

The Impact of ICT-enabled Internships on Policy Analysis Skills among Final Year Students

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This study examines the impact of ICT-enabled internships on policy analysis skills among final-year students at Universiti Malaysia Terengganu. As digital governance and evidence-based policymaking gain prominence under initiatives like MyDIGITAL, equipping students with data-driven decision-making capabilities is essential. The study analyses data from 134 internship students, focusing on their exposure to digital tools, big data analytics, and virtual collaboration platforms during a 16-week internship program. Findings indicate that ICT-integrated internships significantly enhance policy research competencies, data visualisation skills, and policy modelling abilities. However, challenges such as digital infrastructure limitations in remote placements persist. The study underscores the importance of optimising ICT-driven internships to bridge the gap between academic knowledge and practical policy analysis, ensuring graduates are well-prepared for the evolving demands of the policy sector.

Keywords: ICT-enabled internships; policy analysis skills; digital governance; data-driven decision-making; higher education

I. INTRODUCTION

In this era of rapid digital transformation, information and communication technology (ICT) has become a critical enabler of professional development across various fields, including policy analysis. As Malaysia strives to become a knowledge-based economy under several initiatives, such as the Malaysia Digital Economy Blueprint (MyDIGITAL) and the Shared Prosperity Vision 2030 (SPV 2030), equipping graduates with relevant analytical and decision-making skills is crucial (Felker, 2024; Aziz *et al.*, 2021; Mahdi *et al.*, 2024). Internships, particularly those supported by ICT (Valtonen *et al.*, 2021), provide an avenue for students to apply theoretical knowledge in real-world policy settings (Hsu *et al.*, 2022), while enhancing their analytical competencies.

According to Garlinska *et al.* (2023), the integration of ICT in internships has transformed the traditional learning experience by facilitating access to digital tools (Garlinska *et al.*, 2023), big data analytics (Javaid *et al.*, 2024; Zhao & Zhou, 2024), and remote collaboration platforms (Bampasidou *et al.*, 2024; Castro, 2019). In Malaysia,

government and private institutions are increasingly emphasising digital governance and evidence-based policymaking. Thus, policy analysts must be proficient in utilising ICT-enabled resources for data collection, trend analysis, and policy evaluation (Horn & Gifford, 2022; Javed *et al.*, 2021; Khan *et al.*, 2021). For final year university students aspiring to enter policy-related careers, digital internships offer an immersive experience that could strengthen their research skills, and critical thinking and policy communication abilities.

In Malaysia, digital governance is becoming a national priority, with government agencies, such as the Economic Planning Unit (EPU), the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), and the Institute of Strategic and International Studies (ISIS Malaysia) increasingly leveraging ICT for policy formulation and evaluation (Mahdi *et al.*, 2024). Despite these advancements, there is a lack of empirical research on how ICT-enabled internships could contribute to the development of policy analysis skills among final year university students. Understanding this impact is crucial, as Malaysia aims to

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strengthen its policy research capabilities to address emerging socio-economic challenges, including climate change, digital transformation, and economic sustainability.

Despite the growing adoption of ICT-driven learning experiences, research on their effectiveness in shaping policy analysis skills remains limited, particularly in the Malaysian context (Adisa *et al.*, 2024). This study aimed to examine the impact of ICT-enabled internships on the policy studies competencies of final year students at the Policy Studies Department, Faculty of Business, Economics and Social Development (FBESD), Universiti Malaysia Terengganu, Malaysia (UMT). It has assessed the extent to which these digital experiences could enhance the students' ability to evaluate policy issues, engage in data-driven decision-making, and contribute to policy formulation (Shamsuddin & Razak, 2023). By exploring this relationship, this study sought to provide insights into how universities, especially the FBESD, UMT and employers could optimise internship programmes to better prepare graduates for the evolving demands of policy-related professions in Malaysia.

II. MATERIALS AND METHOD

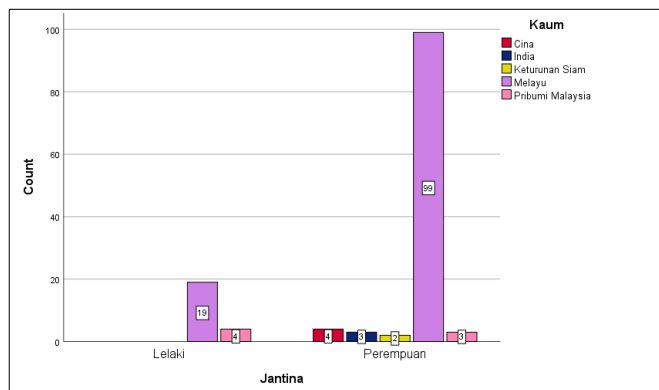


Figure 1. Gender Diversity among Internship Students (UMT Session II 2024/2025)

This study investigated the impact of ICT on the policy analysis skills of undergraduate students pursuing their final year internship at the Department of Policy Studies, FBESD, UMT. This research involved 134 students who were enrolled during the Session II 2024/2025 internship programme from October 2024 to January 2025, in accordance with the university's 16-week internship requirement. The scope of this study encompassed all Malaysian students from the same department placed in internship positions across the nation, including in the states of Sabah and Sarawak. The 16-week

internship period aligned with institutional guidelines and adhered to the standards set by the Ministry of Higher Education (MOHE) Malaysia under the MyMoheS (Malaysian Ministry of Higher Education System) initiative. This study employed a research design that integrated secondary data analysis using a content analysis approach. SPSS version 25.0 was utilised for the quantitative component, while the qualitative component involved the use of narrative statements derived from logbook entries.

According to Figure 1, gender diversity plays a pivotal role in bridging the gap between academic knowledge and practical application. With the graduate employability rate in Malaysia recorded at 85.4% in 2022 (Department of Statistics Malaysia: Malaysia, 2023), universities are continuously seeking innovative approaches to enhance students' readiness to enter the workforce. ICT-enabled internships, which incorporate digital platforms, virtual collaboration tools, and data analytics software, are emerging as a critical component (Tarafdar *et al.*, 2023) in preparing students for policy-related careers (Sturgeon & Zylberberg, 2017; Panda *et al.*, 2025). These internships provide access to real-time policy simulations, big data analytics, and cloud-based policy management tools, which would enable students to gain hands-on experience in policy research, impact assessment, and strategic planning.

Figure 1 illustrates that among the 134 final year internship students, 23 were males ($n = 17.2\%$) and 111 were females ($n = 82.8\%$). Their demographic profile showed a majority of Malays at 88.1%, followed by Indians at 2.2% (represented by three respondents), Chinese at 3.0% (represented by four respondents), and only 1.5% were Malaysian Siamese and 5.2% were Bumiputera, represented by two and seven respondents, respectively. Interestingly, among the female students, three were Bumiputeras, four Chinese, three Indians, and only two Malaysian Siamese. Meanwhile, the remaining 99 female respondents were Malays (89.2%).

These findings showed that female students, particularly from the Malay ethnic group, would be more likely to engage in internships compared to their male counterparts. This trend aligns with the national higher education statistics (Ministry of Higher Education, 2025), which reported a higher female enrolment rate in Malaysian universities (Rahim *et al.*, 2024). The underrepresentation of minority

groups, such as Chinese, Indian, and Malaysian Siamese students has raised important questions regarding accessibility and participation in internship programmes.

Table 1. ICT Knowledge among Internship Students

Ethnicity	ICT Knowledge Before Internship		ICT Knowledge After Internship	
	Basic	Moderate	Competent	Moderately Competent
Chinese	1	3	4	0
Indian	2	1	3	0
Malaysian Siamese	0	2	2	0
Malay	100	18	95	23
Bumiputera	7	0	4	3
Total	110	24	108	26

The findings presented in Table 1 indicate that the use of ICT tools during internships has significantly enhanced students' policy analysis skills, especially in data visualisation, digital policy modelling, and the use of online research databases. A total of 108 respondents were reportedly competent, although 26 respondents who were moderately competent highlighted challenges related to limited access to advanced ICT infrastructure, especially in remote placement areas.

Table 2. Disparity between Internship Students and Ethnicity

Ethnicity	Organisation				Total
	GLC	State Gov.	PBT	Private	
Chinese	1	0	1	2	4
Indian	0	0	2	1	3
Malaysian Siamese	0	0	0	2	2
Malay	8	0	71	39	118
Bumiputera	1	1	3	2	7
Total	10	1	77	46	134

As shown in Table 2, internship sector classifications show that 77 respondents have been placed under local councils (PBT), while 46 have been placed under the private sector, with entities like companies and SMEs, and 10 have been placed under Government-Linked Companies (GLCs). These results showed that future internship opportunities may extend beyond the public sector, while highlighting the critical need for ICT proficiency as a core employability skill across diverse organisational settings.

Table 3. Frequency of ICT-enabled Usage among Internship Students

Gender	Daily ICT-related Data		Total
	If Necessary	Daily	
Male	11	12	23
Female	61	50	111
Total	72	62	134

Table 3 presents the evaluation of digital experiences in enhancing students' competencies. These results revealed a relatively narrow disparity of frequency of ICT usage, whereby 72 internship students reported using digital tools only, when necessary, while 62 indicated frequent engagement with different applications, such as Microsoft Excel, Google Sheets, and other ICT-related software for data-related tasks.

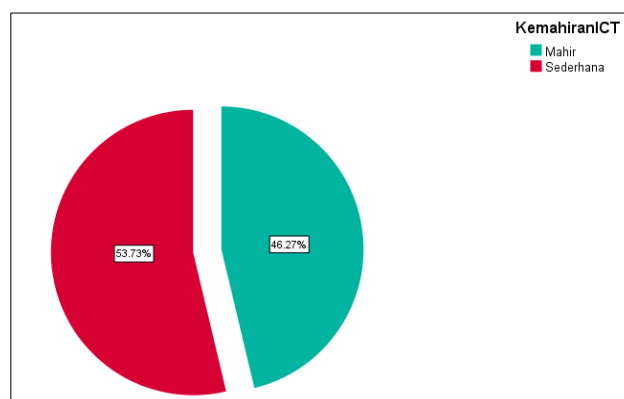


Figure 2. ICT-enabled Impact on Internship Students (UMT Session II 2024/2025)

Based on 134 respondents, Figure 2 shows that 53.73% (28 respondents), who have interned in the private sector with daily ICT usage, report improved ICT knowledge through their internship experience. Meanwhile, 46.27% assessed their ICT proficiency as moderate, underscoring the

importance of early and continuous ICT exposure throughout their undergraduate journey.

Table 3 presents differences in internship student distribution across 13 Malaysian states by gender. However, there was no internship student from Perlis during the study coverage. The majority of respondents were from Kelantan (22.4%), followed by Terengganu (21.6%), while Melaka had the least (0.7%). Notably, female Malay students dominated the sample (99 respondents) compared to males (19 respondents).

Figure 3 illustrates ICT usage across organisational sectors among internship students at the Department of Policy Studies. The results showed that the overall ICT proficiency was moderate for 72 students, while 62 were proficient. A majority of the proficient-level users were concentrated in government agencies and federal departments, with three respondents each. Meanwhile, the highest number of moderate users were from state government placements (55 respondents), followed by other government agencies (7 respondents), with only students placed in professional bodies demonstrating full ICT expertise during their internship period.

This study also utilises the VOSviewer to perform a bibliometric analysis by examining keyword associations, as shown in Figure 4. By applying different keyword strings, such as “ICT,” “IT,” “IoT,” “internship,” “training,” “students,” and “employees,” the analysis revealed a strong correlation between specialised ICT-related terms and final year students. Notably, there has been a progressive development in policy analysis skills among final year students from the Department of Policy Studies, FBESD over recent years.

For comparative purposes, Table 4 presents data on internship allowances, where a value of “0” indicates no allowance and “1” indicates the provision of financial support. The analysis revealed that 62.7% of the internship students received some form of allowance, with those placed in private firms reporting monthly allowance ranging from RM300 to RM1,000. Figure 5 displays the monthly youth unemployment trends based on data from the Department of Statistics Malaysia, highlighting a consistent rise in unemployment rates from 2016 to 2024, particularly following the COVID-19 pandemic. This upward trend emphasised the urgency of strengthening ICT and policy

analysis competencies among youth to support national talent development and retention efforts.

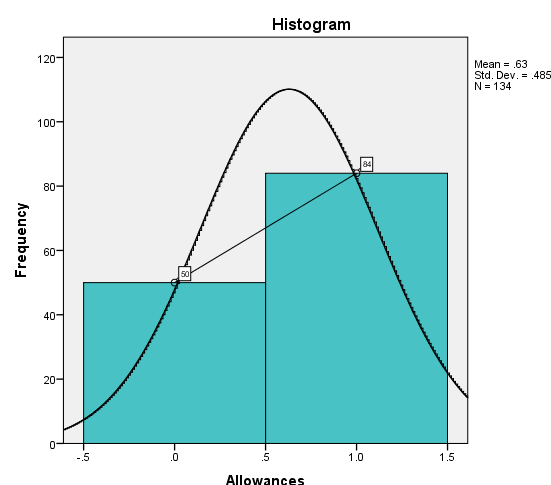


Table 4. Allowances among Internship students

Data	Frequency	Percent	Cumulative Percent
0	50	37.3	37.3
1	84	62.7	100.0
Total	134	100.0	

Notes: 0 represent none and 1 represent allowances provided.



Figure 5. Department of Statistics Malaysia: Monthly Youth Unemployment (Department of Statistics Malaysia: Malaysia, 2023)

Table 3. State Differences among Internship students

State	Male				Female						Total Based on Ethnicity	Percentage (%) Based On Ethnicity	
	Placement		Ethnicity		Placement		Ethnicity						
	East Malaysia	Peninsular Malaysia	Malay	Bumi- putera	East Malaysia	Peninsular Malaysia	Chinese	Indian	Malaysian Siamese	Malay			Bumi- putera
Johor	0	1	1	0	0	6	0	1	0	5	0	7	5.22
Kedah	0	1	1	0	0	8	0	0	0	8	0	9	6.72
Kelantan	0	4	4	0	0	26	0	0	0	26	0	30	22.39
Melaka	0	0	0	0	0	1	0	0	0	1	0	1	0.75
Negeri Sembilan	0	0	0	0	0	4	0	0	0	4	0	4	2.99
Pahang	0	1	1	0	0	10	0	0	0	10	0	11	8.21
Penang	0	1	1	0	0	3	1	0	1	1	0	4	2.99
Perak	0	0			0	2	0	0	0	2	0	2	1.49
Sabah	5	0	1	4	9	0	2	0	0	6	1	14	10.45
Sarawak	0	0	0	0	3	0	0	0	0	1	2	3	2.24
Selangor	0	3	3	0	0	11	0	1	1	9	0	14	10.45
Terengganu	0	6	6	0	0	23	1	0	0	22	0	29	21.64
Federal Territories	0	1	1	0	0	5	0	1	0	4	0	6	4.48
Total	5	18	19	4	12	99	4	3	2	99	3	134	100.00

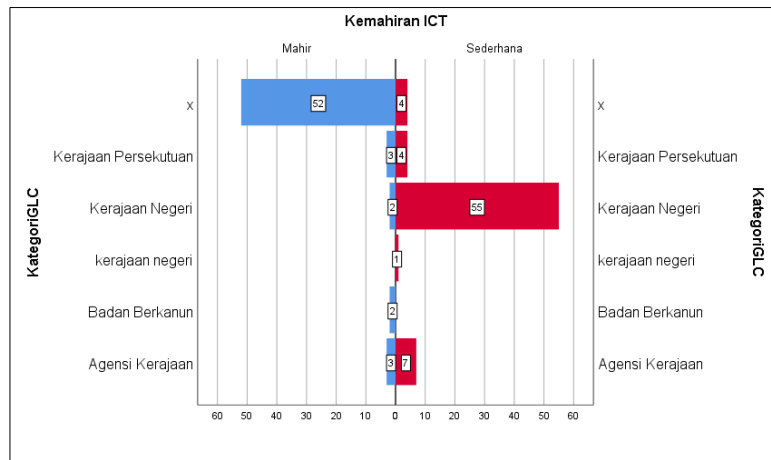


Figure 3. Sectoral classification among Internship students

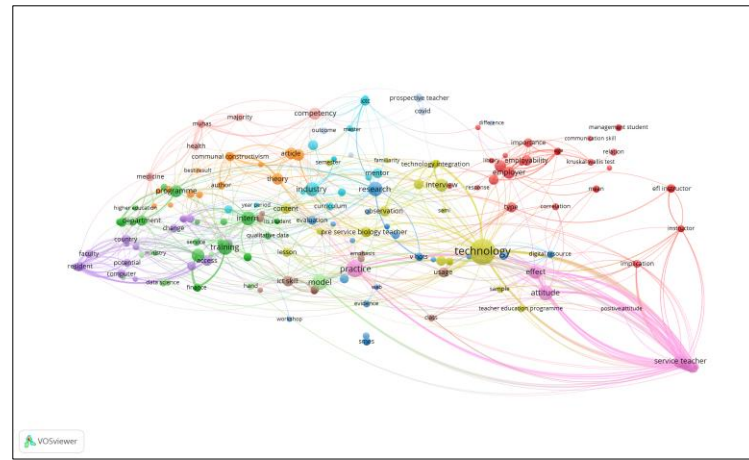


Figure 4. VOSviewer results of keywords association

III. RESULTS AND DISCUSSION

Using the qualitative component of this study, namely the daily book log of the internship students from FBESD, UMT, this study extracted several responses pertaining to the impact of ICT prior to their graduation. Table 5 indicates that those who have interned in Sabah or Sarawak (n = 5 respondents) and have been provided monthly allowances are lesser in number compared to those who have interned in Peninsular Malaysia (n = 79 respondents). In terms of the overall composition, those who interned in East Malaysia

have the highest tendency for getting allowances due to the initiatives by the MOHE, especially in collaboration with the Talent Corp, to enhance students' experiences and IT literacy during their internship.

Table 5. Allowances among Internship Students Across Malaysia

State		Monthly Allowance		Total
		Yes	No	
East Malaysia	Count	5	12	17
	% of Total	3.7%	9.0%	12.7%
Peninsular Malaysia	Count	79	38	117
	% of Total	59.0%	28.4%	87.3%

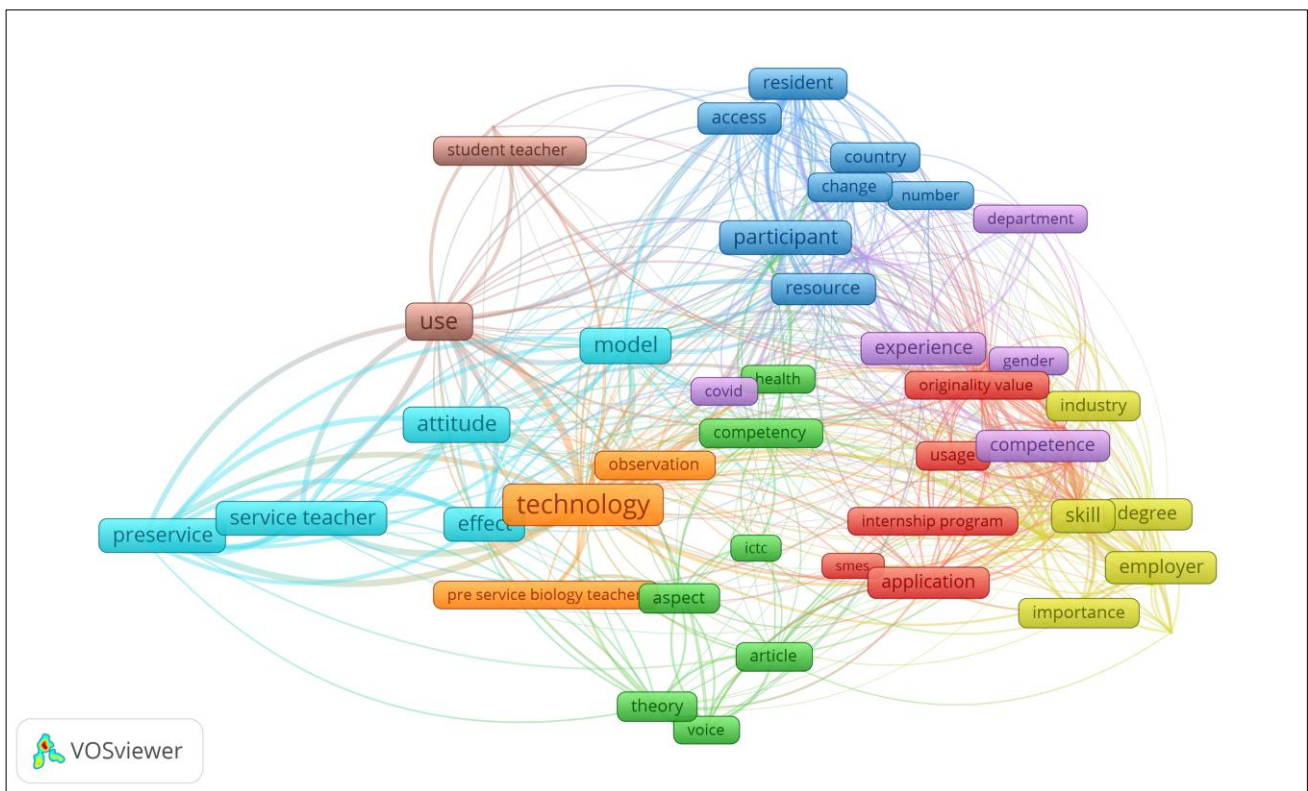


Figure 6. Bibliometric Analysis using VOSviewer Based on Titles and Abstracts

Figure 6 illustrates the bibliometric analysis results, which has been conducted using VOSviewer with patterns and trends based on keyword searches. By applying the same technique, this research has identified recurring keywords associated with internship students, including “technology,” “competency,” “aspect,” “experience,” “application,” and “use.” These patterns indicated the significance of ICT in enhancing students' knowledge during and after their internship period. This interpretation also aligns with the findings presented in Figure 3. Table 6 shows the narrative

statements of three respondents that are extracted from their daily book log.

Table 6. Respondents that utilised ICT-enabled internships

No.	Gender	Place	State	Sector
Respondent 1	Female	Vivahomes	Selangor	Private
Respondent 2	Female	MPK	Johor	Government
Respondent 3	Female	SifuTech	Terengganu	Private

“...able to learn various things, such as learning in-depth about how to use software like Excel...helped in ensuring that the stored information is organised and easy to store.”

[Respondent 1]

Respondent 1 noted that learning to use Excel during the internship has helped her manage and organise data more systematically, leading to more efficient and structured policy-related tasks. This statement aligns with Bampasidou *et al.* (2024), who opined that digital competency is the key to fostering analytical thinking and evidence-based decision-making in public policy. Hence, the integration of ICT could improve access to policy databases (Garlinska *et al.*, 2023), enhance analytical abilities (Hsu *et al.*, 2022; Javed *et al.*, 2021), and strengthen critical thinking (Panda *et al.*, 2025). However, further clarification and in-depth discussion on how these ICT tools are applied in practical internship settings are essential to comprehensively address the intended objectives of this study.

“Trainees also had the opportunity to understand the process of managing the registration of summonses into the Judicial E-Filing System (eFS). It provided a deeper understanding of the importance of the digital system...it helped improve case management efficiency.”

[Respondent 2]

Respondent 2 highlighted how digital tools used during her internship, such as Excel and the E-Filing System, has enhanced her ability to manage data efficiently and to better understand administrative processes. These experiences showed how ICT was able to support structured and accountable public service work. Bampasidou *et al.* (2024) opined that digital competencies are essential for evidence-based decision-making in policy studies. These findings showed that ICT-enabled internships could play a vital role in equipping students with essential digital competencies that could effectively prepare them for the demands of the modern workforce.

“...facilitate access to the information, resources, and tools needed to perform daily tasks more efficiently.”

[Respondent 2]

“Used the AutoCount and Point of Sales systems to calculate total sales, total count of laptop repair services, and the total sales of new and refurbished laptops.”

[Respondent 3]

In addition, Respondents 2 and 3 shared that ICT tools (for instance, digital filing systems, AutoCount, and Point of Sales) helped streamline daily tasks by improving access to information and automating data processes. These platforms enabled efficient tracking of financial records, service operations, and documentation. Such practical exposure not only enhanced workplace productivity but also developed key competencies in handling structured data as an essential foundation for effective policy analysis. According to Adisa *et al.* (2024), digital proficiency could support evidence-based decision-making, which is a core requirement in policy-related work.

IV. CONCLUSION

ICT-enabled internships are vital in bridging the gap between academic learning and real-world policy analysis, in line with the goals of MyDIGITAL and SPV 2030. Digital tools could enhance students' abilities in data-driven research and evidence-based decision-making by fostering critical skills for the modern workforce, as reported by Respondents 1, 2, and 3. However, unequal digital access remains a challenge. This study has underscored the need for universities and employers to enhance and expand ICT-driven internships to ensure inclusive, effective, and future-ready skill development.

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VI. REFERENCES

- Adisa, MO, Oyediji, S & Porras, J 2024, 'The nexus between ICT, top-down and bottom-up approaches for sustainability activities: A systematic mapping study', *Journal of Cleaner Production*, p. 141768.
- Aziz, AA, Abdulkarim, I & Jusoh, JA 2021, 'A review of supply and demand digital talents in Malaysia', in *International Conference on Business and Technology*, pp. 721-738, Cham: Springer International Publishing.
- Bampasidou, M, Goldgaber, D, Gentimis, T & Mandalika, A 2024, 'Overcoming 'Digital Divides': Leveraging higher education to develop next generation digital agriculture professionals', *Computers and Electronics in Agriculture*, vol. 224, p. 109181.
- Castro, R 2019, 'Blended learning in higher education: Trends and capabilities', *Education and Information Technologies*, vol. 24, no. 4, pp. 2523-2546.
- Felker, G 2024, 'Malaysia's ICT sector policymaking: toward a developmental network state', *The Pacific Review*, pp. 1-32.
- Garlinska, M, Osial, M, Proniewska, K & Pregowska, A 2023, 'The influence of emerging technologies on distance education', *Electronics*, vol. 12, no. 7, p. 1550.
- Horn, C & Gifford, SM 2022, 'ICT uptake and use and social connectedness in rural and remote communities: a study from Sarawak, Malaysia', *Information Technology for Development*, vol. 28, no. 4, pp. 721-746.
- Hsu, JL, Jones, A, Lin, JH & Chen, YR 2022, 'Data visualization in introductory business statistics to strengthen students' practical skills', *Teaching Statistics*, vol. 44, no. 1, pp. 21-28.
- Javaid, M, Haleem, A, Singh, RP & Sinha, AK 2024, 'Digital economy to improve the culture of industry 4.0: A study on features, implementation and challenges', *Green Technologies and Sustainability*, p. 100083.
- Javed, A, Yasir, M, Ali, M & Majid, A 2021, 'ICT-enabled innovation, enterprise value creation and the rise of electronic social enterprise', *World Journal of Entrepreneurship, Management and Sustainable Development*, vol. 17, no. 2, pp. 189-208.
- Khan, W, Sohail, S, Roomi, MA, Nisar, QA & Rafiq, M 2024, 'Opening a new horizon in digitalization for e-learning in Malaysia: Empirical evidence of Covid-19', *Education and Information Technologies*, vol. 29, no. 8, pp. 9387-9416.
- Mahdi, NAN, Fernando, Y & Ibrahim, A 2024, 'Revealing the Path to a Green Economy: Insights and Recommendations for Sustainable Development in Malaysia', *International Journal of Integrated Engineering*, vol. 16, no. 2, pp. 245-258.
- Malaysia, MMS 2023, 'Department of Statistics, Malaysia', Change, 2022.
- Ministry of Higher Education 2025, Graduate Employability, <<https://www.mohe.gov.my/en/services/graduate-employability>>.
- Panda, G, Dash, MK, Kaswan, MS & Chaudhary, R 2025, 'Exploring the impact of digital technology in Indian higher education: a comprehensive analysis', *The TQM Journal*.
- Rahim, SSBA & Chua, KH 2024, 'Basic Education in Malaysia', in *International Handbook on Education in Southeast Asia*, Singapore: Springer Nature Singapore, pp. 591-607.
- Shamsuddin, F & Razak, AZA 2023, 'Development of a Model for Data-Driven Decision Making: Critical Skills for School Leaders', *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, vol. 8, no. 12, pp. e002614-e002614.
- Sturgeon, T & Zylberberg, E 2017, 'Vietnam's evolving role in ICT global value chains', *Vietnam at a Crossroads*, p. 133.
- Tarafdar, M, Rets, I & Hu, Y 2023, 'Can ICT enhance workplace inclusion? ICT-enabled workplace inclusion practices and a new agenda for inclusion research in Information Systems', *The Journal of Strategic Information Systems*, vol. 32, no. 2, p. 101773.
- Valtonen, T, Leppänen, U, Hyypiä, M, Kokko, A, Manninen, J, Vartiainen, H & Hirsto, L 2021, 'Learning environments preferred by university students: a shift toward informal and flexible learning environments', *Learning Environments Research*, vol. 24, pp. 371-388.
- Zhao, B & Zhou, J 2024, 'Research hotspots and trends in digitalization in higher education: A bibliometric analysis', *Heliyon*, vol. 10, no. 21.