Effective learning environment towards learning agility

Ainunnazlee Mohd Ali[*a], Nur Liana Kori[b], Mohammad Zaim Salleh[c],
Norliza Saiful Bahry[d], Nor Sara Nadia Mohamad Yunus[e],

[a,b,c,d,e]*Faculty of Business and Management, Universiti Teknologi MARA Puncak Alam, Malaysia*

ARTICLE INFO

ABSTRACT

As a catalyst for cultivating this agility, an effective learning environment often features student-centered teaching approaches, ample resources, and a friendly atmosphere. Student motivation, willingness to change, and engagement can substantially impact their learning agility. This study uses a survey approach to analyze the various characteristics of a learning environment and their impact on students' learning agility, with a sample size of 323 students from private universities in Selangor. The analysis also explores the extent to which students' attitudes influence this relationship, either enhancing or diminishing the effect of the learning environment on agility. Data was collected via surveys administered to university students, followed by structural equation modeling analysis. The findings indicate that an effective learning environment positively correlates with learning agility, and this relationship is notably enhanced when students demonstrate a positive attitude toward learning. Curiosity, resilience, and a growth mindset are essential elements in optimizing the advantages of an effective learning environment. The study's implications underscore the importance of educators considering student attitudes when creating learning environments intended to cultivate agile, adaptive learners.

1. Introduction

Malaysia's development plan strongly emphasizes education, aiming to give students the skills and information they need to advance personally and as a country. The Ministry of Education oversees the Malaysian educational system's pre-primary, primary, secondary, and postsecondary phases. This system offers a range of courses to accommodate different learning needs and consists of public and private institutions. Since gaining independence in 1957, science, technology, engineering, and math (STEM) education has been a top priority in Malaysia's educational system (Azhar et al., 2024). There was a colonial feel to the previous system. The Education Blueprint 2013–2025 delineates Malaysia's objectives to enhance the caliber of education and generate graduates capable of competing on a global scale. The ability and desire to adapt knowledge from experiences to succeed in novel circumstances is known as learning

---

agility. Its four main dimensions are people, outcomes, mental agility, and change agility. Learning agility is vital to education because it fosters students' critical thinking and problem-solving skills to effectively traverse complex and dynamic settings (Vadakalu Elumalai et al., 2020). The educational system ensures students prepare for lifelong learning and situations by encouraging learning agility.

Learning agility takes the form of people agility (managing relationships with others), outcomes agility (reaching goals under challenging circumstances), and mental agility (critical and creative thinking) (Mohd Satar et al., 2021). These types of agility support students' success and adaptation in various contexts. Education and learning agility have significantly been impacted by digitization, which has changed traditional teaching techniques through digital resources, online learning, and virtual classrooms, increasing accessibility and flexibility in education. However, digitalization also brings drawbacks, including the digital divide, diversions, and the requirement for digital content quality management. Currently, in Malaysia, most education institutes, mainly public universities and schools, are implementing IR 4.0 in major universities and schools. This issue was exposed during the recent pandemic, which forced the country's education sector to implement online learning (Rasiah et al., 2023).

The rapid shift to digital teaching methods has created challenges for students, educators, and the government, highlighting the urgent need for digital literacy among teachers and students. Post-pandemic, private and local universities have adopted online learning, moving away from traditional classrooms (Nathan, 2019). Both public and private universities are addressing gaps in digital infrastructure, yet another issue remains the need to strengthen soft skills among graduates, even as they meet industry knowledge standards. For example, while universities are making strides in improving digital infrastructure, a critical gap persists in developing essential soft skills among graduates, which IR 4.0 companies increasingly value. Despite extensive schooling, many Malaysian students fall short of their full potential, as evidenced by Singh (2019), who found that a portion of their education needed more practical value, resulting in graduates reaching only 62% of their capability. Addressing digital and soft skills gaps is essential for preparing graduates who are technically proficient and equipped with the creativity and communication skills needed in today's workforce. Therefore, this study aims to investigate the significant influence of information, communication, and creation skills on learning agility among students in private universities in Selangor with the mediating effect of positive student attitudes.

2.   Literature Review

2.1   Learning agility

Learning agility refers to an individual's ability to quickly adapt and adjust their behavior based on new experiences and changing environments (Haring et al., 2013). It entails a readiness to learn and the flexibility to shift from one idea to another. This adaptability enables individuals to develop both their current and future potential continuously. Learning agility is also a set of competencies shaped by a person's openness, willingness to learn, and adaptability (Silalahi et al., 2020). A highly agile learner can transfer skills and knowledge across diverse situations, demonstrating resilience and a proactive mindset in the face of challenges.

In recent years, the importance of learning agility has surged, mainly due to two primary factors. The first factor is the rapid advancement of technology associated with the Fourth Industrial Revolution (IR 4.0). This era has introduced technologies such as artificial intelligence, machine learning, and the Internet of Things, which have fundamentally altered the landscape of work and daily life. As technological progress accelerates, individuals must adapt swiftly to these ongoing changes (Frick & Grudowski, 2023). Those who lack agility may need help to keep pace and avoid being left behind in this dynamic environment. For example, in industries like information technology and healthcare, professionals must frequently learn new tools, systems, and protocols, emphasizing the need for continuous adaptation.

The second factor driving the significance of learning agility is globalization, which has expanded educational and professional opportunities beyond national borders. Learning is no longer limited to a

single country or culture; individuals from diverse backgrounds now access international courses and programs. This shift has led to a globally competitive academic and professional landscape, with individuals constantly seeking ways to distinguish themselves from peers worldwide. Globalization has also increased interaction and collaboration among people with varying perspectives, necessitating adaptability and cultural awareness. In this context, students and professionals alike are encouraged to develop essential soft skills, such as analytical thinking, problem-solving, and cross-cultural communication, to stand out in a diverse, competitive landscape (Henriksen et al., 2021; Ismail et al., 2024). Ultimately, learning agility is no longer just an advantage; it is becoming a fundamental requirement for success in the modern world.

2.2   Communication skills

The interactions between individuals to exchange views, ideas, and information are broadly defined as communication (Reith-Hall & Montgomery, 2023). Communication allows individuals to express their intentions, goals, and desires, encompassing various functions, including emotional expression, cognitive reasoning, and perceptual awareness (Hargie, 2006). Communication skills, therefore, involve the ability to receive, convey effectively, and process information through verbal and non-verbal channels, and they play a vital role in fostering understanding and facilitating cooperation among individuals (van Laar et al., 2020). In both personal and professional realms, these skills enable students to bridge differences, resolve conflicts, and build productive relationships when they start employment.

Effective communication is indispensable for employees at every level in the modern workforce. As workplaces become more interconnected and digitalized, employees are expected to communicate fluidly through various platforms such as social networking sites, messaging services, and email (van Deursen & van Dijk, 2015). These digital tools enable faster communication and introduce complexities, such as conveying tone and intent in written formats. Students must know how to be adept at using these tools to interact with colleagues, superiors, and clients, often across different time zones and cultural backgrounds, who gain experience during their studies. Effective communication fosters smoother teamwork, higher productivity, and improved problem-solving as students can efficiently share ideas, collaborate on tasks, and give or receive feedback with the team.

In addition, for students, developing communication skills is particularly significant. In educational settings, students with strong communication abilities tend to perform better in group projects, participate more actively in discussions, and seek assistance when needed. These behaviors enhance academic performance and build a foundation for future professional success. Communication skills empower students to ask meaningful questions, articulate their thoughts, and engage in reflective conversations, all of which contribute to a more agile and adaptive mindset. In addition, as students prepare to enter an increasingly competitive global job market, communication skills can provide a crucial advantage by setting them apart as adaptable, collaborative, and culturally aware individuals.

Communication skills have been linked to learning agility, a concept gaining recognition in academic and professional circles. Several scholars (Henriksen et al., 2021; Tang et al., 2017; van Laar et al., 2020) suggest that effective communication underpins learning agility by enabling individuals to ask questions, seek feedback, and process complex information more readily. Those with strong communication skills are often more comfortable engaging in discussions, sharing insights, and exploring new ideas, which foster adaptability and continuous learning. Through open dialogue and interaction, communicators gain exposure to diverse perspectives, which helps students adapt to new information and adjust their approach when faced with novel challenges. Communication skills are more than a means to exchange information; they are essential for building rapport, fostering inclusivity, and creating a positive learning and working environment. Strong communicators can navigate complex social dynamics more efficiently, make informed decisions, and lead others effectively. As the demand for these skills continues to grow in educational and professional contexts, developing communication competence becomes beneficial and essential for success in a rapidly evolving world. Therefore, the following hypothesis is developed:

Hypothesis 1: Communication skills are positively significant to learning agility.

2.3   Information skills

Information skills encompass the abilities required to collect, organize, and critically assess information from various sources (Silva, 2009). These skills allow individuals to manage extensive data effectively, distinguishing reliable information from unreliable or misleading content (Marchionini & White, 2007). These abilities are becoming more crucial in today's information-rich environment since people are constantly exposed to fresh knowledge via news sources, internet channels, and professional sources. The capacity to filter, interpret, and apply pertinent information is crucial for effective decision-making and problem-solving. Literacy skills represent a vital subset of information skills, encompassing the capacity to read, analyze, and interpret information effectively (van Laar et al., 2020). Literacy skills are essential for academic and professional achievement, facilitating complex information processing and developing well-reasoned conclusions. In recent years, digital literacy has gained significance, necessitating proficiency utilizing digital tools for accessing, organizing, and presenting information. Digital literacy enhances traditional literacy by facilitating engagement with online resources, multimedia, and social media platforms, promoting a more thorough understanding and distribution of information.

Students today place significant importance on information skills, acknowledging that independent learning, critical thinking, and autonomous work are crucial for success in a rapidly evolving educational landscape. Students seek information skills such as self-directed learning, critical analysis, and adaptability in their studies. Self-directed learning enables students to independently acquire knowledge, which is particularly beneficial in fields characterized by rapid technological advancements and diverse applications. Critical thinking skills enable individuals to assess information credibility, identify biases, and evaluate sources logically. Evidence indicates a correlation between information skills and learning agility, and the results indicate that information-related study skills, including research and data evaluation, are strongly correlated with learning agility (Ismail et al., 2024). Individuals proficient in collecting, analyzing, and applying information tend to be more adept at adapting to novel learning experiences and dynamic environments. Well-developed information skills enhance the exploration of new topics, the absorption of complex information, and the ability to adapt to emerging knowledge.

Consequently, individuals possessing strong information skills excel in academic environments and are more equipped to address the requirements of an information-driven, dynamic workplace. Therefore, information skills are fundamental to lifelong learning and professional adaptability. They assist students in developing resourcefulness and independent thinking, enabling them to excel in students can enhance their effectiveness in learning. Therefore, we offer the following hypothesis:

Hypothesis 2: Information skills are positively significant to learning agility.

2.4   Creation skills

Creativity, or creation skills, denotes an individual's ability to utilize artistic expression and innovative thinking to tackle social, sustainable, and economic challenges (Henriksen et al., 2021). This capability encompasses artistic creativity and the cognitive flexibility to utilize knowledge and produce innovative solutions for intricate, real-world challenges (Tang et al., 2017). Creativity is a multidimensional skill encompassing ideation, adaptability, and problem-solving, which has gained significance in contemporary dynamic and multifaceted environments. Creativity is a crucial factor in career success and advancement in the contemporary workplace environment. Employers today prioritize candidates who can think creatively, providing innovative perspectives that contribute to organizational innovation and resilience. Creativity enables individuals to tackle challenges through innovative approaches, including designing new products, enhancing processes, and formulating sustainable solutions. Thus, early cultivation of creativity in students offers a competitive advantage, equipping them with essential skills to navigate evolving career landscapes and contribute effectively to their respective fields (Maria et al., 2018). Research indicates a correlation between creativity and other critical competencies, including learning agility.

Research by Ismail et al. (2024) asserts that creativity directly impacts a student's learning agility by improving their ability to absorb, interpret, and apply new knowledge across various contexts. Creativity promotes receptiveness to new concepts, enabling students to seize learning opportunities and adjust to evolving contexts more effectively. In this context, creativity is a cognitive tool that enables students to evolve continuously, engage with complex problems, and develop innovative solutions within a learning environment. Therefore, it is hypothesized that:

Hypothesis 3: Creation skills are positively significant to learning agility.

2.5   Student's attitude

Student attitude includes the spectrum of positive and negative emotions and responses that students encounter throughout their educational experiences, involving learning, interactions, and overall academic environments (van Laar et al., 2020). These feelings and attitudes are not only internal but frequently appear in visible actions directed at classmates, teachers, and academic obligations. A student's level of interest, excitement, or apathy can affect how much they participate in group activities, pay attention in class, and interact with the learning setting as a whole. Beyond important academic and social skills, a student's attitude is also critical. Reith-Hall and Montgomery (2023) assert that a positive attitude toward studying improves a student's learning agility, defined as the capacity to swiftly acquire, adapt, and apply new knowledge. This attitude is crucial for developing information-processing skills, enabling students to effectively gather, analyze, and synthesize information from various sources. Students' attitudes also influence their communication skills, as those who are positively engaged are more likely to express themselves clearly and confidently, facilitating effective collaboration and discussion with students and lecturers.

Furthermore, Tan et al. (2017) emphasize that student motivation is closely tied to their attitude and is critical in fostering creativity skills. A motivated student is more inclined to engage in creative problem-solving, explore new ideas, and undertake intellectual risks, critical elements of creativity in both academic and real-world settings. In these studies, student attitude often acts as a link between teaching methods or educational content and subsequent academic performance, engagement, and skill development. Therefore, the following hypothesis is developed:

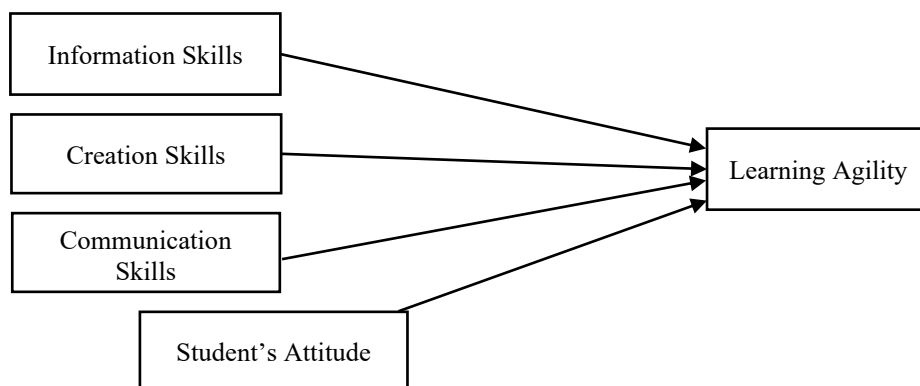*Hypothesis 4: Student's Attitude is positively significant to learning agility.*

Figure 1. Research framework

3.   Methodology

Three hundred and twenty three (323) students from private universities in Selangor participated in the survey. A convenience sampling method was applied, and all survey items were adapted from previous scholars in similar research areas. Most students intend to learn new things, and female students found a higher mean score for learning agility than male students. The findings suggested that female students have a higher inclination for adaptive learning than male students. Out of these 323 samples, the majority (99.7%) were between 20 and 25 years old, indicating that most advanced students are below 25.

Moreover, most (87.9%) students reported no significant working experience. After the data was collected, the data was analyzed using the Structural Equation Model (SEM) using Smart PLS. In SEM, the data accessed the measurement model and structural model of the framework. A measurement model assessment included convergent validity and discriminant validity of the items and constructs tested. Meanwhile, the structural model applied hypothesis testing is related to the research objectives.

4.   Findings

4.1 Measurement Model Assessment

When assessing the indicator reliability (outer loading), the indicators are consistent with what it intends to measure (Urbach & Ahlemann, 2010). The value of outer loading should be equal to and more significant than 0.5, which is acceptable. As shown in Table 1, all the factors loading for the constructs were more significant than 0.5 and concluded that all items were acceptable for reliability. Next is the assessment of convergent validity, which is when individual indicators reflect a construct known as average variance extracted. In order to achieve adequate convergent validity, each construct should account for at least 50 percent of the variance in the assigned indicators (AVE > 0.50). It established that the Average Variance Extracted (AVE) values were examined for each convergent validity construction. All the AVE values greater than 0.5 (Information Skill = 0.704, Communication Skill = 0.828, Creation Skill = 0.883, Learning Agility = 0.854, Attitude = 0.845) indicated that more than half of the variance of the indicators explained by the construction of reliability and validity.

Henseler et al. (2015) introduced the heterotrait-monotrait (HTMT) ratio of correlations, as noted by Voorhees et al. (2016). The HTMT is the average of item correlations across constructs, compared to the mean of average correlations for items within the same construct. High HTMT values indicate issues with discriminant validity. In this context, an HTMT value exceeding 0.90 indicates a lack of discriminant validity. However, when constructs exhibit greater conceptual distinctiveness, a lower and more conservative threshold value is recommended, such as 0.85 (Henseler et al., 2015).Furthermore, bootstrapping can be utilised to assess whether the HTMT value significantly deviates from 1.00 (Henseler et al., 2015) or from a lower threshold, such as 0.85 or 0.90, which should be determined according to the context of the study (Franke and Sarstedt, 2019). The researcher can assess whether the upper bound of the 95 percent confidence interval of HTMT is below 0.90 or 0.85.The assessment applied the Heterotrait-Monotrait Ratio of Correlation (HTMT) for discriminant validity, which refers to the correlation ratio within the constructs to correlations between the constructs. The HTMT value should be greater than 0.85 or 0.90 when using this assessment (Ringle et al., 2023). The result in Table 2 shows there are no issues with discriminant as the values meet the threshold values.

Table 1. Convergent validity assessment

Constructs	Factor Loading	Composite Reliability (CR)	Average Variance Extracted (AVE)
Attitude		0.956	0.845
ATT1	0.924		
ATT2	0.933		
ATT3	0.922		
ATT4	0.897		
Communication skills		0.960	0.828
COMSKILLS1	0.898		
COMSKILLS2	0.933		
COMSKILLS3	0.914		
COMSKILLS4	0.921		
COMSKILLS5	0.883		
Creation skills		0.958	0.883
CREATESKILLS1	0.931		
CREATESKILLS2	0.941		
CREATESKILLS3	0.947		
Information skills		0.969	0.704
INFOSKILL1	0.682		
INFOSKILL2	0.784		
INFOSKILL3	0.828		
INFOSKILL4	0.813		
INFOSKILL5	0.823		
INFOSKILL6	0.805		
INFOSKILL7	0.859		
INFOSKILL8	0.908		
INFOSKILL9	0.879		
INFOSKILL10	0.876		
Learning agility		0.967	0.854
LEARNA1	0.920		
LEARNA2	0.938		
LEARNA3	0.942		
LEARNA4	0.898		
LEARNA5	0.923		

Table 2: Discriminant validity

Constructs	1	2	3	4	5
1. Attitude					
2. Communication skills	0.668				
3. Creation skills	0.577	0.900			
4. Information skills	0.708	0.890	0.813		
5. Learning agility	0.865	0.799	0.717	0.817	

4.2 Structural Model

The R-square (R^2) values mean the contribution level of variance in the dependent variable being explained by the independent variables. A 0.64 R^2 value by Learning Agility indicates that 64% of the variance in learning agility is related to the combined effects of information, communication, creation, and attitude. Following, 55% of the variance in attitude also explains the independent variables in the model. In this analysis, path coefficients have indicated the strength and significance of the direct relationship between the variables. In testing the hypotheses, assessing the path coefficient presents the beta values; t-values should be greater than 1.96 for a significance level of 0.05 in a two-tailed test. As shown in Table 3, the direct effect of attitude (β= 0.513, t-value= 5.966, p< 0.05), communication (β= 0.181, t-value= 1.602, > 0.05), creation skills (β= 0.0653, t-value= 0.086, p> 0.05), information (β=0.236, t-value= 2.309, p< 0.05) indicates that attitude and information skills have significance influence on learning agility. Hence, as shown in Table 3, the results revealed that hypothesis 2 was supported and contrasted with hypothesis 1, and hypothesis 3 was not supported. Meanwhile, assessing mediation of attitude found that attitude mediates the relationship between information skills and learning agility (β= 0.264, t-value= 3.2896, p< 0.05). Therefore, hypothesis 6 was supported, and the student's attitude did not mediate the relationship between communication skills and creation skills, so there was no significant influence on learning agility. Hypotheses 4 and 5 were not supported.

Table 3. Structural model

Hypothesis & pathway	β	t	p	Supported?
H1: Information skills → Learning agility	0.236	2.309	0.000	Yes
H2: Creation skills → Learning agility	0.065	0.086	0.574	No
H3: Communication skills → Learning agility	0.181	1.602	0.084	No
H4: Student's Attitude → Learning agility	0.513	5.966	0.000	Yes

5. Discussion

Information, communication, and creation are essential and specific skills that enhance learning agility (Eichinger & Lombardo, 2004). Students with information skills can effectively locate, evaluate, and utilize the source of information. In the fast-paced, information-driven world of today, information skills and learning agility are essential. They enable people and organisations to efficiently solve issues, adjust to changing circumstances, and make well-informed decisions. So that, being able to swiftly adjust to different responsibilities, tools, and settings is crucial in today's dynamic work world (Ajayi & Udeh,2024). Secondly, students with communication skills can exchange and facilitate the understanding of knowledge with peers, making value exchange.

Thirdly, creation skills have allowed students to learn traditional methods and develop innovative solutions. Students with a collection of these skills are more likely to adapt and learn in rapidly changing and diverse situations. From the structure of the model, information skills and attitude were significant towards learning agility. However, creation and communication skills were insignificant towards learning agility as the hypothesis 2 and hypothesis 3 were not supported. A possible explanation to this is due to communication barriers which become a challenge for students to be agile in learning and adapting to changing and diverse situations. For example, fear to failure, lack of self-efficacy, and low curiosity prevent the students from learning agility. Both information skills and learning agility are interrelated skills that enable students to survive in an a education and workforce later that is constantly changing. Education institution can make a place where learning new things and being flexible is valued by removing obstacles like rigid communication systems, a fixed attitude, and limited access to resources (Damian & Radu, 2023). This method not only fosters individual development but also fosters group success, resilience, and creativity, so guaranteeing that the organisation continues to be competitive, relevant, and prepared for the future.

Although the ability to create something new is crucial, the ability to learn quickly and adapt to new situations is what really allows for sustainable development in the long run. Creativity can thrive when necessary, since learning agility emphasises adaptability, being open to feedback, and applying information in different settings. Having said that, acquiring agility is more generalised and advantageous to everyone, whereas creativity is more situational and niche-specific. Thus, in the context of career advancement, learning agility is generally regarded as more universally vital, although creativity skills are essential and complementary.

6. Implication

Additionally, the study's scope could benefit from a more nuanced exploration of the factors involved. For instance, "information skills" could be further broken down into specific competencies, such as critical thinking and reading skills, offering a deeper, more detailed understanding of each factor. Future research could address these limitations by expanding the sample size and refining the dimensions within each factor. Another promising direction for future studies would be to investigate how different educational levels interact with each factor, using attitude as a mediating variable. Such an approach could provide insights into whether and how learning agility and related skills differ across educational stages, adding further value to our understanding of these critical competencies. Therefore, policymakers should focus on creating educational strategies that support the informative learning environment and further promote positive attitudes among students. However, the non-significant direct effects of communication and creation skills on learning agility are less impactful than information skills.

The study's findings make a valuable contribution to academic literature, especially by enhancing our understanding of learning agility and its related factors—information, communication, and creation skills. The study has notable limitations. The primary limitation is its relatively small sample size of 323 respondents, which constrains the generalizability of the findings. Increasing the sample size could enhance the validity and reliability of the data, as larger respondent pools typically yield more robust results.

7. Conclusion

The findings of this research effectively address the stated research questions and objectives while making a valuable contribution to the scholarly literature. The study confirms a significant effect of information skills and attitude on learning agility, emphasizing the critical role of both variables in shaping attitudes. The results underscore the importance of information skills as a foundation for enhancing students' soft skills. The mediating role of attitudes in this context underscores the importance of fostering student interest and motivation during lectures to enhance learning agility.

Based on these findings, several suggestions can be made to enhance learning agility among Malaysian students. Skill development programs should focus on building core competencies such as information, communication, and creation skills. Equally important is the need for educational institutions to create positive and supportive learning environments that promote self-directed learning and encourage the development of positive attitudes. Tailored interventions should be designed to address the unique needs of diverse demographic groups, ensuring equitable learning opportunities. Integrating digital literacy into academic curricula is also essential for enabling local students to stay competitive in a globalized, technology-driven world, thereby cultivating a generation of skilled individuals capable of representing Malaysia internationally. These recommendations should be implemented with ongoing assessment and updates to ensure alignment with the evolving educational landscape, fostering a system that adapts to the demands of a rapidly changing world.

Acknowledgments

Conflict of interest statement

This section is compulsory. The following is an example of a conflict-of-interest statement: The authors agree that this research has been conducted in the absence of any self-benefits, commercial, or financial conflicts and declare the absence of conflicting interests with the funders.

References

Ajayi, F. A., & Udeh, C. A. (2024). Agile work cultures in IT: A Conceptual analysis of hr's role in fostering innovation supply chain. *International Journal of Management & Entrepreneurship Research, 6*(4), 1138-1156. https://doi.org/10.51594/ijmer.v6i4.1004

Azhar, Z., Jalaludin, D., Ghani, E. K., Ramayah, T., & Nelson, S. P. (2024). Learning agility quotient and work readiness of graduating accounting students: embracing the dynamics of IR4.0. *Accounting Education, 33*(4), 450–472. https://doi.org/10.1080/09639284.2023.2211567

Damian, D. I., & RADU, C. (2023). Preparing Students For The Future Of Work: The Role Of Agility In Higher Education. In Proceedings of the *INTERNATIONAL MANAGEMENT CONFERENCE* (Vol. 17, No. 1, pp. 242-256). Faculty of Management, Academy of Economic Studies, Bucharest, Romania.

Eichinger, R. W., & Lombardo, M. M. (2004). Learning agility as a prime indicator of potential. *People and Strategy, 27*(4), 12.

Franke, G., & Sarstedt, M. (2019). Heuristics versus statistics in discriminant validity testing: a comparison of four procedures. *Internet research, 29*(3), 430-447. https://doi.org/10.1108/IntR-12-2017-0515

Frick, J., & Grudowski, P. (2023). Quality 5.0: A paradigm shift towards proactive quality control in Industry 5.0. *Asia-Pacific Journal of Business Administration, 14*, 51-56. https://doi.org/10.5430/ijba.v14n2p51

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science, 43*, 115-135.

Hargie, O. (2006). The Handbook of Communication Skills. (4th ed.). Routledge.

Haring, S., Shankar, J., & Hofkes, M. K. (2013). *The Potential of Learning Agility. The Relationship between Learning Agility and Success*. HFMtalentindex.

Henriksen, D., Creely, E., Henderson, M., & Mishra, P. (2021). Creativity and technology in teaching and learning: a literature review of the uneasy implementation space. *Educational Technology Research and Development, 69*(4), 2091–2108. https://doi.org/10.1007/s11423-020-09912-z

Ismail, Z., Aziz, R. C., & Chea, C. C. (2024). Preparing future-ready learners: 21st century skills in an open and distance learning education in Malaysia. *Jurnal Pendidikan Terbuka Dan Jarak Jauh, 25*(1), 27-40. https://doi.org/10.33830/ptjj.v25i1.7546.2024

Marchionini, G., & White, R. (2007). Find What You Need, Understand What You Find. *International Journal of Human-Computer Interaction, 23*(3), 205–237. https://doi.org/10.1080/10447310701702352

Maria, M., Shahbodin, F., & Pee, N. C. (2018, September). Malaysian higher education system towards industry 4.0–current trends overview. In *AIP Conference Proceedings* (Vol. 2016, No. 1). AIP Publishing. https://doi.org/10.1063/1.5055483

Mohd Satar, N. S., Dastane, O., & Morshidi, A. (2021). E-learning satisfaction during COVID-19 pandemic lockdown: analyzing key mediators. *International Journal of Management, Accounting and Economics, 8*(8), 542-560. Available at SSRN: https://ssrn.com/abstract=3972907

Nathan, L. (2019, July 2). *Covid-19 — how one pandemic transforms the education system worldwide. The Malaysia Reserve*. https://themalaysianreserve.com/2020/07/02/covid-19-how-one-pandemic-transforms-education-system-worldwide/

Rasiah, R., Low, W. Y., & Kamaruddin, N. (2023). *Digitalization and Development: Ecosystem for Promoting Industrial Revolution 4.0 Technologies in Malaysia* (p. 295). Taylor & Francis. 10.4324/9781003367093

Reith-Hall, E., & Montgomery, P. (2023). Communication skills training for improving the communicative abilities of student social workers: A systematic review. *Campbell Systematic Reviews, 19*(1), 1–46. https://doi.org/10.1002/cl2.1309

Ringle, C. M., Sarstedt, M., Sinkovics, N., & Sinkovics, R. R. (2023). A perspective on using partial least squares structural equation modelling in data articles. *Data in Brief, 48*, 109074. https://doi.org/10.1016/j.dib.2023.109074

Silalahi, D. E., Hotmadinar Sianipar, H., & Kurnia, I. (2020). Agility of Male and Female Students through Online Learning during Covid-19. *GSJ, 8*(12).

Silva, E. (2009). Measuring Skills for 21st-Century Learning. *Phi Delta Kappan, 90*(9), 630–634. https://doi.org/10.1177/003172170909000905

Singh, H. (2019, May 16). *Delivering game-changing initiatives for national education. The Malaysian Reserve*. https://themalaysianreserve.com/2019/05/16/delivering-game-changing-initiatives-for-national-education/

Tan, J. P.-L., Choo, S. S., Kang, T., & Liem, G. A. D. (2017). Educating for twenty-first-century competencies and future-ready learners: research perspectives from Singapore. *Asia Pacific Journal of Education, 37*(4), 425–436. https://doi.org/10.1080/02188791.2017.1405475

Tang, G., Yu, B., Cooke, F. L., & Chen, Y. (2017). High-performance work system and employee creativity: The roles of perceived organizational support and devolved management. *Personnel Review, 46*(7), 1318–1334. https://doi.org/10.1108/PR-09-2016-0235

Urbach, N., & Ahlemann, F. (2010). Structural equation modeling in information systems research using partial least squares. *Journal of Information Technology Theory and Application (JITTA), 11*(2), 2. Available at: https://aisel.aisnet.org/jitta/vol11/iss2/2

Vadakalu Elumalai, K., P Sankar, J., R, K., Ann John, J., Menon, N., Salem M Alqahtani, M., & Abdulaziz Abumelha, M. (2020). Factors Affecting the Quality of E-Learning During the COVID-19 Pandemic from the Perspective of Higher Education Students. *Journal of Information Technology Education: Research, 19*, 731–753. https://doi.org/10.28945/4628

van Deursen, A. J. A. M., & van Dijk, J. A. G. M. (2015). Internet skill levels increase, but gaps widen a longitudinal cross-sectional analysis (2010–2013) among the Dutch population. *Information, Communication & Society, 18*(7), 782–797. https://doi.org/10.1080/1369118X.2014.994544

van Laar, E., van Deursen, A. J. A. M., van Dijk, J. A. G. M., & de Haan, J. (2020). Determinants of 21st-Century Skills and 21st-Century Digital Skills for Workers: A Systematic Literature Review. *SAGE Open, 10*(1), 215824401990017. https://doi.org/10.1177/2158244019900176