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Enhancing Undergraduates' Digital Competencies through a Mentorship Model

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Abstract
Digital transformation requires organizations to seek cutting-edge technology and skilled digital workers. Digital competencies gaps among undergraduates are alarming. Closing the digital competency gap requires a mentorship approach for undergraduates in the future digital economy. This conceptual paper proposes a mentoring model to develop undergraduates' digital competencies. Qualitative interpretivism research via cross-sectional case study is suggested. Targeted participants will be purposefully sampled and interviewed to collect data. NVIVO will transcribe and thematically assess interviews. Thus, the study will explore a digital competency mentorship model to cultivate digital talent to lead a future competitive labour market in the digital economy.

Keywords: Digital competencies; mentorship; undergraduates; digital talent

1.0 Introduction
Globally, the world has revolutionized from the first Industrial Revolution (IR) in mechanization to mass production (IR 2.0), computer and automation (IR 3.0) and cyber-physical systems (IR 4.0), which emphasizes a lot on digitalization. Today, IR 4.0 leaps forward advanced technological innovations such as big data analytics, augmented reality, system integration, cloud computing, the Internet of Things (IoT), 3D printing, cyber security, autonomous robots, simulation, and others. These revolutions boost the digital economy. Huawei and Oxford Economic (2017) report quantified that the digital economy is worth US 11.5 trillion globally, equivalent to 15.5 per cent of the global Gross Domestic Product (GDP), which has grown two and half times faster than global GDP over the past 15 years, double in size since 2000. As the global economy rapidly digitalizes, an estimated 70% of new value created over the next decade will be based on digitally enabled platform business models (World Economic Forum, 2023). Due to digitalization, there are expected to be more technological and innovative breakthroughs that will lead to the creation of new digital-related jobs. The Global Competitiveness Report Special Edition 2020 identifies eleven (11) priorities for economic transformation, one of which is to increase investment in the skills needed for jobs and "markets of tomorrow" (Schwab & Zahidi, 2020). Thus, it is an imminent indication of the move to digital human capital to help organizations and enterprises operate efficiently in both the existing and future of the digital economy.

1.1 Research Background and Issues
On the other hand, the outbreak of the Covid-19 pandemic accelerates the digital transformation of the labour market worldwide. Hence, organizations sought state-of-the-art technologies and the quest for digital talent due to the Great Resignation that hit the global labour market. The Great Resignation effect was seen in mass resignation among employees with different work perspectives and pressures. According to Randstad (2021), great resignation is already happening in Malaysia as the percentage of employees changing their employment increased by 7%, from 29% in March 2021 to 36% in September 2021.

In conjunction, aviation, hospitality technologies, professional services, manufacturing, and supply chain industries are actively hiring talent to replace the workforce that they have lost over the past two years to service the return of international and domestic travel (Mardhiah, 2022). Companies are looking for highly skilled, commercial-savvy talent and digitally adept at driving change and efficiency as processes become more digitized (Mardhiah, 2022). According to Economic Minister Mohd Rafizi Ramli, the skills gap is the leading cause of youth unemployment, not the increase in the minimum wage (Tay, 2023). He also highlighted that Malaysia's ongoing high youth unemployment rate of 10% is mainly due to a mismatch of skilled talent produced by local training institutions and the actual skills in demand by the market (Tay, 2023).

Singapore led and scored 7.8 on the Overall Digital Skills Gap Index (DSGI) Global Rankings, while Malaysia scored 7.2 and ranked tenth in the global ranking of digital skills (Wiley, 2023). The ranking of DSGI is determined by various pillars, such as digital skills of institutions, digital responsiveness, government support, supply and demand, competitiveness, data ethics and integrity, and research intensity. Curiously, the researchers examine the DSGI between Malaysia and the top countries in each pillar. Table 1 shows that Malaysia scored competitively under the pillars of 'Government Support' and 'Supply, Demand & Competitiveness' but poorly under 'Digital Skills Institutions, 'Research Intensity,' 'Data Ethics & Integrity,' and 'Digital Responsiveness.' The Digital Skills Gap Index statistics indicate Malaysia still lags in most pillars, primarily digital responsiveness.

Table 1. Comparison of DSGI Rank and Score between Malaysia and Leading Country

Pillar	Leader of each DSGI Criteria			Malaysia	
	Country	Rank	Score	Rank	Score
Digital Skills Institutions	Chinese Taipei	1	8.3	16	6.6
Digital Responsiveness	Sweden	1	9.3	40	6.2
Government Support	United Arab Emirates	1	10	7	8.4
Supply, Demand & Competitiveness	United Arab Emirates	1	8.7	4	7.9
Data Ethics & Integrity	United Kingdom	1	9.3	31	8.1
Research Intensity	United States	1	6.9	21	5.6

(Source: Wiley, 2023)

Even though Malaysia has initiated several digital and technology standards, digital development is still vague, precisely for undergraduates who will work in the digital economy. There are no clear guidelines, methodology or model for digital human capital development in bridging the gap between undergraduates' digital competencies and the digital competency demanded by employers to be successful and competitive in the industry. Our GDP and national income will suffer if we lose control of digital change. The big question is, why are our undergraduate trainees not digitally proficient? Is there enough digital talent? How to adapt to digitalization? Today's employees must be reskilled and upskilled to avoid a worst-case scenario of technological transition, talent shortages, mass unemployment, and escalating inequality (Schwab & Zahidi, 2020).
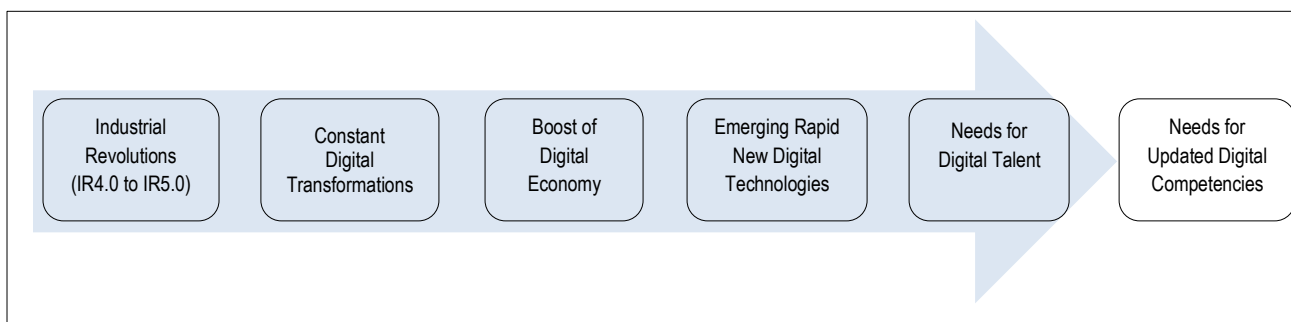

Fig. 1: The Influence of Industrial Revolutions on Digital Transformation

The study may expand research and analysis on mentorship and digital competency, essential for digital human capital development and transformation studies. Figure 1 synthesizes the introduction and background of the study from a series of Industrial Revolutions (IR1.0 to IR5.0) to influence constant digital transformations, which boost the digital economy, accelerate the emerging of new technologies, the quest for digital talents and necessitate the need to enhance digital competencies.

1.2 Research Objectives and Significance

Considering the above research gap, the researchers intend to pursue three primary research objectives: to identify the critical elements of digital competency that are paramount to developing digital competencies for undergraduates; to explore the viewpoints of employers on mentorship for the development of digital competency for undergraduates; and to develop a mentorship model that can be used to enhance the development of digital competency for undergraduates in Malaysia.

The significance of the study is for the policy makers, employers, and future researchers to have better insight into developing the next digital-related infrastructures and policies for the nation, in line with Social Development Goals (SDG 4 – to provide Quality Education), the 12th Malaysia Plan (RMKe-12) and Wawasan Kemakmuran Bersama 2030 (WKB 2030). This is to capitalize on the digital economy, which is projected to contribute 25.5% of Malaysia's GDP by 2025 (Lee, 2023).

1.3 Scope and Limitation

The scope of the research is on employers' or mentors' viewpoints on undergraduates' level of digital competencies in Malaysia. Mentoring is crucial to bridge the gap between undergraduates' current digital competencies and the industry's demands. The unit of analysis is the employer at a supervisory or managerial level who has substantial knowledge and experience (use, adapt, or build technologies) in the digital technology field in Malaysia.

However, the limitation of the study is a time-consuming qualitative research process that involves many procedures. Next, the sample size is small. In this qualitative research, the participant who will be chosen is limited, leading to not being able to represent the whole population. However, the genuine data and information from experienced and knowledgeable participants may offset its drawbacks.

Following this introduction, section 2 reviews previous studies on mentorship and digital competencies; section 3 explains methodologies and further discusses the subject matter; section 4 summarizes and recommends improvement of the study.

2.0 Literature Review

2.1 Mentorship

Mentorship, also known as mentoring, is a relationship in which an experienced and knowledgeable mentor supports the personal and professional growth of a less experienced person, the mentee. Smeak (2020) defines mentoring as a voluntary interpersonal relationship in which a mentor takes the time to support, teach, cultivate personal development, influence wise career choices, and assist the protégé in achieving his or her objectives. A mentor is an elder, more experienced individual who guides and supports a younger individual (Freeman & Kochan, 2019). According to McCluney, Fallaize and Schempp (2018), to be an effective mentor, one must be accepting, trustworthy, and a team player.

Mentorship has been widely studied in various fields, including education, business, and psychology, and has been shown to have several benefits for both mentors and mentees. Mentoring programmes in the workplace have increased over the years due to their demonstrated value (Gardiner & Weisling, 2018). The benefits of mentoring include career advancement, problem-solving abilities, reduced employee attrition, and improved workplace performance and morale (Merriam & Grenier, 2019). Organizations commonly use Mentoring programs to offset initial learning curves (Merriam & Grenier, 2019). Jacobi (1991) was responsible for coining three components of the mentoring relationship, which are emotional and psychological support, personal assistance with career and professional development, and role modelling.

Table 2. Types of Mentoring and Its Definition

Mentoring Function	Definitions
Reverse Mentoring	Reverse mentoring is a breakthrough practice with an intergenerational function where young adults provide support and knowledge to older adults (Breck et al.., 2018).
Informal Mentoring	Informal mentoring is an organic relationship between collogues, peers, or friends with no pre-planned agenda, and no set structure and tends to be more casual and authentic (Chandler et al., 2016).
Formal Mentoring	Mentoring is a social phenomenon which influences social processes (Garvey et al., 2017).

There are several types of mentoring, such as reverse, informal, and formal. Its definition is tabulated in Table 2. In this study, the researchers will investigate the informal digital competency mentoring provided by mentors in organizations to undergraduates. Hence, mentorship is an important approach to be explored in guiding undergraduates to nurture and develop their digital competencies to be competitive in the workplace.

2.2 Digital Competency

The IR 4.0 incorporates new technologies that combine the physical, digital, and biological worlds, impacting all disciplines and economies. These technologies have great potential to continue to connect billions more people to the web and drastically improve the efficiency of businesses and organizations (Schwab, 2021). One of the main issues of digital transformation is that it impedes the digital competency or skills gap. Digital skills are employee abilities needed to support digital transformation (Lam & Law, 2019). Digital literacy is the awareness, attitude, and ability to use digital tools and facilities to identify, access, manage, integrate, evaluate, analyze, and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others in specific life situations to enable constructive social action (Secker, 2007). It combines technical skills (e.g., using specific software or devices) and broader digital literacy skills, such as problem-solving, critical thinking, and digital citizenship.

Digital competence is becoming increasingly important in the digital world, enabling individuals to fully participate in society, pursue their goals and improve their employability. According to Vuorikari, Kluzer, and Punie (2022), digital competencies can be broken down into several key components such as information and data literacy; communication and collaboration; digital content creation; safety and security; and problem-solving and critical thinking as tabulated in Table 3.

Table 3. Key Components of Digital Competencies and Their Meaning

Key Components of Digital Competencies	Explanations
Information and data literacy	The ability to find, understand, evaluate, and use digital information and data effectively.

Communication and Collaboration	The ability to use digital technologies to communicate and collaborate effectively with others.
Digital content creation	The ability to create, edit and publish digital content, such as text, images, audio, and video.
Safety and Security	The ability to use digital technologies safely and securely and to protect personal information.
Problem-solving and critical thinking	The ability to use digital technologies to solve problems, make decisions, and think critically.

(Source: Vuorikari et al., 2022)

However, digital literacy, skills, and readiness are low, contributing to the digital competency gap and causing undergraduates to miss opportunities in the digital job market. Addressing the digital gap assures that students have the digital skills needed for employment and that the digital economy has the skilled workforce it needs.

2.3 Underpinning Theories

Bandura's social learning theory posits that individuals learn through observing and imitating others' behaviour and through their own experiences and feedback (Bandura, 1978). This theory has been widely studied and applied in various fields, including psychology, education, and communication. Ragins and Kram (2007) found that the mentee's observation of the mentor's behaviour and attitudes can significantly impact the mentee's career development. Moreover, Eby, Allen, Evans, Ng, and DuBois (2008) investigated the relationship between mentoring and career success, where it positively impacts career outcomes by providing role models and reinforcing career-related behaviours and attitudes. This suggests that Bandura's social learning theory aids in understanding the mechanisms and impact of mentoring relationships on individuals' behaviour and development.

Next, the Communities of Practice (CoP) Theory is a social learning theory that focuses on social interaction and participation in developing knowledge, skills, and identity in a particular domain (Lave & Wenger, 1991). This theory has been applied to the study of mentoring, which often involves transferring knowledge and skills within a community of practice. Clutterbuck and Megginson (2005) found that mentoring relationships can serve as a key mechanism for promoting the integration of mentees into a community of practice, facilitating the transfer of knowledge, skills, and norms. Next, Looi, Lim and Chen (2008) used communities of practice theory to examine the role of mentoring in developing managerial skills in the workplace. They found that mentoring can provide opportunities for the mentee to observe and participate in the practices of more experienced community members, leading to the development of managerial skills. Thus, the literature suggests that CoP Theory can be a useful framework for understanding the mechanisms of mentorship and its impact on mentees' knowledge, skills, and identity formation.

In conclusion, both theories recognize the social aspect of learning, the importance of observation and modelling, social interaction and collaboration, and context's impact on learning. Integrating these theories can help communities of practice comprehend learning and development through cognitive processes and social interactions, which are vital for developing digital competencies via the mentorship approach for undergraduates.

3.0 Methodology

In constructing a conceptual framework, a meticulous academic methodology involved reviews of literature and empirical data from authoritative sources such as Scopus, Web of Science (WoS), reputable online news outlets, reports, and statistical databases. By conducting analysis of articles and harnessing real-world data from diverse online platforms, the conceptual model was not only academically grounded but also reflective of the practical nuances and contemporary trends in the field. This approach enriches the model and aligns with the relevant knowledge available. Next, data will be collected using a case study strategy, purposeful sampling, document reviewing and interviewing the target population, professionals in supervisory or managerial roles with substantial digital knowledge in Malaysia's public and private sectors. Furthermore, NVIVO software will be used to transcribe interview data, including analyses and syntheses of relevant data on the applicability of mentorship and digital competency framework. The study will contribute to the knowledge by expanding it to mentorship and digital competency pertinent areas to digital human capital development in the digital economy, which are essential studies on digital transformation. Directionally, the study will provide insights into a pioneer mentorship model or framework that will be beneficial to be adopted by the organization, education, or training institutions in Malaysia in preparing digital-ready young talent to dominate the competitive future labour market in the ever-stimulating digital economy.

4.0 Findings

Guided by Bandura's Social Learning Theory (Bandura, 1978), the Digital Competence Framework for Citizens (Vuorikari et al., 2022); and the Communities of Practice (COP) model (Lave & Wenger, 1991), the following Digital Competency Mentorship Model (DCMM) for Undergraduate Trainees is being proposed to explore and gain insight into this study from the perspectives and experiences of employers in Malaysia (Figure 2). The digital competence elements included in the study are information and data literacy, communication and collaboration, digital content creation, safety and problem-solving. The researchers believe these elements are not stagnant and will keep changing or expanding parallel to the evolution of digital competencies and the digital economy over time. Simultaneously, as mentorship is becoming increasingly important in the field of social research, thus, it is critical to investigate the mentorship process and the dynamics of the mentor-protégé relationship. The model emphasized on mentoring process and the relationship between mentor-protege and how those dynamic relationships can be explored to enhance the digital competencies of undergraduate trainees in closing the gap between their current level and industry demand. In conclusion, digital technology, competencies, and societal evolution affect individual knowledge and lifelong learning. The future is unpredictable but responsive to the dynamic changes brought by digital transformation, we can reduce the digital divide by nurturing the next generation of workforce to

adapt and thrive in the digital economy by nurturing and developing their digital competencies.
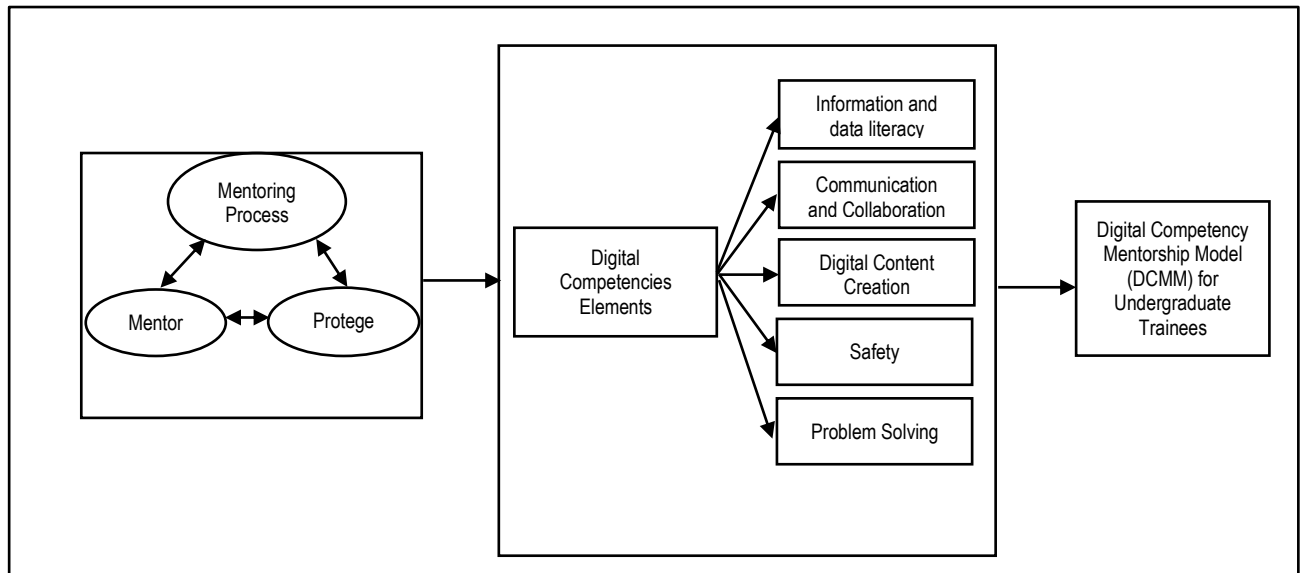

Fig. 2: Conceptualizing the Digital Competency Mentorship Model (DCMM) for Undergraduate Trainees

4.1 Research propositions

Based on the above exploration and conceptual model, the following research propositions are being suggested:

2.4.1.   Identifying critical digital competency elements will significantly contribute to the effective development of digital competencies for undergraduate trainees.

2.4.2   The employers' viewpoints on mentorship will elucidate the pivotal role of mentorship in supporting the development of digital competencies for undergraduate trainees.

2.4.3   Developing a tailored mentorship model for Malaysian undergraduate trainees will significantly enhance their digital competencies.

5.0 Discussion

As technology advances rapidly, many organizations struggle to recruit skilled digital workers. Traditional educational institutions sometimes fall behind the fast-changing digital landscape, leaving undergraduates unprepared for the labour market. This gap challenges undergraduates who are preparing to enter the workforce. A mentorship model may be a powerful solution to fill this gap, such as connecting undergraduates with experienced professionals who can guide them through updated digital knowledge and share practical insights, foster a growth mindset and continuous learning, where mentors may inspire undergraduates to explore new technologies, innovate, and adapt to the evolving digital world. Mentors can also guide undergraduates in acquiring essential digital skills and provide appropriate tools, technology, and industry trends to help them advance. In a world where digital skills quickly become obsolete, future workers must be adaptable and agile. Thus, leveraging mentors' expertise may help undergraduates bridge the gap between academia and industry by equipping themselves with the digital skills and knowledge demanded to succeed in the digital labour market.

6.0 Conclusion & Recommendations

The study sheds light on the significance of mentorship in fostering the development of digital competencies among undergraduates in Malaysia, which is crucial in both the present and future digital landscape. Valuable insights on mentorship and digital competencies elements were explored to design the conceptual model. Hence, a reduction in digital competencies gaps among undergraduates is expected once the model and propositions are tested in future research. This study is vital to enhance the future development of digital human capital in the ever-competitive dynamic labour market. Therefore, further research on other populations, methodologies, or contexts is recommended. Future research endeavours should consider employing more rigorous methodologies, such as longitudinal studies coupled with multivariate statistical analysis to improve the validity and dependability of the potential findings. This strategy enables more robust findings on the researched issues. Observing growth over time helps researchers understand mentoring's long-term effect and predict prospective outcomes. Multivariate statistical analysis, which examines multiple variables simultaneously, enables researchers to explore complex relationships between mentorship and digital competencies.

Paper Contribution to Related Field of Study
This paper contributes to the field of digital transformation and human resources development.

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