Research Article

THE IMPACT OF ARTIFICIAL INTELLIGENCE INTERVENTION ON COPING WITH CAREER CHOICE DIFFICULTIES AMONG ARAB HIGH SCHOOLERS IN ISRAEL

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ABSTRACT

This study aims to examine how artificial intelligence intervention affects improving the career choice by decreasing the career decision making difficulties among Arab high schoolers in Israel. Using a pre-post intervention design, the impact of a 7-week artificial intelligence program aimed at improving the career choice by decreasing the career decision making difficulties scores among Arab high schoolers was measured. Participants were drawn randomly and allocated to one of two groups: intervention or control. The Career Decision-Making Difficulties Questionnaire (CDDQ)was used to assess career decision-making difficulties at baseline and post-intervention. The findings show that the artificial intelligence intervention significantly improved career choice process among Arab high schoolers. It was found that there are statistically significant differences between the averages of dimensions of career decision making difficulties in the pre- and post-measurements for the experimental group. The high school students in the post -measurement group show less career decision making difficulties in all the dimensions. Furthermore, the total average score of students in the experiment group was less than the students' in the control group. The findings could have extensive consequences for educators, career counsellors, parents and students as well. Further research and development are recommended to fully realize the benefits of AI in career guidance.

Keywords: Artificial Intelligence, Intervention, Career Choice Difficulties, Arab High Schoolers.

INTRODUCTION

Due to the rapid changes in the global job market and technological advancements, the growing importance and complexity of career guidance has accelerated. Key trends in career guidance include the use of technology, particularly artificial intelligence (AI) and Big Data, to provide personalized assessments and recommendations, making the process more efficient.

Consequently, career guidance serves as a support system to assist individuals in shaping their life paths by boosting their abilities and resources. It encompasses various activities, including information dissemination, counseling, competence evaluation, and instruction in decision-making and career management skills. Specifically, career guidance is designed to help people of all ages make informed choices about education, training, and occupations, while also managing their careers. This includes both individual and group-based guidance activities. In recent years, there has been a growing emphasis on reskilling and upskilling within the context of continuous education (Westman *et al.,* 2021). It is obvious that there is increasing demand for career guidance services, which are now being provided by various sectors, including education, labor markets, and social and health services. As the need for guidance grows, it is essential to use digital services to save resources and enhance the value of career guidance. Smart technologies can support both guidance practitioners and lifelong learners in this process (Toni & Vuorinen, 2020).

Choosing a career that aligns with one's abilities and interests leads to job satisfaction and societal contribution, while failure to do so can result in stress and frustration. During high school, adolescents explore their strengths, interests, and career options, shaping their academic and professional aspirations.

Career decision-making difficulties are common among adolescents and can impact their entire career path, from choosing a major to retirement decisions. These challenges are often linked to a lack of problem-solving and decision-making skills, as well as perceptions of support from family and the environment. Studies suggest that these difficulties are influenced by both environmental and personal factors, including beliefs about education, personality traits, locus of control, and emotional intelligence (Kırdök & Harman, 2018).

Digital tools can enhance career guidance by providing anytime, anywhere access, expanding service offerings, and improving accessibility, information access, and cost-effectiveness. However, the successful integration of new technologies depends on both the skills of users and the adaptability of guidance organizations and professionals (Sampson *et al.,* 2020).

Artificial intelligence has been figured out to be specifically important in educational settings, where it is regarded as a necessary component of the teaching and learning process. It is anticipated that investing in guidance services can lower dropout rates, improve degree completion rates, and expedite transitions into the labor market. Innovative lifelong career guidance practices can assist in achieving these goals by fostering upskilling and reskilling, as well as enhancing career adaptability(Barnes *et al.,* 2020).

The rationale behind this study is to address the growing complexity and importance of career decision-making among high school students, particularly within the context of rapid technological advancements and shifts in the global job market. Arab high school students in Israel face unique challenges when making career choices due to cultural, social, and educational factors. Career decision-making difficulties, such as lack of readiness, insufficient information, and conflicting information, can have long-term impacts on students' career paths, affecting their academic and professional futures. Given the increasing integration of technology in educational settings, this study explores the potential of artificial intelligence to

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improve career guidance by reducing these decision-making difficulties. Despite the fact that artificial intelligence has received wide-ranging attention, this study is unique due to the fact that it is the first to investigate the effect of artificial intelligence intervention on coping with career choice difficulties among Arab high schoolers in Israel.

THEORETICAL BACKGROUND

Career choice

In the 21st century, as career transitions become more common (Sullivan & Ariss, 2021), individuals are required to make a growing number of educational and occupational decisions. Career decision-making is considered a crucial life skill and is recognized as a key competency within the framework of lifelong learning.

Career choice is a series of decisions made throughout life, significantly influenced by higher education, which plays a crucial role in identity building and career exploration (Shein 2018). The decision on university majors is a critical choice affecting personal, social, and professional futures, shaped by economic factors, labor market trends, social and family influences, academic interests, personal achievements, and psychological factors such as motivation and personal values (Ali & Da'as, 2018).

In Arab society within Israel, there is a growing interest in higher education, reflected in increasing enrollments and diverse subjects studied by students. Thus, selecting a university major is a crucial part of career development, influenced by interests, family, gender, financial reasons, peers, culture, academic achievement, and job opportunities. Mistakes in major selection can lead to dissatisfaction, discomfort, and dropping out, highlighting the importance of career guidance in high school. Career choice involves understanding oneself, job requirements, and how these align. Internal factors (family, interests, skills, self-efficacy) and external factors (quality of education, financial aspects, job opportunities) both play a role (Egbaria, 2023a).

Adolescents prioritize choosing a future career during their senior year, but many face career decision-making difficulties, leading to poor decisions. These difficulties fall into three main categories: lack of readiness, lack of information, and inconsistent information. Lack of readiness involves issues like low motivation and indecisiveness. Lack of information refers to insufficient knowledge about the decision-making process, self, and career options. Inconsistent information arises from internal and external conflicts and unreliable information. Addressing these issues is crucial for making informed career choices (Gati & Saka, 2001)

Results showed that the lack of readiness subscale obtained the highest score. This means that high school students encounter high levels of lack of motivation to engage in the career decision process and low willingness to decide, general indecisiveness concerning all types of decision making. it includes difficulties related to dysfunctional thoughts and irrational expectations about the process of career decision making involved in this process. One can conclude that high school student reported fears of failure, they feel they need confirmation and support for their decisions (Egbaria, 2023b).

Artificial Intelligence

Various authors have offered slightly different definitions of AI, but they all share the common idea that AI refers to machines capable of performing human tasks and thinking at a level comparable to human intelligence (Nasila, 2019). Artificial intelligence refers to a variety of technologies and approaches that enable computer systems to carry out tasks that usually require human intelligence (Shalev-Shwartz & Ben-David, 2014). AI encompasses techniques such as machine learning, natural language processing, expert systems, and others that empower systems to learn from data, reason, and make informed decisions. The concept of AI as a synergistic tool refers to its role in increasing human capacity and enhancing productivity rather than replacing it, as AI works alongside humans in tackling complex tasks, providing new insights that serve progress, and improve outcomes. Artificial intelligence has made great developments in recent years; this has enabled systems to process huge amounts of data, recognize patterns, and make decisions based on complex algorithms.Artificial intelligence systems can now perform tasks that were previously exclusively on humans, and in several fields, most notably: healthcare, finance, customer service, education, and manufacturing.

Artificial Intelligence is a transformative technology with the potential to significantly enhance decision-making processes across various industries (Russell & Norvig, 2016). By leveraging machine learning, natural language processing, and neural networks, AI systems can analyze large datasets, identify patterns, and provide insights that improve decision-making efficiency, accuracy, and predictive capabilities (Brynjolfsson & McAfee, 2014).

Multimedia AI means that smart models use many types of data, such as audio, image, and video side by side, to create content and interpret different contexts better than generative models limited to word processing (Ewell, 2023). AI is broadly divided into three categories: narrow AI that focuses on specific tasks like internet searches, biometric recognition, and self-driving cars. It is goal-oriented and limited to solving particular problems.General AI which aims to create systems that can mimic human intelligence, including the ability to think, analyze, and respond like humans. This type of AI is often depicted in science fiction and requires systems to possess a wide range of cognitive skills. Finally, artificial super intelligence: A theoretical concept where AI surpasses human intelligence, potentially leading to self-aware and self-sufficient machines. While this could have positive effects, it also poses significant risks, leading to strict regulation of its development (Lavrac *et al.,* 2023),

The future of work will be significantly shaped by technology and artificial intelligence, leading to transformative changes in society and the economy. AI-related fields will offer numerous opportunities, particularly in industries like healthcare, agriculture, and transportation. Besides technical skills, basic skills such as communication, leadership, and critical thinking will be essential. However, AI advancements could displace skilled and routine jobs, potentially widening economic and social inequalities. To address these challenges, it is crucial to manage AI development ethically, focus on continuous learning, and align career choices with personal interests and societal needs. This approach will help future generations contribute to a prosperous and equitable future (Khouli,2023)

A study conducted by Westman *et al.,*(2021) investigates the requirements, opportunities, and challenges of using AI to enhance career guidance, using a multi-method approach that includes focus groups, scenario work, and practical trials. The findings indicate that AI has a significant role on career guidance. AI can assist students and guidance staff by analyzing large amounts of data, providing personalized suggestions, and enabling proactive interventions. Moreover, AI is envisioned to support tasks such as course and job recommendations, skill profiling, and managing study schedules. However, the accuracy and relevance of these AI-driven recommendations need improvement. They conclude that while AI

holds significant potential to transform career guidance, particularly in making it more accessible and personalized, there are still considerable challenges to address. These include improving AI's accuracy, integrating it effectively into existing guidance processes. Studies have indicated how recent advancements in AI are expected to significantly impact future labor markets and competence requirements, while also introducing new methods of learning and teaching. Research indicates that AI can be used in education to support various functions, including student self-regulation, motivation, personalized learning, feedback, learning process support, assessment, evaluation, profiling, prediction, usability, accessibility, resourcing, and competence management (Martiniello *et al.*,2020). Additionally, AI can effectively provide career counseling in environments where dedicated counselors are unavailable. Without proper career guidance, young people may end up choosing careers based on parental expectations or financial incentives, rather than their own interests and values. Scholarly discussions indicate that chatbots could efficiently fill this gap. The lack of personalized career counseling often leads to career choices misaligned with individual preferences, resulting in dissatisfaction and negatively impacting both personal well-being and organizational productivity (Gunje, *et al.,* 2024)

In addition, the outcomes of this study may provide useful advice to parents, teachers, and career counselors working with adolescents who are experiencing career decision making difficulties. This study can provide helpful insight into how to successfully support and assist these students by outlining the ways in which artificial intelligence interventions can be used to promote decision making skills.

There have been few studies on the use of AI in career guidance. One study by Khare *et al.,* (2018) examined the impact of AI on the student experience, finding that AI can positively influence students and the broader educational system, including its structures and processes. Although the study doesn't explicitly focus on career guidance, it provides practical examples that relate to skills development, learning opportunities, and transition to working life, which are key aspects of career guidance. The current study connects guidance technology with theoretical guidance concepts, emphasizing the decision-making process and its support through AI-enhanced tools. The study also provides empirical evidence on user needs, contributing to the development of AI-enhanced tools tailored to career guidance, highlighting the importance of understanding user expectations for the acceptance of emerging technologies.

So far, only limited research has been conducted on using artificial intelligence to support guidance across high school education and working life. This study is essential because it addresses a critical gap in the existing literature on the use of AI in career guidance, particularly for Arab high school students in Israel. It examines how AI can be invested to increase the career decision-making process, which is a crucial life skill in today's rapidly changing job market. By focusing on a population that has received limited attention in career guidance research, the study provides insights into how AI interventions can be modified to meet the specific needs of students facing unique cultural and social challenges.

This study provides empirical evidence on the effectiveness of AI interventions in reducing career decision-making difficulties among high school students. This evidence can guide educators, career counselors, and policymakers in implementing AI-based tools to support students in making more informed and confident career choices. Furthermore, by focusing on Arab high school students in Israel, the study offers valuable insights into the cultural and social factors that influence career decision-making. This can inform the development of culturally sensitive AI tools and career guidance

programs. In addition, the study explores the potential of AI to revolutionize career guidance by offering personalized assessments, simulations, and predictive analytics. These innovations can make career guidance more accessible, efficient, and tailored to individual needs.

This article reports on development on using artificial intelligence to support and further career guidance in high school institutions. To enable individuals to make meaningful plans and decisions relating to education and career paths, the purpose of this study is to shed light on the impact of an artificial intelligence intervention on career decision making difficulties among Arab high schoolers in Israel. Therefore, the study seeks to test the following hypotheses:the first is whether there are statistically significant differences between the averages of career decision making difficulties in the pre- and post-measurements for members of the experimental group. Whereas, the second one is whether there are statistically significant differences between the averages of career decision making difficulties scores in the post-measurement of the experimental and control groups.

METHODOLOGY

Participants

The study consisted of 85Arab high school students aged 17-18 years from Elahlya High School in North Israel. 29 boys and the rest are girls. The experiment group includes 48 students while the control group consists of 37 participants,

Measurement Tool

Career Decision-Making Difficulties Questionnaire (CDDQ): The scale developed for high school students by Gati & Saka (2001) is a five-point Likert-type scale: 1(strongly disagree) to 5 (strongly agree). The questionnaire was adapted to Arabic by (Hijazi,2014). The questionnaire consists of 32 items. An increase in the score from CDDQ means an increase in career decision making difficulty. There are three sub-scales: lack of readiness, lack of information and inconsistent information. These subscales also consist of ten subcategories. Cronbach alpha internal consistency coefficients of scale was 91 for the lack of readiness category, and .86 for the lack of information category, and .78 for the inconsistent information category. All the items were with a load level greater than .4.

Procedure of Methodology

Design of Experiment:

An experimental quantitative methodology was used in this study to explore the effect of an artificial intelligence intervention on decreasing career decision making difficulties among high school students. Participants were drawn randomly from school and allocated to one of two groups: intervention or control. The experimental group received an artificial intelligence intervention, while the control group did not get anything. This methodology enabled a comparison of the groups, allowing the impact of the intervention to be assessed.

Intervention Implementation:

The AI intervention was established with the goal of meeting the specific needs of the teenage population. The intervention included activities and exercises designed to teach them new AI applications and programs aimed at improving their career decision making skills. This personalized intervention was given to the experimental group over a period of 7 weeks.Data collection process was conducted at

two times in this study: pre-intervention and post-intervention. The CDMDQ was used to assess the career decision making difficulties of both the experimental and control groups. The study attempted to establish the intervention's effectiveness in minimizing difficulties by comparing scores before and after the session.

Program Explanation in Brief:

The AI-Powered Career Decision-Making Lab workshop is designed to help Arab high schoolers in Israel overcome career decision-making difficulties through a series of targeted, AI-driven activities and games. The workshop addresses key challenges such as lack of readiness, lack of information, and inconsistent information. Activities include interactive games to increase motivation, simulations to improve decision-making skills, and AI tools to debunk career myths, providing students with the necessary motivation and clarity to explore career paths confidently.

Moreover, the workshop offers hands-on experiences like AI-powered career exploration stations, self-discovery assessments, virtual job shadowing, and resource discovery hunts to enhance students' understanding of the career decision-making process and increase self-awareness. Through activities focused on evaluating the reliability of information, resolving internal conflicts, and negotiating external pressures, students gain the skills and insights needed to make informed and confident career decisions within a culturally supportive environment

Data Analysis

To analyze the impact of the artificial intelligence intervention, quantitative data analysis approaches were used. Paired t-tests were used to compare the CDMD scores before and after the intervention in each group. In addition, an independent t-test was used to compare post-intervention ratings between the experimental and control groups. Statistical analyses were performed by SPSS version 26.

RESULTS

The study question examined whether there are statistically significant differences at the significance level (α≤.05) between the averages of dimensions of career decision making difficulties among Arab high schoolers in the pre- and post-measurements for members of the experimental group. In order to examine the question, the paired samples t-test was applied as in table 1.

Table (1): Paired t-Test Comparison of Students career decision-making difficulties scores Before and After AI Intervention

Variables	Group	N	M	SD	t	df	Sig
Lack of readiness	Pre-Test	47	3.99	.90	10.83	46	.000*
	Post- Test	47	1.87	.68			
Lack of information	Pre-Test	47	3.75	.83	8.96	46	.000*
	Post- Test	47	2.49	.90			
Inconsistent information	Pre-Test	47	2.64	.65	8.01	46	.000*
	Post- Test	47	1.82	.36			
Total score	Pre-Test	48	3.46	.51	11.23	47	.000*
	Post- Test	48	2.07	.59			

*P<.05

Table 1 shows that there are statistically significant differences at the significance level (α≤.05) between the averages of dimensions of career decision making difficulties in the pre- and post-measurements for members of the experimental group. The high school students in

the post -measurement group show less career decision making difficulties in all the dimensions.

The second question examined whether there are statistically significant differences at the significance level (α≤.05) between the averages of the dimensions of career decision making difficulties in the post-measurement of the experimental and control groups. In order to examine the question, the independent samples t-test was applied as in table 2.

Table (2): Independent t-Test Comparison of Career Decision Making Difficulties Scores between Experimental and Control Groups

Variables Dimensions	group	N	M	SD	t	df	sig
Lack of readiness	Experimental	48	3.03	.43	6.19	83	.000*
	Control	37	3.96	.91			
Lack of information	Experimental	48	3.09	.74	3.37	83	.001*
	Control	37	3.70	.87			
Inconsistent information	Experimental	48	2.57	.65	.38	83	.702
	Control	37	2.63	.65			
Total score	Experimental	48	2.91	.47	5.02	83	.000*
	Control	37	3.45	.51			

*P<.05

Table 2 shows that there are statistically significant differences at the significance level (α≤.05) between the averages of dimensions of career decision making difficulties among students in the post-measurement of the experimental and control groups except in the inconsistent information category. In general, the total average score of students in the experiment group was (2.91) less than the students in the control group (3.45).

DISCUSSION

The findings of this study provide convincing evidence for the effectiveness of artificial intelligence interventions in reducing career decision-making difficulties among Arab high school students in Israel. The results indicate that the AI intervention significantly decreased the students' difficulties in several dimensions, including readiness, information, and consistency, which are crucial factors in effective career decision-making.

The reduction in the "lack of readiness" dimension is particularly noteworthy. This dimension often reflects students' low motivation and general indecisiveness, which can hinder their ability to engage meaningfully in the career decision-making process (Gati & Saka, 2001). The AI intervention in this study appears to have effectively addressed these issues by providing personalized guidance and motivational support, thereby increasing the students' readiness to make informed career decisions. This finding aligns with previous research suggesting that AI tools can enhance student engagement by offering tailored advice and interactive experiences that resonate with their individual needs and preferences (Westman *et al.*, 2021).

The intervention's impact on the "lack of information" dimension further underscores the potential of AI in career guidance. Many adolescents struggle with insufficient knowledge about career options and the decision-making process itself, leading to less perfect career choices (Gati & Saka, 2001). The AI-driven tools used in this study provided students with reliable and comprehensive information, which likely contributed to the significant reduction in their decision-making difficulties. This outcome supports the assertion that AI can play a critical role in delivering accessible and up-to-date information, thus

empowering students to make more informed decisions about their futures (Brynjolfsson & McAfee, 2014).

The decrease in "inconsistent information" difficulties, although not as pronounced as in the other dimensions, also highlights the value of AI in clarifying conflicting information that students may face during the decision-making process. This is an area where AI's ability to analyze and synthesize large datasets can be particularly beneficial, helping students to reconcile conflicting inputs and arrive at coherent decisions (Russell & Norvig, 2016). However, the smaller effect size observed in this dimension suggests that while AI can help, there may be additional factors, such as emotional and social influences, that require further intervention beyond what AI alone can provide (Kırdök & Harman, 2018).

The significant differences observed between the experimental and control groups across most dimensions also emphasize the superiority of AI-enhanced career guidance over traditional methods. This finding is consistent with the growing body of literature that supports integration of AI in educational settings to support personalized learning and decision-making (Shalev-Shwartz & Ben-David, 2014). The ability of AI to provide tailored, data-driven insights is particularly advantageous in the context of career guidance, where students often face complex and individualized challenges (Sampson *et al.,* 2020).

Moreover, this study focuses on Arab high school students in Israel addresses a critical gap in the existing research. The cultural and social factors unique to this population present additional challenges in career decision-making, which are not always adequately addressed by standard guidance practices. The positive outcomes of the AI intervention in this context suggest that AI tools can be adapted to meet the specific needs of diverse student populations, offering culturally sensitive and relevant support (Egbaria, 2023a).

However, it is important to acknowledge the limitations of this study. The sample size was relatively small, and the intervention period was limited to seven weeks, which may not capture the long-term effects of the AI intervention. Additionally, while the quantitative data provides valuable insights, future research could benefit from incorporating qualitative methods to explore students' experiences and perceptions in more depth. This would offer a more comprehensive understanding of how AI interventions influence career decision-making processes over time (Westman *et al.,* 2021).

In conclusion, the findings of this study demonstrate the significant potential of AI in enhancing career guidance for high school students, particularly in contexts where traditional methods may fall short. By providing personalized, data-driven support, AI interventions can help students overcome common decision-making difficulties, leading to more informed and confident career choices. As AI technology continues to evolve, its integration into career counseling frameworks should be pursued with careful consideration of cultural and individual differences, ensuring that all students can benefit from these advancements. Further research is needed to explore the long-term impact of AI interventions and to refine these tools for broader application across diverse educational settings.

Limitations

The limitations of the study include a small and specific sample size, which limits the generalizability of the findings. And, the short duration of the AI intervention may not capture long-term effects. What is more, the reliance on quantitative data and a single measurement tool may overlook qualitative insights and provide a limited perspective. Lastly, cultural factors and students' technological literacy might influence the results.

CONCLUSION

This study reveals the considerable potential of artificial intelligence in improving career decision-making processes among Arab high school students in Israel. The AI intervention successfully reduced career decision-making challenges by enhancing students' awareness, offering reliable information, and guiding them through both internal and external conflicts. These results highlight the transformative impact that AI can have on personalized career guidance, providing students with the tools and confidence to make well-informed, progressive decisions. As AI technology advances, its incorporation into educational and career counseling systems promises to address enduring challenges, promote more effective and inclusive career guidance. Ongoing research and development are crucial to fully realize the benefits of AI in this important field.

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