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Leveraging AI for Career Guidance Platform: A Stepwise Journey of Lifelong Learners

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Abstract: *A career guidance platform is a digital tool designed to help individuals make informed educational and occupational choices. By leveraging advanced technologies like Artificial Intelligence (AI) and machine learning, such a platform will provide data-driven insights that deliver tailored recommendations based on an individual's skills, learning records, interests, goals, and the market demand of their occupational choice. It can also help users identify suitable career options, develop necessary skills, and effectively plan their career trajectories. It can provide rich services beyond typical features of career assessments, job matching, resume building, interview preparation, and access to career coaches or mentors.*

AI can be used to analyze individual profiles, including skills, interests, and career goals, to provide customized recommendations and action plans. It can bring engaging interactive sessions with AI-powered career coaches, participate in career quizzes, and receive feedback on their resumes and cover letters. Practical features such as job interview simulations and day-in-the-life experiences for various professions will help users make informed decisions about their career paths. Furthermore, by integrating it with a vast amount of data from the Internet or other data sources, it will enable the

ability to offer real-time and adaptive guidance for exploring career choices. Making such a platform accessible to a wide range of users, from students to professionals seeking career shifts, will change the way people plan and advance their careers. It provides a cost-effective alternative to traditional career coaching, offering expert advice at a fraction of the cost.

This study elaborates on the journey of the Indonesia Cyber Education Institute (ICE Institute) in establishing its next-generation career guidance platform. Employed Design Science Research Methodology, a research paradigm focusing on the development and validation of prescriptive knowledge, the study highlights the approach to achieving the goal by breaking it down into a series of manageable steps. It includes a key decision-making approach that leverages advanced technologies such as AI and machine learning, systematically planned and carefully executed to ensure systematic progress and effective outcomes.

Keywords: Career guidance platform, work-based learning, personalized career advice, artificial intelligence, Indonesia Cyber Education Institute

INTRODUCTION

A career guidance platform is a comprehensive, developmental program designed to assist individuals in making and implementing informed educational and occupational choices across different stages of life. It provides advice, resources, and tools to help individuals identify their career goals, explore various career options, and develop actionable plans to achieve their objectives. In the context of rapidly changing labor markets, career guidance platforms increasingly emphasize lifelong learning, enabling individuals to update their competencies continuously and remain adaptable throughout their careers. These platforms often include features such as career assessments, personalized recommendations, educational resources, and access to career counselling services (Hooley, 2019; Perera & Athanasou, 2019).

There are several arguments supporting the need for career guidance platforms (Perera & Athanasou, 2019; Sharapova et al., 2023). Such platforms help individuals make well-informed decisions about their education and career paths while supporting skill alignment by identifying users' skills, interests, and values and matching them with suitable career options. Importantly, career guidance platforms serve as an avenue for lifelong learning by helping individuals adapt to evolving job market demands, identify skill

gaps, and acquire new competencies over time. They also expand access to guidance resources, particularly for individuals in remote areas or those with limited access to traditional career counselling services. Furthermore, career guidance interventions have been shown to reduce dropout rates and improve educational outcomes, reinforcing sustained engagement in learning pathways (Leung, 2022).

Artificial Intelligence (AI) offers significant potential to enhance career guidance platforms (Westmann et al., 2021). AI can support career guidance by delivering personalized recommendations and insights tailored to individual needs, preferences, and learning histories, thereby strengthening lifelong learning trajectories. AI-driven analytics can also predict future labour market trends and identify emerging career opportunities, enabling platforms to provide timely, relevant, and forward-looking guidance. However, ethical considerations must be addressed, including ensuring fairness, transparency, and respect for individuals' privacy and autonomy in AI-driven career guidance services (Westmann et al., 2021).

Integrating AI into technology platforms requires a careful and stepwise approach to ensure effectiveness and mitigate potential risks. Palumbo and Edelman (2023) argue that a clear strategic plan aligned with organizational goals is essential before AI adoption. This includes identifying specific AI use cases, defining success metrics, and ensuring robust data management practices such as data cleaning, integration, and governance. Ethical and legal compliance is equally critical, necessitating the development of ethical guidelines and impact assessments to support responsible AI use. Implementing AI in phases through pilot testing allows organizations to identify challenges early and iteratively refine systems based on real-world feedback (Pykes, 2024; Vilardell, 2024). Additionally, developing AI-enabled platforms requires a skilled workforce; therefore, organizations must invest in continuous training and development to enhance AI literacy and support a culture of lifelong learning among employees (Palumbo & Edelman, 2023).

The Indonesia Cyber Education Institute (ICE Institute) is a marketplace of online courses in Indonesia that provides high-quality learning opportunities

from prominent domestic and international institutions, including partnerships with global platforms such as edX, Coursera, and XuetangX of Tsinghua University. As a natural evolution of its mission, the ICE Institute aims to support learners beyond course completion by assisting them in navigating their career pathways. This vision led to the establishment of a career guidance platform that directly supports learners in transitioning from education to employment and continuous professional development. By serving university students, graduates, and working professionals alike, the platform reinforces the ICE Institute's mission to be a lifelong learning platform for everyone. This paper highlights the ICE Institute's approach to integrating AI into its career guidance platform, outlining a systematically planned and carefully executed process designed to ensure sustainable development and effective outcomes.

METHODOLOGY

This study employs Design Science Research Methodology, a research paradigm focusing on the development and validation of prescriptive knowledge. While the natural sciences are more concerned with explaining how things are, the design sciences are more concerned with how things ought to be, by determining their building blocks (called the artifacts) to reach the goals (Simon, 1988). The pragmatic nature of Design Science makes this approach fall as a constructive research method, rather than an explanatory science research approach (Dresch et. al., 2015). While the explanatory approach ought to develop knowledge to describe, explain, and predict (Van Aken, 2005), Design Science is mainly to develop knowledge of the process of making choices on what is possible and useful for the creation of possible futures, rather than on what is currently existing (Simon, 1988). Its main purpose is achieving knowledge and understanding of a problem domain by building and applying a designed artifact (Hevner et.al., 2004; Apracio, Apracio & Costa, 2023).

Hevner (2007) suggested three closely related cycles of activities in conducting Design Science: the relevance cycle, the design cycle, and the rigor cycle. The relevance cycle provides the context that is not only used as the requirements for the research but also defines the acceptance or evaluation of

the results. The rigor cycle utilized past knowledge to solve the problem in context. The central design cycle iterates between the two key activities of building and evaluating the design artifacts (building blocks), by taking into account both the requirements (from the relevance cycle) and wisdom from the past (from the rigor cycle).

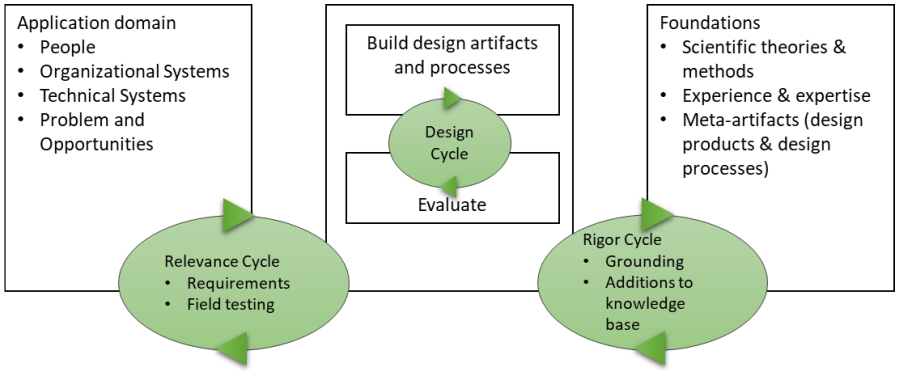

Figure 1. Design Science Research Cycles (Hevner, 2007)

FINDING & DISCUSSION

A. Findings

a. Relevance for ICE Institute

As previously mentioned, it is a natural journey for the ICE Institute to deploy a career guidance platform. It brings the direct benefit of opening a market for upskilling and reskilling to offerings to both university students, graduates, and those who are already in the workforce. Provision of educational courses is one of the key features in any career guidance platform (Hooley, 2019; Perera & Athanasou, 2019; Sharapova, 2023). It provides the business context to open new market opportunities for the ICE Institute. It is also very much aligned with the mission of providing lifelong learning and establishing access to career resources for a wider audience, especially those who are living in more rural areas or have no access to traditional career advancement materials (Leung, 2022).

The problem in context is how ICE Institute is going to provide the required features of a career guidance platform, such as career advice, resources, and tools to help individuals identify their career goals, explore various career options, and develop a plan to achieve their objectives. So do the features of career assessments, personalized recommendations, educational resources, and access to career counseling services (Hooley, 2019; Perera & Athanasou, 2019). Content-wise, those features are already available elsewhere, including from the university-based career centers. Whatever design approach is used, it must consider the relatively small and limited organizational resources of the ICE Institute. Currently ICE Institute comprises fewer than 30 staff members, with a less than five-person technology and system team. Considering talent acquisition issues in advanced technology, such as AI (Palumbo and Edelman, 2023), collaboration is the key to establishing such features (Pykes, 2024; Vilardell, 2024).

The other problem context is incorporating AI features into the career guidance platform itself. According to Westmann et.al. (2021), the possible AI features are personalized recommendations and insights based on individual needs and preferences, predicting future job market trends, identifying emerging career opportunities, resume building, career assessment, and career advice. The goal is to provide more effective and efficient career planning for the users. These business relevance, technology, and organizational contexts, as well as potential use of AI, are consolidated in Table 1. The table will be used to identify specific use cases for AI, setting realistic expectations, and defining success or evaluation metrics (Palumbo & Edelman, 2023).

Table 1. Design Relevance of AI in Career Guidance Platform.

	Expectations	Metrics
Business Context	A platform that can provide comprehensive and personalized services to assist individuals in making and implementing informed educational and occupational choices.	Use of AI to establish personalized advice and insights for more effective and efficient career planning.
Opportunities	Linking to the core offering of educational	Ability to provide (AI-assisted) personalized

	courses and resources within the ICE Institute.	recommendations of relevant courses for upskilling and reskilling to deal with career changes and trends.
	Serving users from less developed areas to be able to access quality career advancement services, on par with their more advantaged counterparts	Ability to provide career information that is relevant to users from various locations, job expectations, and career choices.
People & Organizational Setup	Ability to leverage AI as much as possible, despite the relatively lean and small team of the ICE Institute	Collaboration and use of existing resources, rather than an in-house build. Use of AI tools to reduce the organizational burden and tap into more advanced features.

The above design relevance table, along with the relevant rigor, will be used as the reference to determine the activities within the design cycle.

b. The Rigor

The relevance rigor can broadly be categorized as theoretical basis (foundational knowledge) and wisdom or insights from past design iterations. In alignment with the focus of this paper on the stepwise journey of the ICE Institute to integrate AI within its career guidance platform, the main theoretical basis is a stepwise refinement approach as initially coined by Niklaus Wirth (1971), that interestingly rooted or heavily inspired by the seminal book of Herbert Simon (1969) on the "Science of Artificial". The book is considered influential in both the domain of the learning sciences and artificial intelligence, and more especially influential in design theory (You & Hans, 2019).

According to Wirth, a program construction consists of a sequence of refinement steps. Each step of a given task is broken up into a number of subtasks. Each refinement of both the task and the corresponding data description should be conducted in parallel (Wirth, 1971). Although the original Wirth's idea is mainly toward the development of computer programs, the

approach is applicable in designing and building a complex system. The integrity of the final solution – the complex system, coming from a traceable series of elaborations that deal with specific challenges, implementation choices, or environmental interaction. It is all about the story of their making (Ward, 2021).

This iterative improvement approach is very much aligned with the Design Theory principle. It is about developing knowledge in the process of making choices on what is possible and useful for the creation of possible futures (Simon, 1988). The existence of the artifacts or building blocks is to achieve knowledge and understanding of a problem domain (Hevner et.al., 2004; Apracio, Apracio & Costa, 2023). It is clearly then reflected in the previously mentioned three-cycle process (Hevner, 2007). The other relevance is the need to take a careful and stepwise approach in integrating AI into any solutions (Palumbo & Edelman, 2023).

Taking those wisdoms to the domain of developing a career guidance platform implies two things: (1) there are opportunities for AI to improve the career guidance offering, (2) on the other hand, there are constraints related to people and the organizational setup of the ICE Institute. The appropriate approach, referring to Table 1, is to develop the system in partnerships with external partners – including utilizing existing systems in the market, and focusing on the use of AI – at least initially – to reduce the burden of the organization to provide content for the career guidance platform.

c. Design Journey

Besides the previously elaborated features of a career guidance platform, the research also conducts a stock-taking of features in similar platforms in the market, especially those that are state-run or implemented at the national level. Insights from three platform (MyFuture – Australia, My Next Move – USA, and My Skills Future – Singapore) highlighted some similarities of the features, namely: skills-based matching, integration with labor market information – including employee partnerships on job opportunities, interactive career exploration tools, alumni success stories and insights, resume career building, mock interview practices, mentorship and networking opportunities, integration with academic planning, and gamification of career exploration.

On the other hand, the current information asset at the ICE Institute is the database of courses and learners. The effort to match the common features and existing data assets is resulting in a diagram connecting the demand (of the job market) with the supply (learners or candidates), as depicted in Figure 2.

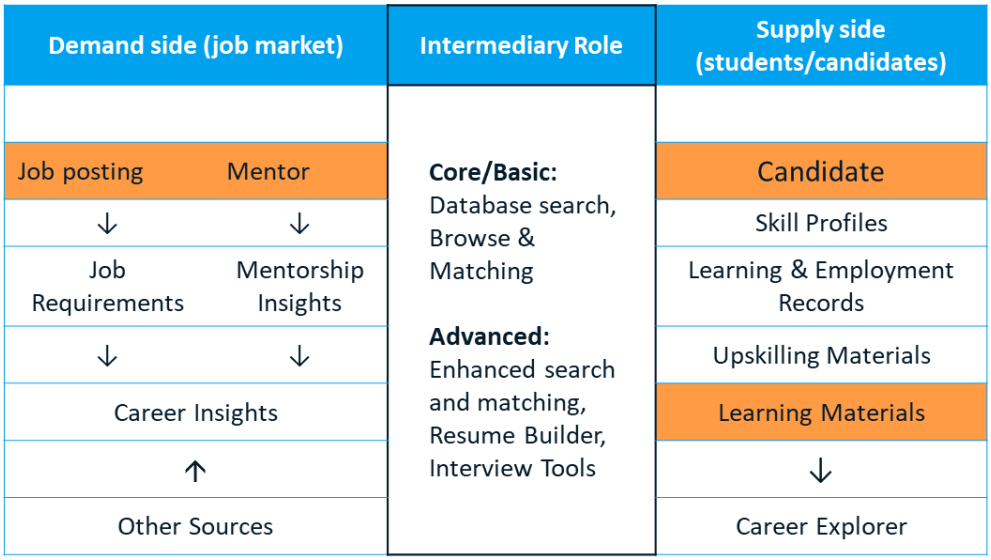

Figure 2. Matching the demand side and supply side

The orange boxes indicate core datasets that are expected to be provided by the career guidance platform: job opportunities, mentors, and candidates. The platform plays the intermediary role, starting by providing the core or basic functions of searching the database, browsing the dataset, and conducting a basic matching between candidate versus mentor profile, as well as with the available job opportunities. They act as the basis of further enhancement, including the provision of various AI approaches. Since the datasets are mostly in text format, the most suitable approach is to use various natural language processing (NLP) algorithms as part of the AI solution. The latest development of generative AI using Large Language Model (LLM) opens up the opportunity to push the boundaries, i.e., by providing personalized career insights, virtual AI mentors, as well as generating possible career trajectories and the required learning material to meet that trajectory.

The next design iteration is to identify how to fulfil those requirements, considering the previously described constraints. To set the realistic expectation, the platform will start by providing search and matching capabilities that basically employing text matching algorithm. To implement the job opportunities database, the platform will employ an aggregation approach, whereby it will aggregate content from various electronic job boards, making it a single shop to look at the online job postings. It employs Application Programming Interface (API) whenever available and web-scraping on as needed basis. To meet the need of localized job opportunities,

the platform utilizes job listings as provided by global search engines – in this case, Microsoft Bing and Google Search. Both search engines provide localized search results based on the user's location. The approach is expected to reduce the organizational burden of collecting and inputting job opportunities into the system. AI will mainly be used to provide the matching between jobs and candidates.

The mentorship features consist of two main approaches: (1) a traditional mentorship database, in partnership with various mentorship programs in the market; and (2) a virtual AI mentor, utilizing an available generative AI platform as the backend. The system opts to use an AI as a Service approach, whereby ICE Institute is not developing its own AI algorithms but utilizes existing AI services in the market. The system is currently experimenting with two leading AI platforms: OpenAI's ChatGPT and Anthropic's Claude.

The use of a generative AI system also opens up the opportunity to establish an AI Career Adviser, which is called Karin the Robo Career Advisor (the term "Karin" is a wordplay of "Karir" that means Career in Bahasa Indonesia). It is a chatbot style to ask career-related questions. Currently, it is implemented using the Chat GPT from OpenAI. There are two main reasons to use that platform: (1) there are existing career advisor learning models to start with; (2) it supports the language detection and interpretation of Bahasa Indonesia, which is very crucial to be implemented in this platform.

The platform also works in partnerships with various career-related websites, university career centers, as well as subscribing to various career-related data feeds. Those contents are needed as part of a specialized domain dataset for further improvements of both the Karin Robo Career Advisor and the Virtual AI mentor. It will be used as part of the satellite dataset in the Retrieval Augmented Generation (RAG) technique (Patrick et.al., 2023; Yunfan et.al., 2023; AWS, 2024). It modifies interactions with the base large language model (such as OpenAI's ChatGPT or Anthropic's Claude), so it responds to user queries with reference to a specified set of documents, to augment information drawn from their model or training data. The objective is to improve the domain-specific response, specifically the career-related questions.

It should be noted that the above journey is conducted in iterative mode, following the three-cycle approach of the design science methodology (Hevner, 2007).

B. Discussions

a. Lessons Learned

The journey of the ICE Institute in leveraging AI for its career guidance platform demonstrates that the design science approach is a suitable method for guiding both feature development and technological exploration, particularly within a lifelong learning context. This approach enables ICE Institute to iteratively cycle between business requirements, operational constraints, applicable rigor (including theories and best practices), and insights generated throughout the design process. Such iterative movement is especially important for lifelong learning systems, which must remain adaptable to learners' evolving needs across different career stages rather than being optimized for a single point of transition.

Through this approach, the ICE Institute was able to incrementally incorporate new features and alternative design strategies, including the potential use of AI to support mentorship programs and personalized learning pathways. These developments strengthen the platform's role in supporting continuous learning and career development, allowing learners to revisit the platform as their skills, goals, and labour market conditions change. The design science approach also facilitated the integration of new partners over time, reinforcing the ICE Institute's function as an intermediary and facilitator of information within a broader lifelong learning ecosystem. This intermediary role is consistent with the ICE Institute's operation as an online learning marketplace, connecting course providers with learners while enabling sustained engagement in education beyond formal degree completion.

Another key lesson learned is that adopting a stepwise implementation approach allows the ICE Institute to initiate AI-driven career guidance in a modest and controlled manner, rather than being driven by technological hype. This gradual approach aligns with lifelong learning principles by prioritizing long-term value creation and learner outcomes over short-term technological adoption. By focusing on measurable organizational and learning-related success indicators—such as sustained learner engagement, relevance of recommendations, and alignment between learning pathways and career goals—the ICE Institute follows a pragmatic strategy that supports durable and scalable lifelong learning services (Funk, 2019).

c. Risks Mitigations

The ICE Institute has taken a relatively conservative approach to incorporating AI into its career guidance platform, despite recognizing its significant potential to enhance lifelong learning and career development. This caution reflects an awareness that AI-driven systems, while powerful, may introduce risks such as algorithmic bias, lack of transparency, and ethical concerns related to data use and user autonomy (Westmann et al., 2021). These risks are particularly critical in lifelong learning contexts, where AI recommendations may influence not only immediate career decisions but also long-term learning trajectories and employability outcomes.

The current stepwise and iterative implementation strategy serves as a key risk mitigation mechanism. By gradually introducing AI functionalities, the ICE Institute can assess its impacts on different learner groups, evaluate potential biases in career and learning recommendations, and ensure compliance with ethical, legal, and institutional guidelines. This cautious approach supports responsible AI adoption while preserving learner trust—an essential condition for sustained participation in lifelong learning systems.

Furthermore, iterative development enables continuous refinement of AI models based on real-world feedback, ensuring that the platform remains responsive to changing labour market demands and learner needs over time (Pykes, 2024; Vilardell, 2024). In the context of lifelong learning, such adaptability is crucial, as static or opaque recommendation systems risk reinforcing outdated skill pathways. The ICE Institute's emphasis on monitoring, evaluation, and ethical governance, therefore, strengthens the platform's capacity to function as a trustworthy and inclusive lifelong learning infrastructure rather than merely a short-term career matching tool.

CONCLUSION

Design science methodology is well-suited to guide and document the exploratory journey, as in the effort of the ICE Institute in developing its career guidance platform. It enables working in mini cycles, revising and refining, and stepping back if needed as part of the stepwise refinement approach. It is more relevant in the incorporation of AI into such a system, because it will enable the organization to gradually adapt to possible risks such as algorithm bias and other ethical considerations. Apart from continuously looking at future journeys incorporating AI into the career guidance platform, further research

can also look at the possibility to speed up the stepwise approach in order to deal with the demand for speedy time to market that has become the business credo of today's technology business.

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