and digital tools were essential for fully remote learning.

Developing Skills

While hybrid learners displayed greater practical technical proficiency, remote learners showed enhanced digital collaborative abilities.

Resulting

1. Enhanced practical comprehension is facilitated by hybrid learning.
2. Completely remote learning enhances adaptability and self-directed learning abilities.
3. Fully distant environments are more likely to have communication obstacles.
4. Using both approaches together could improve learning results.

Recommended

1. Use organized hybrid models that blend real and virtual laboratories.
2. Teach staff and students technical skills.
3. Make digital support systems and internet infrastructure stronger.
4. Create interactive online coding platforms to improve participation from a distance.

Conclusion

According to the study's findings, there are clear benefits and drawbacks to both hybrid and totally remote learning in computer science education. Fully remote learning provides flexibility and accessibility, whereas hybrid learning improves practical exposure and human connection. Institutions should think about implementing a structured hybrid model that combines the advantages of both strategies for long-term academic progress. Inferential statistical techniques might be used in future studies to confirm comparative effectiveness.

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