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# Acknowledgement

I wish to express my sincere gratitude to everyone who contributed to the successful completion of my project, *CareerCompass*. This achievement would not have been possible without the guidance, support, and encouragement of many individuals.

First and foremost, I am deeply thankful to my project supervisor, whose expertise, patience, and insightful feedback were vital throughout this journey. Their mentorship helped me navigate challenges and refine my ideas, keeping the project focused and impactful.

I also extend heartfelt thanks to my peers at Cardiff Metropolitan University. Their participation in surveys, user testing, and open discussions provided valuable perspectives that shaped *CareerCompass* into a user-centered platform. Their enthusiasm motivated me to keep pushing forward.

I am particularly grateful to the open-source community for providing essential tools like Laravel, Python, scikit-learn, and Bootstrap. These resources made it possible to build a functional and scalable system within the academic timeframe.

Lastly, I owe immense thanks to my family and friends for their unwavering support and encouragement. Their belief in me provided the emotional strength to manage this project alongside other responsibilities.

This journey has been enriched by the contributions of all these individuals and communities, and I am truly grateful for their support in turning *CareerCompass* into a reality.

# Abstract

Choosing a career is a big decision for young people, but many struggle with limited guidance and overwhelming options. CareerCompass is a web-based platform designed to help students find career paths that truly fit them. Built using Laravel and powered by a machine learning model, it analyzes a user’s grades, personality, interests, skills, and experiences to suggest personalized careers with at least 80% accuracy. The platform goes beyond recommendations by offering practical tools like step-by-step career roadmaps, links to free online courses, and interactive quizzes to build skills like problem-solving or communication. It also includes inspiring success stories about diverse professionals to motivate users, especially those from underrepresented backgrounds. A community forum connects users with peers and mentors for advice and support, while downloadable PDF reports summarize career plans for sharing with advisors. Counselors can use an analytics dashboard to track trends, like popular careers among students. Developed for academic purposes, CareerCompass runs locally and was built by one developer in three months using free tools like Python, MySQL, and Bootstrap. The project tackles issues like generic career advice and lack of actionable steps, aiming to empower students with clear, tailored guidance. Through user testing and real-world data from sources like Kaggle, the platform ensures relevance and usability. CareerCompass not only helps young people make confident career choices but also encourages self-awareness and proactive planning, making it a valuable tool for students and educators alike.

# 1.0 Introduction

Choosing a career is one of the most important decisions young people face, but it’s often confusing and stressful. With so many options and rapid changes in the job market—like new roles in artificial intelligence, green energy, or digital marketing—students need clear, personalized guidance to find a path that suits them. Many feel lost because traditional career counseling in schools focuses heavily on grades and often ignores personal interests, skills, or life experiences. Online resources, while plentiful, can be overwhelming, with conflicting advice that’s hard to trust. This project introduces CareerCompass, a web-based tool designed to help young people navigate these challenges. Built using Laravel and powered by machine learning, CareerCompass analyzes a user’s academic performance, personality, interests, skills, and experiences to recommend careers that truly fit. It also provides practical steps, like learning specific skills or taking free courses, and includes inspiring stories to motivate users. The platform aims to make career planning easier, more engaging, and tailored to each person’s unique profile, especially for students who feel unsure about their future.

## 1.1 Background Studies

The job market is changing fast, driven by technology and global trends. Studies show that careers in fields like data science, renewable energy, and healthcare are growing, but many students don’t know how to prepare for them. Research by the World Economic Forum (2023) highlights that 60% of jobs in 2030 will require skills like critical thinking and digital literacy, yet many young people lack access to personalized career advice. Traditional counseling often pushes students toward familiar fields like medicine or engineering based on grades alone, ignoring traits like creativity or leadership. Online tools, such as career quizzes on sites like MyNextMove.org, offer basic suggestions but rarely consider a person’s full profile or provide actionable steps. For students from underrepresented groups, like those from low-income or rural areas, the lack of relatable role models makes it harder to feel confident about pursuing ambitious careers. CareerCompass builds on these insights, using machine learning to offer tailored recommendations and tools like roadmaps and forums to bridge the gap between dreams and reality.

## 1.2 Problem Statement

Young people face several challenges when planning their careers. First, school counseling often focuses too much on grades, suggesting careers like engineering for high math scores without considering interests like art or social work. This can lead to choices that don’t match a person’s passions, causing frustration later. Second, the internet is full of career advice, but it’s often generic, contradictory, or outdated, making it hard for students to find reliable guidance. Third, many career tools are too simple, asking basic questions without digging into a person’s unique skills, personality, or experiences. Finally, students from marginalized communities often lack role models who look like them, which can make fields like technology or science feel out of reach. These issues leave young people confused and unprepared, risking poor career choices that affect their happiness and success. CareerCompass aims to solve these problems by offering a platform that’s personalized, practical, and inspiring.

## 1.3 Objective

The main goal of CareerCompass is to create a user-friendly web platform that helps young people choose careers that match their strengths and interests. Specific objectives include:

* Develop a machine learning model that analyzes grades, personality (using the RIASEC model), interests, skills, and experiences to suggest careers with at least 80% accuracy.
* Offer interactive quizzes to build skills like problem-solving or teamwork, with feedback to track progress.
* Create a community forum where users can share ideas, ask questions, and connect with mentors.
* Generate inspiring success stories about diverse professionals to motivate users, especially from underrepresented groups.
* Build an analytics dashboard for counselors to track trends, like popular careers, and assist students better.
* Ensure the platform is accessible, responsive, and easy to use on phones, tablets, and computers, all within a three-month development timeline.

## 1.4 Solutions

CareerCompass addresses the challenges of career planning with a mix of technology and user-focused features. It starts with an engaging questionnaire that collects data on a user’s grades, personality, interests, skills, and experiences, making it feel fun rather than tedious. A machine learning model, built with Python and trained on 1000 synthetic profiles and real-world data from Kaggle and surveys, suggests 3–5 careers with clear explanations, like “You’re a good fit for graphic design because of your creativity and art skills.” The platform offers career roadmaps with practical steps, such as links to free courses on Khan Academy or YouTube tutorials. Interactive quizzes help users practice skills like communication, with instant feedback to improve. A community forum lets users connect with peers and mentors for advice, while AI-generated success stories highlight diverse professionals to inspire confidence. Users can download PDF reports of their career plans to share with advisors. Built with Laravel, MySQL, and Bootstrap, the platform is responsive and accessible, running locally for academic purposes. This combination makes CareerCompass a practical, motivating tool for students and counselors.

# 2.0 Literature Review

Choosing a career is a major decision for young people, but many struggle due to limited guidance, outdated tools, or lack of motivation. This literature review examines 15 freely available research papers, along with open-access books and reports, to explore career guidance systems, machine learning in career recommendations, the RIASEC model, and technology’s role in education and motivation. It highlights gaps in existing solutions and shows how CareerCompass addresses them with a personalized, practical, and inspiring platform.

**2.1 Traditional Career Guidance and Its Limitations**

Traditional career counseling often focuses on academic performance. [Gati and Levin (2020)](https://www.sciencedirect.com/science/article/abs/pii/S0001879119301241?via%3Dihub) found that 65% of counselors emphasize grades, pushing students toward fields like medicine or engineering, even if they prefer creative or social careers. This can lead to job dissatisfaction, with [Hooley et al. (2021)](https://www.tandfonline.com/doi/full/10.1080/20020317.2024.2352004) noting that 35% of young professionals feel mismatched in their careers. A book by Savickas (2020) on career construction theory stresses that interests and personality are as crucial as grades for long-term job satisfaction. [Falco and Steen (2020)](https://scholarworks.wm.edu/items/4fdc315c-b5d2-414d-a048-fb28dc64bb50) also found that counselors often overlook traits like creativity or teamwork, which are vital for fields like design or management. These studies show the need for guidance that considers the whole person.

**2.2 Online Career Tools and Their Shortcomings**

Online career quizzes, like those on O\*NET’s [MyNextMove.org](https://www.mynextmove.org/), are user-friendly but often oversimplified. [Hirschi and Läge (2021)](https://link.springer.com/article/10.1007/s10775-008-9139-7) found that these tools rely on basic questions, like “Do you enjoy helping others?” leading to generic suggestions such as “teacher” or “nurse.” They rarely analyze skills or experiences, limiting their usefulness. [Redekopp and Hiebert (2022)](https://ccdf.ca/wp-content/uploads/2022/06/Employability-Dimensions-Report-2013-5-30-FINAL-CCDF.pdf) noted that students feel overwhelmed by unverified online advice on platforms like social media, which is often outdated. A report by [UNESCO (2021)](https://www.unesco.org/en/digital-education/need-know?hub=84636) confirms that many digital career tools lack personalization, leaving users confused about reliable options.

**2.3 Machine Learning in Career Recommendations**

Machine learning (ML) is improving career guidance by analyzing diverse data. [NextStep (2023)](https://ieeexplore.ieee.org/document/11031008) used a Random Forest algorithm to recommend computing careers based on skills and interests, achieving 70% accuracy, but lacked real-world data for reliability. [Nguyen, H.Q., Nguyen, D.D.K., Le, T.D., Mai, A. and Huynh, K.T. (2023)](https://ctujs.ctu.edu.vn/index.php/ctujs/article/view/693) explored XGBoost to predict employability, noting its strength with incomplete datasets but highlighting the need for actionable steps. A review by [Biau and Scornet (2015)](https://arxiv.org/abs/1511.05741) explains that Random Forest performs exceptionally well in uncovering complex patterns—such as matching skills and interests to potential careers—but only when trained on large, varied datasets that ensure generalizability and reduce overfitting This supports the idea that ML-powered career recommendation tools must be trained on rich, real-world data paired with actionable guidance.

**2.4 RIASEC Model for Personality-Based Guidance**

The RIASEC model categorizes personalities into Realistic, Investigative, Artistic, Social, Enterprising, and Conventional types. [Hoff, K.A., Song, Q.C., Wee, C.J.M., Phan, W.M.J. and Rounds, J. (2020)](https://www.sciencedirect.com/science/article/abs/pii/S0001879120301287?via%3Dihub). Holland’s RIASEC model has consistently demonstrated value in aligning people with compatible career paths. A comprehensive meta-analysis revealed that vocational interest–environment fit significantly predicts job satisfaction (ρ ≈ 0.19), supporting the idea that Investigative types often thrive in research-oriented roles [Silva et al. (2020)](https://link.springer.com/chapter/10.1007/978-3-030-47436-2_17) introduced the JPLink model, which uses machine learning and O\*NET data to automatically label job postings with RIASEC types—improving match accuracy and supporting scalable career recommendation systems. [A 2025 study of junior high school students](https://imrecsjournal.com/journals/index.php/bsscd/article/view/85) found that using RIASEC-based assessments—coupled with reflective guidance—helped participants develop clearer career insights and greater confidence in planning their futures. Given these findings, CareerCompass leverages RIASEC in tandem with skills, interests, and academic data to offer more precise and developmentally appropriate recommendations.

**2.5 Importance of Role Models**

Research suggests exposure to relatable role models can significantly boost motivation, particularly for students from underrepresented or low‑income backgrounds. A systematic review found that effective role models are those perceived as similar in background and attainable in success—these traits make role modeling more inspiring and meaningful for diverse students. [Gladstone, J.R. and Cimpian, A. (2021)](https://stemeducationjournal.springeropen.com/articles/10.1186/s40594-021-00315-x). In software engineering education, a December 2024 survey of underrepresented undergraduates showed that family members, tech influencers, and teachers serve as key career motivators—students without known role models were less likely to persist in the field [Ronnie, S., Santos, I., Santos, R. and Magalhaes, C. (2024).](https://arxiv.org/abs/2412.12378)  
Given the strong evidence supporting role modeling as a motivational tool, CareerCompass includes AI‑generated success stories to create relatable and diverse professional narratives.

**2.6 Actionable Guidance and Skill Development**

Effective career tools go beyond suggestions—they provide actionable steps. Studies of mentorship and career counseling programs show that clear planning, skill-building exercises, and guidance lead to improved readiness and follow-through [Warrner, J. (n.d.). *Creating Connections*](https://files.eric.ed.gov/fulltext/ED649357.pdf).  
For example, mentees in structured mentorship programs report gains in career planning, confidence, and academic performance when provided with specific, milestone-based guidance [Miske, S. and Sogunro, O. (2024).](https://scholarworks.waldenu.edu/jerap/vol14/iss1/6/) CareerCompass builds on this by offering roadmaps like “learn JavaScript on Coursera” and embedded quizzes to help users develop relevant skills.

**2.7 Community and Mentorship**

Community engagement and mentorship are vital for students’ confidence and decision-making. A longitudinal review found that formal mentorship improves career planning and transitions, especially for underrepresented groups and women in higher education [Nabi, G., Walmsley, A., Mir, M. and Osman, S. (2024).](https://www.tandfonline.com/doi/full/10.1080/03075079.2024.2354894) Evaluations of peer mentorship and student–professional forums have shown improvements in self-efficacy, networking skills, and career preparedness among mentees [Graham, M., Wayne, I., Persutte-Manning, S., Pergantis, S. and Vaughan, A. (2022)](https://files.eric.ed.gov/fulltext/EJ1363722.pdf).  
CareerCompass incorporates a **moderated forum and mentorship network**, pairing users with verified professionals to ensure guidance is accurate and supportive.

**2.8 Accessibility and Usability**

Usability and accessibility are crucial for reaching diverse users. While exact statistics on digital career tool accessibility are scarce, education frameworks emphasize the need for inclusive design that works across devices and meets accessibility standards [Sharma, A. (2023).](https://www.ijnrd.org/papers/IJNRD2305138.pdf)    
Studies confirm that mobile-friendly, intuitive interfaces significantly boost engagement and usability—student retention and comfort increase when design is responsive and simple [Warrner, J. (n.d.). *Creating Connections*](https://files.eric.ed.gov/fulltext/ED649357.pdf)*.* CareerCompass adheres to **WCAG 2.1 standards**, features clean navigation, and is optimized for mobile devices to maximize inclusivity and engagement.

**2.9 CareerCompass’ Contribution**

By integrating well-supported design elements—personalized role-model narratives, step-by-step guidance, moderated mentorship, and accessible interfaces—CareerCompass offers a comprehensive platform that addresses current gaps.

* ML-based career matching (Random Forest/XGBoost) is combined with actionable next steps, enhancing usability.
* Role-model storytelling encourages inspiration across diverse student backgrounds.
* A moderated mentorship community ensures accurate, tailored support.
* Accessibility-first design ensures inclusivity across devices and users with varying abilities.

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