Barriers and effectiveness to counselling careers with Artificial Intelligence: A systematic literature review

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Abstract

AI career counselling barriers and effectiveness have not been reviewed empirically. This report reviews empirical data on career counselling with AI in two areas: barriers and effectiveness. This systematic review examines empirical evidence on AI career counselling barriers and effectiveness. SLR examined Scopus, PubMed, Google Scholar, Crossref databases. Scopus had 70, PubMed 7, Google Scholar 78, and Crossref 2000. The review comprised 10 PRISMA-analyzed studies. The manuscripts were published between 1992 and 2023. Namibia, India, South Korea, Finland, USA, UK, and Sri Lanka are included in the study. Two studies examined barriers (Suresh et al., 2021; Westman et al., 2021) and ten studied the effectiveness of career counselling with artificial intelligence (Carson et al., 1999; Crowley, 1992; Guleria & Sood, 2023; Hendahewa et al., 2006; José-García et al., 2022; Lee et al., 2018; Rao et al., 2020; Sodhi et al., 2016; Suresh et al., 2021; Westman et al., 2021).

Le barriere e l'efficacia dell'uso dell'intelligenza artificiale nella consulenza professionale non sono state riviste empiricamente. Questo rapporto esamina i dati empirici sulla consulenza professionale con l'intelligenza artificiale in due aree: barriere ed efficacia. Questa revisione sistematica esamina le evidenze empiriche circa gli ostacoli e l'efficacia dell'intelligenza artificiale nei servizi di consulenza professionale. SLR ha esaminato i database Scopus, PubMed, Google Scholar, Crossref. Scopus ne aveva 70, PubMed 7, Google Scholar 78 e Crossref 2000. La revisione comprende 10 studi analizzati da PRISMA. I manoscritti sono stati pubblicati tra il 1992 e il 2023. Questa ricerca include Namibia, India, Corea del Sud, Finlandia, Stati Uniti, Regno Unito e Sri Lanka. Due studi hanno esaminato le barriere (Suresh et al., 2021; Westman et al., 2021) e dieci hanno studiato l'efficacia della consulenza professionale con intelligenza artificiale: (Carson et al., 1999; Crowley, 1992; Guleria & Sood, 2023; Hendahewa et al., 2006; José-García et al., 2022; Lee et al., 2018; Rao et al., 2020; Sodhi et al., 2016; Suresh et al., 2021; Westman et al., 2021).

Keywords: barriers; effectiveness; career counselling; artificial intelligence

Parole chiave: barriere; efficacia; consulenza professionale; intelligenza artificiale

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1. Introduction

A crucial aspect of integrating AI into counselling services is the careful consideration of the human-technology interaction (Abrams, 2023). The shift from conventional educational counselling to technology-driven counselling, such as the utilisation of computers, internet, apps, and programmes, presents both efficacy and challenges throughout its implementation. This has been strengthened by (Westman et al., 2021), which found various kinds of technology utilised in career advice AI: Seamless integration of interactive artificial intelligence (AI) has been seen in career consulting practise; Real-time AI models are used for various career advice tasks; A separate tool for batch AI application for career advice activities; Traditional analytical tools used in career counselling.

The examination of the impact of computerised tools on the evolution of traditional career counselling has been explored in a study conducted by (Watts, 1986). Authors (Van & Loan, 2016) have presented a method in which data collection, user modelling, and the utilisation of an intelligent system are employed to acquire information that encompasses valuable course information and training courses. Artificial intelligence (AI) use computer programmes to facilitate the training and development of intelligent devices.

There has been a longstanding anticipation among counsellors on the integration of artificial intelligence (AI) into the counselling profession (Illovsky, 1994; SHARF, 1985). However, it is worth noting that significant advancements in computer processing power, natural language processing, and artificial neural networks have only emerged over the past ten years, leading to the development of a novel set of AI capabilities (Hirschberg & Manning, 2015; Russell & Norvig, 2010). The aforementioned breakthroughs have brought artificial intelligence into the forefront of attention. AI is utilised by healthcare practitioners for many purposes such as clinical training, therapy, evaluation, and decision-making (Hamet & Tremblay, 2017). An intelligent system can be defined as a system that incorporates artificial intelligence. Career counselling plays a crucial role in assisting students who are in their last semester of a degree programme or those who are completing high school and grappling with challenges pertaining to making informed decisions about their future career paths (Morgan & Ness, 2003).

Nevertheless, the utilisation of artificial intelligence (AI) encounters some barriers. According to (Luxton, 2014), the field of digital mental health is currently in its early stages of study, application, and ethical considerations, resembling a frontier-like environment. According to (Rizzo et al., 2016), ensuring safety and effectiveness are essential considerations. Many platforms provide users with support services in response to mental health threats, accompanied by visible disclaimers regarding their intended use. According to recent research(Booyse & Scheepers, 2023), barriers to the use of AI in decision-making include factors such as human social interaction, strict regulations, innovative work environments, a lack of trust and transparency, an ever-changing corporate environment, a lack of authority and control, and ethical issues.

However, despite these measures, many individuals may still view these tools as a substitute for therapy (Luxton, 2014). In addition to encountering barriers, the utilisation of artificial intelligence (AI) in the field of counselling also demonstrates efficacy. According to (Alonso & Casalino, 2019), Educational data mining (EDM) is a subfield of artificial intelligence (AI) that is employed for the purpose of analysing educational data. The utilisation of EDM facilitates the extraction of concealed information from existing data sets, enabling the construction of predictive models that can forecast trends pertaining to educational data and student outcomes. In their study, (Kongsakun & Fung, 2010) have presented a framework for an intelligent recommendation system that aims to effectively handle student data and extract valuable associations from it.

The primary objective of this research is to examine the obstacles and efficacy associated with the utilisation of artificial intelligence in the context of career counselling. This assertion is substantiated by (Fulmer, 2019), who

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notes the absence of a comprehensive assessment of empirical research specifically focused on AI-assisted career counselling. This distinctive characteristic sets apart the present review study from other works in the field. The existing body of literature in the field of counselling lacks a sufficient number of descriptive, correlative, or experimental studies pertaining to artificial intelligence. Furthermore, there is a dearth of scholarly investigations employing a comprehensive literature evaluation to examine the obstacles and efficacy associated with utilising artificial intelligence in the context of career counselling. Therefore, doing this research holds significant importance. The study's outcomes, being grounded in empirical facts, provide significant value as a point of reference for researchers, counsellors, and policy makers.

This literature analysis examines the barriers and effectiveness associated with the application of artificial intelligence (AI) in the field of career counselling. There are two objectives that aim to address the following research inquiries:

1 What are there barriers to career counselling with artificial intelligence?
2 How effective is the use of artificial intelligence in career counselling?

The study employed the Publish or Perish (PoP) software and formulated precise search terms in order to thoroughly investigate pertinent scholarly literature. A comprehensive and methodical investigation was carried out across multiple data sources, such as Scopus, Google Scholar, Crossref, and PubMed, in order to obtain a definitive answer to the research question. The process of selecting research was carried out in accordance with preestablished criteria for inclusion and exclusion, following a comprehensive study.

2. Literature review

2.1 Counselling career and artificial intelligence

Guidance and counselling services include personal services, the field of learning services, the field of social services, and career services (Muhammad & Patriana, 2021; Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 111, 2014) (Edit: please provide de-anonymised citation of 2021 publication; please provide a shorter citation for the 2014 law).

Career guidance is a systematic procedure aimed at aiding individuals in the exploration and cultivation of their interests, values, capabilities, and aspirations. Its primary objective is to facilitate informed decision-making regarding one's educational pursuits, professional endeavours, and other personal undertakings (Roy, 2020).

The term 'Artificial Intelligence' (AI) refers to the branch of computer science that focuses on developing ways to give computers and other technologies the capacity to behave in a way that demonstrates intelligence. In many people's minds, the machine in question is a tool for eliminating the need for human labour, which would allow for increased productivity and better overall results. According to (Kaplan & Haenlein, 2019), this phenomena is frequently referred to as "a system" that has the ability to effectively grasp external input, acquire knowledge from it, and use that knowledge to accomplish preset goals and activities via adaptable adjustments. This definition describes a system that possesses these capabilities. Regardless of the particular definition that is employed, the discipline of AI is one that focuses on the creation of technologies and computer systems that are intended to assist humans in problem-solving and boost their efficiency. These technologies and computer systems can be created to help people. The term 'artificial intelligence' refers to the intelligence that is created by people and displayed by machines. According to (Russell & Norvig, 2010), AI refers to the human-made instruments that duplicate the cognitive capacities displayed by the human brain.

The integration of AI and counselling has resulted in the emergence of interactive platforms. The future prospects of their link will mostly hinge upon the development rate of AI, which, assuming the present patterns persist, is projected to fall within the spectrum ranging from linear to exponential. Exponential development

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might potentially enable AI-systems, which now possess limited questioning abilities, to acquire sophisticated judgment, diagnostic capabilities, and the capacity to embody the ethical, cognitive, emotional, and relational attributes of a therapist (Jennings et al., 2005; Skovholt & Jennings, 2004).

2.2 *Barriers to career counselling with artificial intelligence*

According to the Oxford Dictionary's online edition, *barriers* can be defined as "problematic circumstances, regulations, or conditions that impede an individual's ability to accomplish a task or render it unattainable" (Oxford University Press, n.d. -a). The presence of barriers within the scope of this study denotes the existence of problems encountered in the implementation of AI-based career counselling. The transition from interpersonal dynamics to human relations in the field of counselling and related disciplines can give rise to numerous unresolved existential dilemmas (Green, 2018).

An area of research that warrants more investigation pertains to the impact of AI on diverse cohorts of counselling clients. According to (Fulmer, 2019), there is a need for the advancement of research in AI counselling. The counselling community requires more empirical evidence about the impact of AI services on those who seek human involvement due to feelings of being unheard, unnoticed, and unworthy of care. Various components, linkages, and tools within the field of AI necessitate varying degrees of data standardization. This variability in data standardization might subsequently lead to increased challenges in achieving interoperability and present substantial obstacles to the implementation of AI systems (Engstrom et al., 2020). The issue of professional burnout is a significant and escalating concern, as evidenced by the research conducted by (Bender et al., 2020). Moreover, a notable level of apprehension exists among medical students and young professionals over the potential impact of AI on the field of radiology, as highlighted by (Fishman et al., 2020).

2.3 The effectiveness of career counselling with artificial intelligence

According to the Oxford University's online dictionary, the term *effective* is defined as success of effectiveness, the occurrence of change, and the establishment of cause and effect relationships (Oxford University Press, n.d. -b). The efficacy of AI-based career counselling is contingent upon its success in facilitating goal-oriented changes. In essence, the utilisation of AI yields favourable outcomes or improvements in the context of career counselling objectives. The basic components of counselling, as supported by Fulmer (2019), are: (a) establishing a professional alliance, (b) fostering empowerment, and (c) achieving goals.

Therefore, the successful implementation of counselling treatments necessitates adherence to three essential principles. Nevertheless, one could posit that if the AI meets one or two of the established requirements, it progressively approximates the degree of efficacy, if not achieving the status, of a counsellor. An instance can be cited where an artificial intelligence system possesses the capability to aid individuals in attaining their health objectives, therefore potentially serving as a partial surrogate for a counsellor, since it meets two out of the three essential criteria. The potential incorporation of AI into counselling has the capacity to lead to the accomplishment or even surpassing of the responsibilities traditionally carried out by human counsellors (Fulmer, 2019).

This study aims to explore the cost-effectiveness of AI in the field of career advisory through scientific investigations. A study conducted by Khare et al. (2018) examined the influence of artificial intelligence on the student experience, specifically focusing on its role in providing academic support. The researchers have arrived at the conclusion that AI has the capacity to influence pupils as well as many aspects of the education system, encompassing organisations, structures, procedures, and persons. The utilisation of efficient AI enables individuals to engage in introspection regarding their capabilities and the potential for growth in their learning endeavours.

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Additionally, it supports the seamless transition of acquired knowledge and abilities into a professional setting. This aligns with the primary goal of career counselling (Khare et al., 2018).
The utilisation of technology in the field of career counselling holds significant promise for enhancing efficacy. The effectiveness of this phenomenon encompasses enhanced accessibility, broader availability of information, heightened evaluation capabilities, and increased networking chances. Furthermore, the integration of technology has the potential to reduce overall expenses and enhance cost-efficiency (Sampson et al., 2020). Another illustration is the successful implementation of iAdvice as an expert system, designed to mimic the behaviour of a human expert within a specific and limited field of application, specifically in the realm of career counselling (Bratko, 2001).

3. Method

Search strategy

Using PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis), the reporting framework aims to identify, screen, and evaluate records for eligibility and inclusion (Liberati et al., 2009; Page, McKenzie, et al., 2021; Page, Moher, et al., 2021). The eligibility criteria were described using modified PICO (population, intervention, comparison, and outcome) methodologies and PEO (population, exposure, and outcome) (Pollock & Berge, 2018) objectives. Using the publish or perish application, I searched the Scopus, PubMed, Crossref, and Google Scholar databases for the month of August 2023. Initial identification of articles was conducted by relevant authors, and screening was verified. Menuscript for the period 1980–2023.

Population

In this investigation, population refers to (Pollock & Berge, 2018). This analysis concentrates on the student population. This population accommodates both male and female origins from all countries. Studies with student populations implementing/using artificial intelligence in career counselling

Exposure

The use of exposure in the design of this study refers to (Pollock & Berge, 2018). The exposure is barriers and effectiveness of career counselling. This includes studies investigating: Defining barriers and effectiveness (Oxford, 2023), dan counselling career (Muhammad & Patriana, 2021; Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 111, 2014; Roy, 2020).

Outcome

The use of Outcomes in this research design refers to (Pollock & Berge, 2018). When thinking about what results to include in this review, it's important to keep in mind the notion of AI as the technology that makes computers and machines smart, “systems” that can accurately understand external data, learn from it, solve problems, and apply that learning to meet goals and activities. through flexible adaptation AI is a man-made tool that mimics the “cognitive” skills of the human brain (Kaplan & Haenlein, 2019; Russell & Norvig, 2010). Studies that are not about artificial intelligence were not reviewed.

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Inclusion criteria

If these criteria were met, studies were entered: Must be in English; Must be a full paper; Must Student; counselling career indicators are required; artificial intelligence indicators are required; Must investigate the barriers and effectiveness of career counselling with artificial intelligence.

Identification

Pearl harvesting refers to the systematic approach of broadening search terms in order to identify a wide range of pertinent research that can serve as possible sources (Sandieson, 2006). This approach selects multiple studies that satisfy at least one of the search keywords. Subsequently, the process involved extracting all relevant keywords from each "pearl" and amalgamating them with suitable alternative terms to provide an all-encompassing compilation of search terms for each respective database, as depicted in Table 1. Utilize publish or perish applications to do data retrieval. Scopus, PubMed, Crossref, Google Scholar, and Publish or Perish are prominent examples of data sources utilized in research.

Screening

The eligibility criteria allow for the screening of papers based on the titles and abstracts provided. Systematic reviews or meta-analyses, as well as books or book chapters were disqualified for inclusion in the study (Webster et al., 2021). Alternatives to the database search terms are displayed in Table 1.

Table 1. Alternatives to the database search terms

Screen	Population	Exposure	Outcome
Keyword alternatives	Student*	Barriers* OR Effectiveness* OR Careers Counselling Career* OR Career*	AI* OR Artificial Intelligence* OR Artificial*

Data extraction and data synthesis

This study's data on exposure to barriers and the efficacy of career counselling are both included. Data on population, gender, and exposure was also collected. There is also a synopsis of each study. Quantitative, qualitative, and R&D research follow (Webster et al., 2021). Artificial intelligence is used to synthesize evidence. Learning about AI systems. For each AI-related outcome, several research aggregate outcomes.

Assessment of trustworthiness

The Gorard Trust used a filtering mechanism that allocated scores ranging from 0 to 4 to research papers, taking into account various aspects such as study designs, scales, dropout rates, data quality, and other characteristics that have the potential to influence the dependability of the findings (Gorard, 2014)

4. Results

In August 2023, a total of 70 relevant papers were identified in Scopus, 7 in PubMed, 78 in Google Scholar, and 2000 in Crossref, as depicted in Figure 1, which illustrates the flowchart of the study selection process. After

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eliminating 214 instances of redundancy, a total of 2155 publications have been identified as appropriate for inclusion in the selection. Based on the title and abstract of the screening, it was seen that a total of 2042 reports failed to match the specified criteria in terms of the population, exposure/intervention, and outcomes. The search was limited to a total of 28 relevant articles.

After the process of eligibility screening, a total of 18 studies were deemed ineligible and hence excluded from the analysis. The review encompassed a total of ten papers. PRISMA's guidelines (Liberati et al., 2009) suggest including a majority of quantitative research, two qualitative studies, and one mixed-methods study in Figure 1. The studies referenced in this review are presented in Table 2. Fifteen research were conducted to investigate the topics of Artificial Intelligence and Counselling Career. The Gorard Trust conducted an evaluation of 10 research, with a majority of them receiving a score of 4 (n = 9), and only one study receiving a score of 3 (n = 1).

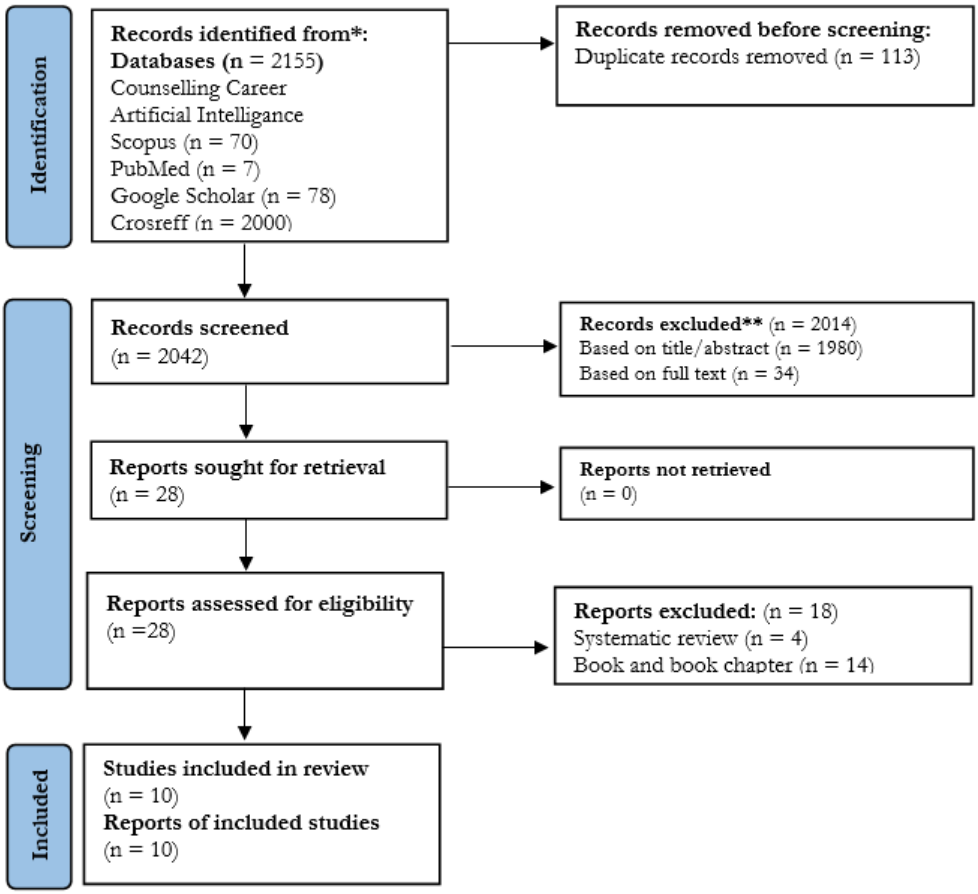

Figure 1. Flowchart for study selection.

Table 2. Classification of the studies that were looked at

Include Exposure: Barriers and Effectiveness Counselling Career **Include Outcome:** Artificial Intelligence	N
(Guleria & Sood, 2023); (Suresh et al., 2021); (Lee et al., 2018); (Westman et al., 2021); (Hendahewa et al., 2006); (Carson et al., 1999); (Crowley, 1992); (José-García et al., 2022)	**10**

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The results of the data collection found two studies that examined barriers to the use of artificial intelligence in career counselling (Suresh et al., 2021; Westman et al., 2021).
The results of data collection found ten that studied the effectiveness of career counselling with artificial intelligence (Carson et al. 1999; Crowley,1992; Guleria & Sood, 2023; Hendahewa et al., 2006; José-García et al., 2022; Lee et al., 2018; Rao et al., 2020; Sodhi et al., 2016; Suresh et al., 2021; Westman et al., 2021). The studies included in this review can be seen in Table 3.

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Table 3. The studies included in the present review

No	Author & Years	Country	Population	Outcome Artificial Intelligence (AI)	Exposure Barriers, Effectiveness Career Counselling	Findings	Method	Text	Rate
1	Guleria & Sood (2023)	India	Students (n = 215)	Artificial Intelligence	Effectiveness of career counselling	Effective career advising helps students choose the correct courses and skills. The top machine learning algorithms for decision-making in the career counselling framework.	QT	Full	4
2	Suresh et al., (2021)	Namibia	University students (n = 36)	Artificial Intelligence	Effectiveness of career counselling	The chatbot exhibits prompt responsiveness to user messages and offers valuable resources in accordance with the demands made by users, particularly students.	R&D	Full	4
					Barriers of Career counselling	Chatbot needs a fast internet connection to respond. The chatbot responded very instantly to testers with decent internet connections. The chatbot takes 5-10 seconds to answer if the			

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						tester's internet connection is unreliable. The chatbot only speaks English. Due to scheduling restrictions, the chatbot could only be used in English. Due of the variety of job kinds, chatbot functionality should be confined to a few resources in particular sectors. It's difficult to simulate every professional area and resource need. Without a Facebook account, individuals cannot utilize the system.		
3	Lee et al. (2018)	South Korea	College students (n = 54)	Artificial Intelligence	Effectiveness of career counselling	This study shows how utilizing AID (Artificial Intelligence-based Design platform) with MPMA (Multiple Preference Matching Algorithm) leads in 0% miss-matching and maximum perfect matches.	Full	4

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4	Westman et al. (2021)	Finland	Higher education students (n=179) and vocational Education students (n=103)	Artificial Intelligence	Effectiveness of career counselling	Artificial intelligence should help students with schoolwork, career preparation, and self-management. Students welcome AI career counselling.	Multiple	Full	4
					Barriers of Career counselling	It's hard and time-consuming to access and share curriculum and timetables. The twenty-one AI for Career Guidance Future Scenarios' most complicated is: - Support career decision-making and promote career services based on situational information. - Increasing counselling interaction: connecting students and counsellors, developing knowledge from previous guidance conversations - Highlight skills: develop a competence portfolio, identify work-related skills			

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							- Comparing competencies with work objectives and needs: self-assessment tool for competence mapping, infers skill gaps from profile data. - Anticipating counselling and case management needs: compiling student information for staff to overview, prioritizing staff activities - Recognize networks: provide career services resources and use connections for jobs. - Preparing students, staff, and organizations for AI-enabled education and creating AI to comprehend education are needed.			
5	Hendahewa et al. (2006)	Sri Lanka	Student undergraduates (n=30)	Artificial Intelligence		Effectiveness of career counselling	The iAdvice model (Career Advisory Expert System) predicts performance with 70% accuracy and 85% relevance. Its nature is evident. and 87% offered useful advice.	QT	Full	4

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6	Carson et al. (1999)	United States of America	9-graders at public high schools in sub-urban Chicago (Sample A, N = 326) and urban Baltimore (Sample B, N = 29)	Artificial Neural Networks	Effectiveness of career counselling	The findings of this research show that artificial neural networks may assist vocational experts combine several sorts of evaluation data when generating career suggestions.	QT	Full	4
7	Crowley (1992)	UK	Student	Artificial System	Effectiveness of career counselling	Not unexpectedly, 92% of students said the second artificial program described them accurately: 'I was amazed it was that accurate.'It was more accurate than most questionnaires.	QT	Full	3
8	José-García et al. (2022)	UK	Students (n=64) studying at the University of Sheffield and the University of Exeter.	Artificial Intelligence in Education (AIED)	Effectiveness of career counselling	C3-IoC, an AI-based tool, lets students see and explore employment options depending on their skills.	QT	Full	4
9	Sodhi et al. (2016)	India	Student (n=31)	Artificial Neural Network	Effectiveness of career counselling	Where counsellors are few in India, the machine learning system may be utilized alone or to aid human career decision-making. Multiple research have shown	R&D	Full	4

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						that Artificial Neural Networks can make complicated decisions better than conventional approaches. From this study, the ANN system may be utilized as an independent counselling advice system or to help counsellors determine a career route for students.			
10	Rao et al. (2020)	India	Student (n=1000)	Artificial Neural Network	Effectiveness of career counselling	This study created an ANN-based system that can analyze a person's personality and anticipate career ambitions. With 20 epochs, the model fits optimally with improved predictions and lower error rate. All model-evaluated MTBI categorizations had sensitivity, specificity, precision, and accuracy over 92%. The suggested classifier proposes potential occupational fields based on the applicants' MTBI questionnaire (Myers-Briggs Type Indicator). Thus, career advisers using this program will improve their skills and eliminate human mistakes. The suggested personality	QT	Full	4

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		prediction technology would help candidates choose the correct job and boost workplace efficiency.	

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5. Discussion

Barriers to career counselling with artificial intelligence

Career counselling is needed to solve problems that arise in the minds of parents towards their children, and guidance cells will play an important role in guiding parents in choosing the right path for their children. Here, Machine Learning will be used to perform computational intelligence tasks intelligently (Yang et al., 2020). This research identified two scholarly investigations that elucidate the barriers encountered in the utilization of artificial intelligence (AI) within the domain of career counselling.

First, the AI-Facebook system is only available to Facebook users (Suresh et al., 2021). A robust internet connection is also needed for Chatbot to respond quickly. When testers were linked to a solid internet connection, the chatbot reacted very instantly. However, if the tester's internet connection is unstable, the chatbot will take 5–10 seconds to respond. This bottleneck. Another drawback is that the Chatbot only speaks English. Non-English speakers cannot use the service. Simulating the solution for every occupational sector and user resource is not possible. This is problematic since consumers' requests are unpredictable.

Then, Westman et al. (2021) revealed various obstacles to applying AI in job advising. Accessing and sharing curricula and timetables is challenging and time-consuming, he says. Westman et al. (2021)'s most challenging of twenty-one Future Scenarios of AI for Career Guidance:

1. Help career planning: encourage career choices and promote career services based on situational data.
2. Increasing counselling interaction: linking students and counsellors, adding earlier guidance conversations to knowledge network.
3. Create a competence portfolio and identify broad work-related talents.
4. Comparing competencies with work objectives and needs: self-assessment tool for competence mapping, reporting competency gaps based on profile data.
5. Anticipating counselling and case management needs: gathering student information for staff to check, prioritizing staff responsibilities.
6. Recognize networks: provide access to current career services information and reuse connections for employment.
7. Students, staff, and organizations must be prepared for AI-enabled education and AI must learn about education.

The effectiveness of career counselling with artificial intelligence

The results of data collection found ten studies examining the effectiveness of using AI in career counselling (Carson et al., 1999; Crowley, 1992; Guleria & Sood, 2023; Hendahewa et al., 2006; José-García et al., 2022; Lee et al., 2018; Rao et al., 2020; Sodhi et al., 2016; Suresh et al., 2021; Westman et al., 2021).

According to Westman et al. (2021), artificial intelligence is posited as a potential answer for aiding students in their academic pursuits, career preparation, and self-management. The integration of AI in career advising is met with a positive reception by students. In a study conducted by Crowley (1992), the author employed computer assistance to investigate the efficacy of utilizing an artificial system. The findings revealed that a significant majority of students (92%) affirmed the effectiveness of the second iteration of the artificial program. Notably, these students expressed surprise at the high level of accuracy achieved by the program in providing descriptions of themselves. This questionnaire has superior qualities compared to other questionnaires, making it more precise in its measurements.

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Several studies have demonstrated the efficacy of employing artificial intelligence (AI) in a platform-based approach for career counselling. For instance, Hendahewa et al. (2006) conducted an evaluation of the iAdvice model, a Career Advisory Expert System, and found that it achieved an accuracy rate of approximately 70% in predicting performance. Furthermore, the model demonstrated a relevance rate of approximately 85% in its predictions. Based on the recommendations provided, the inherent characteristics of the system are readily understandable. Approximately 87% of the respondents offered ideas that were educational and helpful. The implementation of iAdvice (Expert Career Advisory System) serves as a valuable tool for students in the process of discerning their future career trajectory, ensuring alignment with their long-term professional objectives. In their study, Lee et al. (2018) provide compelling evidence for the advantages of using an Artificial Intelligence based Design platform (AID) in conjunction with the Multiple Preference Matching Algorithm (MPMA). This combination yields a result of zero instances of mismatching, while maximizing the number of perfect matches. The authors of the study (José-García et al., 2022) The C3-IoC solution, which incorporates an AI-driven approach known as AID mode, enables students to visually and comprehensively examine a range of professional positions based on their own areas of competence. Furthermore, the assessments conducted on user trials demonstrate that individuals recognize the significance of C3-IoC and its potential to enhance their professional growth and personal advancement.

According to the study conducted by Suresh et al. (2021), it was observed that chatbots exhibit prompt response times to user messages and provide valuable resources in accordance with the demands made by users or students. In order to achieve optimal performance and provide prompt responses, the chatbot requires a reliable and high-speed internet connection. Furthermore, the efficacy of using machine learning-based artificial intelligence (AI) in the field of career counselling has been shown by the research conducted by Guleria & Sood (2023). The objective of successful career advice is to provide students with assistance that facilitates informed decision-making on appropriate course selection and skill-based education.

Researchers have shown that ANN is effective for career counselling. According to Carson et al. (1999), artificial neural networks may help vocational experts combine numerous forms of evaluation data to provide career suggestions. In India, the machine learning system may be employed alone in areas with a counselor scarcity or to aid human career decision-making (Sodhi et al., 2016). This research has shown that Artificial Neural Networks can make complicated decisions when other approaches fail. The ANN system built from this study may be utilized as an independent counselling advice system or to help counsellors determine a career route for students. This work used ANN to create an automated system that can analyze a person's personality and forecast career aspirations (Rao et al., 2020). With 20 epochs, the model fits optimally with improved predictions and lower error rate. All model-evaluated MTBI categorizations had sensitivity, specificity, precision, and accuracy over 92%. The suggested classifier proposes potential occupational fields based on the applicants' MTBI questionnaire (Myers-Briggs Type Indicator). Thus, career advisers using this program will improve their skills and eliminate human mistakes. The suggested personality prediction technology would help candidates choose the correct job and boost workplace efficiency.

The right explanation and interpretation of AI outcomes on career counselling-based educational data sets using established algorithms from an in-depth examination of White and Black box model methodologies. Machine learning algorithms are compared for prediction accuracy. The top machine learning algorithms for career counselling framework decision-making (Guleria & Sood, 2023). This study report was validated by Zhang & Zheng (2022), who said AI can give job, entrepreneurial, and career planning advice. To transition the traditional system to a contemporary career counselling service to assist individuals choose a desirable course of study or work, a wider variety of career guidance management abilities is needed. This includes including strong career

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education in the curriculum and relating it to student growth. Some nations have included it into core curriculum. Career counselling and education services concentrate on the conclusion of compulsory schooling. These career services emphasize direct options for personal growth and decision-making in secondary and postsecondary education. We realize these services are complicated for adult career coaching. But career guidance at our university is quite useful for career and life success (Roy, 2020).

Limits, implications, and recommendation

This study presents an assessment of a restricted set of empirical data that specifically examines the barriers and efficacy of using artificial intelligence in the field of career counselling. Following the completion of the data gathering process, a total of 10 texts were identified as being pertinent to the research topic. This observation indicates that there remains a limited number of studies that investigate the obstacles and efficacy of using artificial intelligence in the field of career counselling.

The aforementioned hurdles are provided as input to educational counsellors who are present at educational institutions and campuses with the aim of enhancing the efficacy of support services. One possible strategy for enhancing the accessibility of career counselling services is to improve internet connectivity, therefore facilitating communication with prospective users and encouraging them to create a Facebook account. The study conducted by Westman et al. (2021) identifies various challenges encountered in the utilization of AI in the field of career counselling. It is important to note that the application of AI in this context is an interdisciplinary domain, as highlighted by Fulmer (2019). Due to the breadth and impact of this field, it is challenging for a single article to fully encompass its scope. Therefore, collaborative efforts among researchers are necessary to develop AI models for career counselling that can be effectively implemented, taking into consideration factors such as gender, geographic location, and educational background. For instance, Liu (2023) has proposed a framework that enhances professional education by using expertise in artificial intelligence, while also including the emerging attributes of integration, innovation, and lifelong learning that are integral to career education. The study by Liu (2023) introduces unique models and approaches for the implementation of "artificial intelligence plus career education" with a focus on curriculum, learning, and the environment.

The aforementioned study results serve as evidence supporting the efficacy of using AI in career counselling. Consequently, it is logical for educational institutions to embrace AI in many aspects such as counselling services, curriculum development, and seminars. Governments that have not yet embraced AI may consider examining empirical evidence that demonstrates the efficacy of AI use. Therefore, it can be concluded that AI plays a substantial role in the field of counselling, as well as in the broader domain of education.

It is recommended that educational counsellors engage in a comprehensive investigation about the hurdles and efficacy associated with the use of AI in the field of career counselling. The proposal for future researchers is to engage in a comprehensive examination of the many models or kinds of AI development in order to choose the most relevant and efficacious model or type to use.

6. Conclusion

This study identified two empirical investigations that explored the obstacles associated with career counselling, as well as 10 empirical studies that investigated the efficacy of utilizing artificial intelligence in career counselling. The identification and resolution of challenges associated with the implementation of AI in the field of career counselling are imperative. One such approach involves boosting the carrying capacity. There is a scarcity of research studies that have investigated the obstacles surrounding the utilization of AI in the domain of career counselling. Consequently, it is imperative for forthcoming scholars to direct their attention towards

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comprehensively exploring the barriers associated with the integration of AI in this field. Although the studies investigating effectiveness are not of a tiny scale. Based on the empirical evidence pertaining to the efficacy of AI-driven career counselling, it is evident that the attainment of counselling objectives and the effectiveness of the AI tools employed are indicative of successful outcomes. The shown achievement provides evidence that AI can be widely used in the field of education across multiple nations.

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