Redefining Career Navigation in Computer Science: A Mixed-Method Approach Integrating Peer Data and Industry Perspectives Project Documentation Led by Karishma

Patel

1 Inspiration Behind the Study

This project began with a deeply personal moment — watching my younger brother, a Class 10 student, stand at a life-altering crossroads. He's being asked to choose between science, commerce, and arts, a decision that feels monumental for a teenager. The weight of expectations from family, teachers, and peers surrounds him, yet I couldn't help but wonder: does he really know what each path holds? Are the voices guiding him grounded in the realities of those fields, or are they just echoes of well-meaning but distant advice?

As a Computer Science undergraduate, I've walked a similar path. Even after diving into this field, I discovered how vast and complex it is — a maze of roles, skills, and possibilities that no one fully prepares you for. I've seen friends and classmates, from high school to graduate school, grappling with the same uncertainty: "What's the right career for me? What does the industry actually want? Where do I even start?" This project was born from that shared struggle — a desire to give students like my brother, and like myself, a clearer map. By listening to the real questions and doubts of students from Classes 9 to 12, as well as undergraduate and graduate students, and connecting them with professionals who live and breathe these careers, I hope to create a bridge between confusion and confidence. My goal is simple but heartfelt: to help students make choices that feel true to them, armed with real-world insights and the freedom to explore, pivot, and discover what truly sets their hearts alight.

2 Need for the Study

In recent years, enrollment in Computer Science and its allied disciplines has surged dramatically both in India and worldwide. According to the All India Council for Technical Education (AICTE), over 376,000 students enrolled in Computer Science and Engineering (CSE) programs in India during the 2022–23 academic year, making it the most sought-after engineering discipline. This is part of a broader trend: the total number of engineering seats in India reached 1.49 million in 2024–25, with new specializations like Artificial Intelligence, Machine Learning, and Cybersecurity rapidly gaining traction (AICTE; Times of India). Globally, the U.S. National Student Clearinghouse reported over 113,000 CS bachelor's degrees awarded in 2022–23 alone, with North American universities experiencing a tripling of CS enrollments since 2005 (NSC, The Atlantic). Despite this explosive growth, there exists a consistent gap between student aspirations and real-world career clarity. With increasing specializations and evolving industry demands, many students — from Classes 9 to 12 to undergraduate and graduate levels — remain uncertain about suitable career paths, skill requirements, and emerging domains. There is an urgent need for structured, evidence-based career interventions that align student expectations with actual industry trajectories.

3 Introduction

This study investigates the phenomenon of career confusion among students in Classes 9 to 12, as well as undergraduate and graduate Computer Science students, and proposes a hybrid intervention model that blends empirical peer data with professional insights. The project was initiated and led by Karishma Patel, a CS undergraduate student, and is grounded in a dual-method framework: (1) collecting quantitative and qualitative data from students through structured surveys to understand their career aspirations, interests, and confusion points; and (2) developing a series of professional video interviews to provide actionable guidance and real-world perspectives. By synthesizing student data with insights from industry professionals in fields like software engineering, cybersecurity, AI/ML, biotech, and fintech, the study aims to map patterns of confusion, identify gaps in awareness, and propose actionable pathways for improved career clarity. This initiative also serves as a reflective documentation of a student-led solution, offering a template for similar interventions in academic institutions. The broader goal is to inform curriculum design, student counseling strategies, and the integration of real-world exposure into education for students at various stages of their academic journey.

4 Objectives of the Study

The primary objectives of this study are as follows:

1. To identify the key factors contributing to career confusion among students in Classes 9 to 12, undergraduate, and graduate Computer Science students, including gaps in awareness about career paths, skills, and industry expectations.
2. To collect and analyze quantitative and qualitative data from student surveys to map their aspirations, interests, and perceived challenges in navigating CS career paths.
3. To develop a series of professional video interviews that provide real-world insights, emerging trends, and practical advice to guide students.
4. To create a hybrid intervention model that integrates student data with professional perspectives to provide actionable career guidance.
5. To establish a scalable framework for academic institutions to address career confusion through data-driven counseling and real-world exposure for students at secondary, undergraduate, and graduate levels.

5 Methodology

The study employs a mixed-method approach to address career confusion among students in Classes 9 to 12, as well as undergraduate and graduate Computer Science students. The primary data collection is conducted through student surveys, while professional video interviews serve as a key component of the solution to provide guidance and bridge awareness gaps.

5.1 Quantitative and Qualitative Data Collection: Student Surveys

- **Target Population:** Students in Classes 9 to 12, undergraduate, and graduate Computer Science students across various institutions in India, representing diverse academic stages and interests.

- **Instrument:** A structured online survey designed to capture data on students' career aspirations, preferred specializations, perceived skill gaps, and specific points of confusion. The survey includes multiple-choice questions, Likert-scale ratings, and open-ended responses to allow for both statistical analysis and qualitative insights.
- **Distribution:** Surveys will be distributed via academic networks, school and college organizations, and online platforms, targeting a minimum sample size of 500 respondents across the target groups to ensure statistical significance.
- **Analysis:** Responses will be analyzed using statistical tools to identify patterns, such as common areas of confusion, popular career interests, and gaps in industry awareness. Descriptive statistics and thematic analysis will be applied to open-ended responses to capture nuanced student perspectives.

5.2 Solution Component: Professional Video Interviews

- **Target Participants:** Industry professionals from diverse CS fields, including software engineering, cybersecurity, AI/ML, biotech, and fintech, with varying levels of experience (early-career to senior roles).
- **Instrument:** Semi-structured video interviews based on a predefined set of questions covering personal background, career insights, education, specialization, global exposure, mindset, and advice for students. These interviews are designed to provide practical, real-world perspectives and actionable guidance to address the confusion identified in student surveys.
- **Language Preference:** The preferred language for interviews is English, though professionals are encouraged to provide recordings in both English and Hindi if time permits, to cater to a broader student audience.
- **Execution:** Interviews will be conducted remotely via video conferencing platforms, recorded, and edited into short, accessible videos for student consumption. A minimum of 10 professionals will be interviewed to ensure diverse perspectives.
- **Purpose:** The videos serve as a solution component, offering students direct access to industry insights and guidance to complement the survey findings, helping them navigate career paths with greater clarity.

5.3 Integration and Dissemination

- **Synthesis:** Survey data will be synthesized to map student confusion points and aspirations, while professional video interviews will provide actionable recommendations to address these gaps, creating a cohesive guidance model.
- **Deliverables:** The study will produce a comprehensive report summarizing survey findings, a series of educational videos featuring professional interviews, and a framework for academic institutions to implement similar career guidance interventions.
- **Dissemination:** Findings and videos will be shared with schools, colleges, student communities, and online platforms to maximize reach and impact for students in Classes 9 to 12, undergraduate, and graduate levels. The framework will be documented as a template for replication in other disciplines.

Acknowledgment
This project is led by Karishma Patel, with gratitude to all participating students and professionals whose contributions make this initiative possible. Your insights are invaluable in shaping the future of CS education and career navigation.