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Career Counselling and Personality Assessment App

Tejas Kailas Darekar[1,*], Vedant Ajit Kadlak[1], Jaydev Manna[1], Pratham Keshav Thombare[1], Sharayu Patil[2]

Abstract

From the early foundations of career counselling, the role of self-awareness in making informed career choices has been well recognized. Frank Parsons, widely regarded as the pioneer of career counselling, emphasized the necessity of understanding oneself to make wise career decisions. He proposed that this self-awareness should be systematically connected to job requirements and opportunities through logical reasoning and structured analysis. This approach aims to empower individuals to make well-informed career decisions, improve job performance, enhance job satisfaction, and facilitate seamless employment opportunities. An individual's temperament could influence career choices. Over time, vocational counselling has increasingly acknowledged the crucial role of personality in shaping career interests, demonstrating a profound connection between the two. Historically, personality traits, along with related aspects such as character, temperament, and moral values, have played a key role in career decision-making. Today, career counselling often includes personality evaluations to assist individuals in managing their career paths. Unlike earlier approaches that viewed personality as solely linked to vocational interests, contemporary career counselling sees personality as a combination of diverse traits influencing key career factors such as job engagement, satisfaction, and performance. While personality does not single-handedly determine career outcomes, it interacts with adaptability and external conditions to shape professional success. Personality assessments play a pivotal role in career planning, enabling self-regulation and enhancing career guidance programs, especially when personalized feedback is provided. These assessments help individuals reflect on, reassess, and refine their career-related self-concepts. Additionally, they align self-perceptions with external evaluations, promoting a balanced and realistic approach to career decision-making. Furthermore, personality traits such as high neuroticism and low conscientiousness can lead to difficulties in making career choices.

Keywords: Career, career guidance, personality, application, technology

INTRODUCTION

As highlighted by Al-Barrak and Al-Razgan [1], in today's rapidly evolving professional landscape, thorough career research and strategic planning are essential before making career decisions. Effective career planning allows individuals to adapt to shifting socioeconomic conditions, ensuring that their chosen career paths align with both their interests and long-term stability. Since career selection is a crucial life decision, it requires careful deliberation.

While some people are naturally drawn to certain career paths, many others find themselves uncertain about their professional direction. Numerous high school students fail to devote sufficient effort to career exploration, often selecting professions based on societal expectations rather than personal abilities and aspirations. Many individuals choose

***Author for Correspondence**
Tejas Kailas Darekar
E-mail: tejas.darekar7@gmail.com

[1]Student, Department of Computer Engineering, Vishwaniketan's Institute of Management Entrepreneurship and Engineering Technology (ViMEET), Maharashtra, India
[2]Professor, Department of Computer Engineering, Vishwaniketan's Institute of Management Entrepreneurship and Engineering Technology (ViMEET), Maharashtra, India

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careers that seem financially stable but later experience dissatisfaction due to a lack of fulfilment. In response to these challenges, many nations have implemented substantial initiatives to enhance career counselling and development programs. For example, Ukraine extended its secondary education from 11 to 12 years, with the first batch of Grade 12 graduates completing their studies in 2013. This revised curriculum was designed to align education with economic demands and labor market needs, integrating career guidance as a structured subject [2]. Similarly, Egypt introduced a new technical education plan in 2007, incorporating elective subjects and academic counselling to assist students in making informed career decisions. This reform was implemented in the 2008–2009 academic year [2].

In England, secondary schools now have access to a free assessment tool that evaluates the effectiveness of career education programs. These programs are assessed based on nationally recognized benchmarks, covering areas such as structured career guidance, labor market exposure, personalized counselling, and workplace experiences. These benchmarks were developed following a report that found that 75% of surveyed schools failed to provide adequate career counselling [3].

Extensive research has established a strong connection between personality types and career preferences [4, 5]. Although these studies focus on various global contexts, research conducted by Kaur et al. [5] highlights the significance of assessing students' personality traits early in their academic journey. Early personality assessments provide students with appropriate career guidance, helping them choose subjects that align with their future aspirations. Additionally, when parents are aware of their children's unique personality traits, they can offer better support, enabling students to make career choices that reflect their strengths and interests.

Despite the presence of school counsellors in many educational institutions, their effectiveness is often hindered by additional teaching responsibilities, limiting the time available for career counselling [5, 6] As these challenges continue to rise, there is an increasing demand for technology-based solutions to improve career guidance. This study explores how artificial intelligence (AI) and digital tools can improve the accessibility and effectiveness of career counselling, making career support widely available to student.

LEARNING MODELS

K-Means Learning Model

The K-means clustering algorithm is a popular method employed in unsupervised machine learning. This method refines cluster assignments through iterative processes, making it highly effective for grouping similar data points. Due to its widespread use, it is commonly referred to as the "K-means algorithm." The algorithm functions in two primary stages:

1. *Assignment stage:* Each data point is allocated to the closest cluster by calculating the Euclidean distance, which measures how similar or different the data points are from each other.
2. *Update stage:* The cluster centroids (the mean position of points within a cluster) are recalculated, and this process repeats until the cluster assignments stabilize. K-means clustering is especially valuable in career counselling as it can classify individuals based on their personality traits, interests, and career preferences, offering tailored career recommendations (Figure 1).

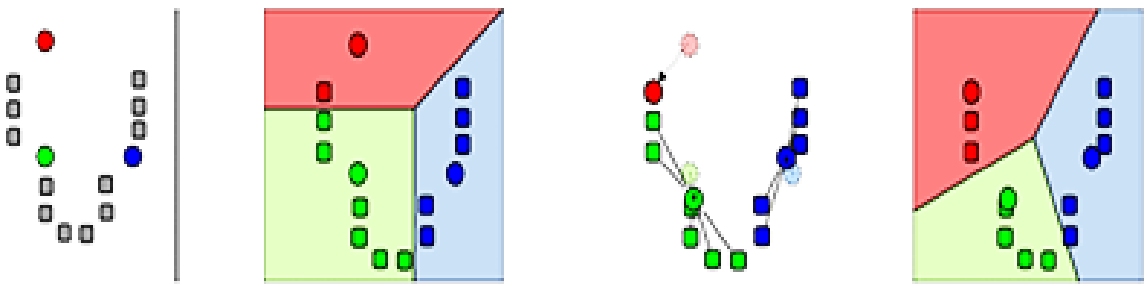

Figure 1. Demonstration of K-means clustering.

Visual, Aural (Auditory), Read/Write, and Kinesthetic (VARK) Model

The Education Bureau highlights the significance of life planning education and career guidance as essential components of student development (Figure 2). The VARK model provides a structured framework for career development, consisting of three key elements:

1. *Self-understanding and development:* Helps people recognize their strengths, areas for improvement, and goals.
2. *Career exploration:* Exposes students to diverse career options, allowing them to make informed choices.
3. *Career planning and management:* Assists students in setting achievable goals and outlining necessary steps to attain them.

This model ensures a comprehensive approach to career guidance, equipping students with essential knowledge and resources to make well-informed career decisions.

Logistic Regression

Logistic regression is a statistical technique used to analyze categorical outcomes. In contrast to linear regression, which assumes a linear relationship between variables, logistic regression predicts the likelihood of an event happening. This technique is particularly beneficial in career counselling for predicting career suitability based on personality traits (Tables 1–3).

In this study, logistic regression was chosen due to its ability to differentiate between career choices by analyzing predictor variables such as personality traits and decision-making tendencies. Prior research has shown that logistic regression outperforms discriminant analysis in non-normally distributed classification problems, making it the preferred statistical approach [7].

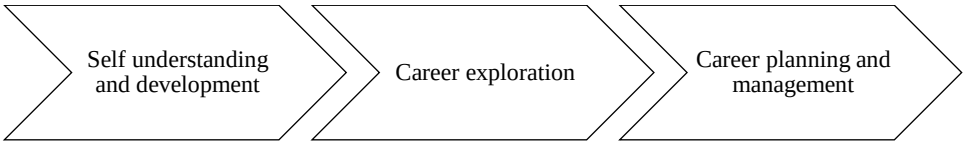

Figure 2. Three components of career development.

Table 1. Logistic regression analysis with personality traits as predictors of susceptibility to the certainty effect in the sample as a whole (N = 200).

Personality traits	*B*	Exp(*B*)	Wald	*df*	*p*
Impulsivity	–0.03	0.97	0.56	1	.967
Venturesomeness	0.11	1.11	4.01	1	.041
Empathy	–0.07	0.94	2.21	1	.14

Table 2. Logistic regression analysis with personality traits as predictors of susceptibility to the sunk cost fallacy in the sample as a whole (N = 200).

Personality traits	*B*	Exp(*B*)	Wald	*df*	*p*
Impulsivity	–0.04	0.96	0.61	1	.434
Venturesomeness	0.12	1.12	4.56	1	.032
Empathy	–0.03	0.97	0.97	1	.480

Table 3. Logistic regression analysis with personality traits as predictors of susceptibility to mental accounting in the sample as a whole (N = 200).

Personality traits	*B*	Exp(*B*)	Wald	*df*	*p*
Impulsivity	–0.02	0.98	.25	1	.620
Venturesomeness	0.20	1.22	14.28	1	.001
Empathy	–0.01	1.02	.18	1	.668

IMPORTANCE OF MENTAL HEALTH

Career assessments and personality tests are vital tools for personal and professional growth, as they assist individuals in identifying their strengths, weaknesses, interests, and behavioral patterns. These tools offer valuable insights that guide career choices, enhance self-awareness, and support long-term career satisfaction.

Clarifies Career Path

Career assessments assist individuals in discovering career options that match their abilities, values, and passions. By matching personal attributes with suitable professions, these assessments reduce career dissatisfaction and enhance long-term success.

1. *Identifying strengths:* These assessments highlight an individual's natural talents and abilities, directing them towards careers where they can excel.
2. *Aligning interests:* Career choices should be based on personal passions rather than financial factors alone, ensuring greater fulfilment.

Increases Self-Awareness

Personality tests provide deeper insights into behavioral patterns, communication styles, and decision-making approaches, empowering individuals to make informed personal and professional choices.

1. *Behavioral insights:* Assessments like the Myers-Briggs Type Indicator (MBTI) and the Big Five Personality Traits framework offer detailed analyses of personal tendencies, such as introversion versus extroversion or being detail-oriented versus big-picture thinking.
2. *Emotional intelligence:* Personality evaluations assess how individuals handle stress, interact with others, and manage conflict—key skills for workplace success.

Improves Career Satisfaction

Choosing a career that aligns with one’s personality and strengths increases engagement and job satisfaction, reducing burnout and frequent job changes.

1. *Finding the right fit:* Career assessments guide individuals toward professions that match their work style, boosting job satisfaction.
2. *Motivation and engagement:* When individuals work in environments that suit their personalities, they remain more motivated and productive, leading to higher performance.

Enhances Workplace Compatibility

Employers can use personality assessments to improve hiring processes by ensuring that candidates are placed in roles that best suit their strengths. This fosters stronger teamwork, minimizes conflicts, and enhances collaboration.

1. *Team dynamics:* Employers can build diverse, well-balanced teams by understanding how different personality types work together.
2. *Cultural fit:* Organizations can identify candidates whose personality traits align with company culture, leading to better job satisfaction and employee retention.

Boosts Confidence and Decision-Making

Career assessments equip individuals with the confidence to make informed career decisions. A clear understanding of one’s strengths and personality traits allows individuals to navigate career changes, promotions, and entrepreneurial ventures with greater certainty.

1. *Informed decision-making:* Understanding core traits and abilities enables individuals to make better career choices aligned with their long-term goals.
2. *Increased confidence:* By recognizing their strengths, individuals build self-confidence and pursue ambitious career paths with conviction.

METHOD

This research adds to the expanding body of knowledge on how digital technologies, especially AI, are being utilized in career counseling, education, and continuous learning. The research was conducted

using the socio-cognitive agency framework, which focuses on how humans interact with technology in decision-making processes. The primary research questions explored were:

1. What are the key factors to consider while integrating AI into career guidance, from the perspectives of students and career advisors?
2. How can AI improve career guidance and counselling services?

Methodological Approach

A multi-method research design was adopted to ensure a thorough and well-rounded analysis, incorporating both qualitative and quantitative techniques. By combining multiple research methods, the study aimed to gain deeper insights and validate findings from different sources [8]. A convergent parallel design was followed, where different research components were carried out separately and later synthesized for a comprehensive understanding [9, 10]. Ethical considerations were strictly followed, ensuring participant confidentiality, informed consent, and compliance with all necessary regulations.

Participants were recruited through advertisements within educational institutions, targeting students and faculty members who are potential users of AI in career guidance. Additional participants were identified through public events and snowball sampling. All participants provided informed consent, and their data was handled in accordance with privacy protocols, including compliance with the European Union's General Data Protection Regulation (GDPR).

Focus Group Discussions

Seven focus group discussions were conducted, divided into two primary participant groups:

1. Higher Education Students (11 participants)
2. Career Guidance Staff (14 participants)

The discussions revolved around ideal career counselling scenarios, the role of technology in career guidance, and the evolving needs of career services. The qualitative insights from these discussions were analyzed using a thematic approach.

Scenario-Based Workshops

To explore AI integration in career guidance, scenario-based workshops were conducted. Seven workshops were held with career counsellors from both higher education and vocational education institutions (n = 333). The scenarios were developed iteratively through the following process:

1. Initial workshop discussions helped create foundational scenario narratives.
2. Follow-up co-design workshops refined these narratives based on participant feedback.
3. The final scenarios were used as research outputs and as awareness tools for AI applications in career counselling [8].

AI Trials and Surveys

Two practical trials were carried out to assess the impact of AI in career counselling. AI tools were developed to offer the following features:

- *Course recommendations:* AI-driven suggestions for academic programs based on student interests and competencies.
- *Job recommendations:* AI-based employment suggestions aligned with individual skill sets.
- *Skills profile analysis:* AI-assisted evaluation of students' competencies and career potential.

A total of 179 higher education students and 103 vocational education students participated in the design and testing of these AI tools. Their input was gathered via hackathons, design jams, workshops, and in-depth user testing. Additionally, surveys were conducted to assess their experiences with AI-driven career counselling. The AI systems leveraged multiple datasets, including:

- Personal data voluntarily shared by students.
- Curriculum details from educational institutions.

- National qualification frameworks.
- Job listings from both public and private platforms.

AI-powered career counseling solutions were incorporated into current digital student services using machine learning and data mining techniques.

AI in Career Guidance: Key Insights Student Perspectives on AI in Career Counselling

Students showed strong interest in AI-driven career counselling, especially in terms of receiving timely and personalized guidance. They envisioned AI as a proactive tool that could identify potential career challenges and offer solutions before issues escalate. Additionally, they emphasized that AI-based guidance should be seamlessly integrated into their daily learning process rather than functioning as a separate system. Key student expectations and concerns included the following:

- *Time management assistance:* AI tools could help students plan their academic workload effectively.
- *Better communication:* AI could enhance interaction between students, teachers, and career advisors.
- *Peer support networks:* AI could facilitate connections with like-minded students pursuing similar career paths

Career Counsellors' Perspectives on AI

Career counsellors viewed AI as a valuable support tool that could streamline various aspects of career guidance. They believed AI could help in recognizing prior learning, predicting future skill demands, and reducing administrative burdens. This would enable them to dedicate more time to directly engaging with students and providing mentorship. However, they also acknowledged that AI could change traditional career counselling roles by automating certain tasks. Some key insights from career counsellors:

- *AI as an administrative assistant:* Automating routine tasks like scheduling appointments and managing student case files.
- *Balancing human and AI support:* While AI can assist in career counselling, human interaction remains essential for emotional support and complex decision-making.

AI and Career Data Management

Both students and career counsellors identified challenges in accessing and utilizing career-related data. AI could play a crucial role in improving information retrieval by:

- Providing relevant career data at the right time.
- Offering proactive career suggestions.
- Recommending counselling sessions based on individual needs.

Both groups also agreed that AI should help in tracking students' academic progress, allowing for early intervention when academic struggles arise.

CONCLUSION

The use of AI in career counselling can revolutionize career choices by providing tailored, data-based suggestions. AI enhances efficiency by automating routine administrative tasks and providing students with timely career guidance. However, despite these advancements, human career counsellors remain essential for addressing the psychological and emotional complexities of career planning.

Future research should focus on optimizing AI-human collaboration in career counselling to ensure that technological advancements complement, rather than replace, traditional career guidance methods. By balancing AI-driven efficiency with human expertise, career counselling can become more accessible, insightful, and impactful.

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