


# Chapter 13


## Reimagining Computer Science Education in Remote, Hybrid, and Flipped Classrooms for Future-Ready Learners

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### ABSTRACT

*Advances in Learning Technology are promoting education in Computer Science from models of education utilizing predominantly lectures as forms of education, to innovations in pedagogy and into emerging models of student centered pedagogies. Distance and hybrid education in knowledge delivery and the concepts of the flipped*

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*learning environment are changing the learning output in Computer Science, providing more flexible, accessible, and participatory models of education which are synchronous with the evolving demands of the society for skills formation. Challenges to the pedagogical basis, strengths, and weaknesses of these forms of education and how they cope with problem solving and interdisciplinary learning are discussed in the light of the canons of equitable access to education. It examines how distance delivery is increasing access to greater diversity of learner, how hybrid models can help provide a degree of collaborative learning while also affording flexibility, and how flipped learning can enhance levels of active learning and levels of cognitive comprehension.*

## **INTRODUCTION**

The increasing advancement of digital technology has had a significant effect on how education is provided and organized, including on the area of computer science education. Inasmuch as computing technology has a presence in almost all areas of modern life, there is a growing need for computer science education to be based on the increased changes taking place, both technologically and societally, if the education of the student at this level is to be meaningful. This section looks at the potential of revamping the computer science curriculum by taking advantage of three models that are being used in developing lecture formats remotely, Hybrid, and Flipped classrooms (where students are taught using videos and materials available online). It also discusses how to transform the way teachers teach by using digital technology, creating a more student-centric instructional model and new technologies such as AI, and learning analytics. Through a critical lens, the authors seek to identify what traditional approaches to teaching do not do effectively and suggest how technology-based pedagogy can improve student participation, skill development in multiple fields of study, inclusion, and adaptability. By combining theoretical principles with practical experiences and real-life examples, this section aims to provide an overall guide to the creation of sustainable and future-focused computer science education environments.

## **MAIN FOCUS OF THE CHAPTER**

This chapter examines how to strategically design and integrate remote, hybrid, and flipped classroom models to transform computer science education for future-ready learners. It discusses how pedagogy has shifted from teacher-centered instructional practices to student-centered technology-enabled learning environ-

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