CHALLENGES POSED BY ICT USAGE IN HIGHER EDUCATION

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Abstract

The use of Information and Communication Technology (ICT) is changing how students learn in universities. In Malaysia, both public and private universities are using online tools like Coursera, YouTube, Zoom, and learning management systems (LMSs) to make learning more flexible and accessible. These tools help students study at their own pace and learn anytime, anywhere, especially during and after the COVID-19 pandemic. The government has also created systems and plans, such as EMIS and the ICT Transformation Plan, to support digital learning and manage education data. These efforts are part of the bigger Malaysia Education Blueprint which aims to improve digital skills and promote new ways of learning. However, there are still big challenges. Not all students have equal access to technology. Those from low-income families or rural areas often struggle with poor internet and fewer digital devices. This "digital divide" makes learning harder and can make some students feel left behind. While there are laws to protect students' personal data, there are still some gaps that raise concerns about privacy. To make sure everyone gets a fair chance at quality education, the government needs to keep improving internet access, digital skills, and providing adequate learning tools for all students. This essay will focus on the challenges posed by ICT usage for students in higher education.

Introduction

Information and communication technology (hereinafter referred to as "ICT") covers all technical means used to handle information and aid communication.[1] In this modern era, rapid

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[1] Eurostat Statistics Explained, 'Glossary: Information and communication technology (ICT)' (*Eurostat Statistics Explained*, 19 September 2023) <https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Information_and_communication_technology_(ICT)#:~:text=Information%20and%20communication%20technology%2C%20abbreviated,as%20well%20as%20their%20software> accessed 18 March 2025.

technological advances heavily impact the educational field. Many higher education institutions (hereinafter referred to as "HEI") have adapted to the changes by integrating digital technologies into the process of learning. Not only must HEIs meet the increased technological demands of Generation Z students, but they also need to prepare for the impending Generation Alpha storm.[2] This means that HEIs must adapt not only to meet the expectations of Generation Z, who are born from the year 1995 to 2012,[3] but also to prepare for the emerging Generation Alpha who are born between 2013 to 2025.[4]

Students' use of ICT

Professor Olha Prokopenko[5] mentioned that digitalization is not only a trend but a promising direction of improvement, including education. Malaysian Universities, both public and private, implement the use of ICT and relevant policies to provide better quality and accessible education. Technology has the capacity to promote and encourage the transformation of education from a very traditional teaching method to a model which is more student-centered.[6] The usage of internet resources such as online course providers and video sharing platforms enables the students to learn any topics on their own without a teacher to guide them through. ICT acts as a catalyst for change and encourages students to learn independently, which gained significant momentum during the COVID-19 pandemic.

Learning approaches through ICT provides opportunities for constructivist learning through their provision and support for resource based as well as student-centred settings.[7] By using online forms, students majoring in psychology programs can acquire data widely through social interactions for the purpose of their research. Students at university-level are equipped with a student learning platform and usually depend on an independent learning process mainly for learning, assessment and research. The learning materials become more accessible through the platform and independent research on the Internet, and the students are free to explore the cyber realm for the information they need. It can be seen that ICT tools help them to complete

[2] Joanna Rosak-Szyrocka, 'The Era of Digitalization in Education Where do Universities 4.0 Go?' (2024) Management Systems in Production Engineering (32) 1 54-66, 55.
[3] USC Libraries, 'Age Groups' (*USC University of Southern California*, 17 April 2025) <https://libguides.usc.edu/busdem/age> accessed 11 August 2025.
[4] *Ibid.*
[5] Olha Prokopenko, 'Technological Challenges of Our Time in the Digitalization of the Education of the Future' (2021) 1(2) Futurity Education, 4-13.
[6] Ron Oliver, 'The role of ICT in higher education for the 21st century: ICT as a change agent for education' (2002) <https://www.qualityes.org/wp-content/uploads/2018/06/The_role_of_ICT_in_higher_education_for_the_21st_c-2.pdf> accessed 18 March 2025.
[7] Zane L Berge, 'Guiding principles in Web-based instructional design' (1998) 35(2) Education Media International 72-76.

their work more efficiently and effectively as students have access to free learning materials shared by universities like Harvard and Massachusetts Institute of Technology. The use of ICT by students emphasizes on the level of understanding, allowing students to develop their personal interpretation on their academic topics. Before the existence of ICT tools, students have typically been forced to accept what has been delivered and institutions have tended to be quite staid and traditional in terms of the delivery of their programs.[8] To illustrate this, students had no choice but to be present in person in the lecture halls to gain knowledge of the topics they are interested in. With the use of ICT, students are given more flexibility to learn depending on their choice of location and time.

In 2020, learning online or e-learning made huge progress when the education sector was affected by the COVID-19 pandemic. During that period, the most common method of e-learning adopted by HEIs was through video conferencing applications such as Zoom and Google Meets. These platforms have been used extensively during and after the pandemic, which instructors and learners will utilize to facilitate virtual learning in both synchronous and asynchronous forms.[9] The implementation of learning management systems (hereinafter referred to as "LMS") has become a necessity and a handy tool for HEIs students to have quick and easy access for educational purposes. The learning activities in an e-learning environment include studying the learning materials, doing the exercises, completing the assignments and sitting for the examination.[10]

Current Mechanism Governing the Use of ICT in Higher Education

In 2015, the Ministry of Education introduced the Education Management Information System (hereinafter referred to as "EMIS") to collect data pertaining to enrolment into three systems. The incorporation of Ministry of Higher Education (hereinafter referred to as "MOHE") in June 2018[11] further introduced an additional 110 systems and applications related to post-

[8] Ron Oliver, 'The role of ICT in higher education for the 21st century: ICT as a change agent for education' (2002) <https://www.qualityes.org/wp-content/uploads/2018/06/The_role_of_ICT_in_higher_education_for_the_21st_c-2.pdf> accessed 18 March 2025.
[9] Sumathi Rathinam et al., 'Trends, Issues, and Challenges in E-Learning in the Malaysian Education System: A Review of Literature' (2023) 2(1) Journal of Social Sciences and Business Quest International University 8.
[10] Ch'ng Lay Kee, 'Face-to-Face Tutorial, Learning Management System and WhatsApp Group: How Digital Immigrants Interact and Engage in E-learning?' (2020) 8(1) Malaysian Online Journal of Educational Technology.
[11] MOHE was established in 2004 as an independent government agency which is responsible for higher education. After the general election in 2018, the new government combined the MOHE under the Ministry of Education, hence the incorporation. In 2020, MOHE was re-established as an independent government agency.

secondary education into the Ministry of Education's structure.[12] Systems like the Tracer Study data and the Research Assessment Data encompass educational data of HEIs of both public and private.[13] These systems are used to manage the administrative workload of the educational institutions. The governance of educational technology is mainly regulated by the Ministry of Education alongside other relevant government agencies with several important documents, namely Malaysia Education Blueprint 2013-2025 and National Educational Policy 2017.[14] These documents lay out the strategies for educational technology initiatives which primarily ensure the sufficiency of ICT infrastructure for all school levels.[15]

According to the ICT Transformation Plan 2019-2023, the Ministry of Education and other relevant government agencies are responsible for overseeing the implementation and development of educational technology initiatives. The Education Technology Division from the Ministry manages teaching and learning processes in school while the Information Management Division acts as a coordinator of ICT. For instance, the Malaysian Administrative Modernisation and Management Planning Unit (hereinafter referred to as "MAMPU") provides the infrastructure for ICT, including the use of open-source applications from the Ministry Level to the District Level.[16] The applications of Open Data Portal launched by MAMPU through Public Sector Open Data Platform consist of reliable data from government agencies, industries and academics that enable students to conduct relevant research. At this level, the Information Management Division will ensure that schools and institutions adhere to best practices and align with the country's educational goals, while formulating and enforcing policies, guidelines, and regulations related to educational technology.

The former Minister of MOHE, Datuk Seri Mohamed Khaled Nordin,[17] stated that 'adopting technology in education, particularly in higher education, is no longer a choice because it has become an imperative to maintain global competitiveness.'[18] He then proposed a white paper titled 'A New Horizon for Science, Technology and Innovation – A Strategy for Malaysia' to enable a powerful strategy in identifying, developing, adapting, and integrating all advanced technological intelligence into the higher education sector. This is aligned with

[12] Nantha Kumar Subramaniam, 'Background Paper Prepared for the 2023 Global Education Monitoring Report: Technology and Education, Southeast Asia' (2023) 28.
[13] *Ibid*, 29.
[14] *Ibid*, 38.
[15] *Ibid.*
[16] *Ibid.*
[17] Minister of Higher Education from 2022 to 2023.
[18] 'Khaled Nordin: Adopting technology in higher education imperative to maintain global competitiveness' *Bernama* (Malaysia, 21 November 2023) <https://www.bernama.com/en/news.php?id=2246604> accessed 22 March 2025.

Malaysia Education Blueprint 2013-2025 which emphasizes the importance of improving digital infrastructure, promoting digital literacy, and fostering innovation in education.

Relevant Legal Principles

With the rise of ICT usage, the **Personal Data Protection Act 2010** (hereinafter referred to as "PDPA 2010") serves as an important legislation to govern data protection and privacy in Malaysia. **PDPA 2010** requires any private HEIs registered under the **Private Higher Educational Institutions Act 1996** to register under the **PDPA 2010** to ensure personal data protection and the privacy of students and teachers. Still, **PDPA 2010** allows 'certain exemptions and exclusions, such as for government agencies or certain types of data processing activities'[19] which can raise concerns about data protection and the potential loopholes of data misuse.

Challenges of ICT Usage

The United Nations Educational, Scientific and Cultural Organization (hereinafter referred to as "UNESCO") highlights that quality education links specifically with the five sustainable development goals (hereinafter referred to as "SDGs"), namely health and well-being, gender equality, decent work and economic growth, responsible consumption and production, climate change mitigation,[20] and also with the rest of the SDGs in one way or another which further emphasizes the efforts in increasing people's access to quality education, regardless of the socioeconomic differences.[21] In the 2030 Agenda for Sustainable Development,[22] it is stated that education is central to the realization of the agenda, and one of the underlying principles is that education is a fundamental human right. Countries must ensure universal access to inclusive and equitable quality education and learning, leaving no one behind.[23]

[19] Nantha Kumar Subramaniam, 'Background Paper Prepared for the 2023 Global Education Monitoring Report: Technology and Education, Southeast Asia' (2023) 40.
[20] UNESCO, 'Unpacking Sustainable Development Goal 4 Education 2030; Guide' (2016) <https://unesdoc.unesco.org/ark:/48223/pf0000246300/PDF/246300eng.pdf.multi> accessed 11 August 2025.
[21] A. Devisakti, Muhammad Muftahu, and Hu Xiaoling, 'Digital divide among B40 students in Malaysian higher education institutions' (2024) Education and Information Technologies 1858.
[22] UNESCO, 'Unpacking Sustainable Development Goal 4 Education 2030; Guide' (2016) <https://unesdoc.unesco.org/ark:/48223/pf0000246300/PDF/246300eng.pdf.multi> accessed 24 March 2025.
[23] *Ibid.*

a. Digital Divide

Despite the pressing need to provide quality education for students of all levels, digital divide has become a growing concern in the higher education sector.[24] Digital divide refers to the gap between individuals, groups and enterprises that have access to ICT and those who do not.[25] Scholars like Hazita Azman, Professor of Applied Linguistics and Language Literacy at University Kebangsaan Malaysia, stated that tertiary students in Malaysia are deemed digitally matured. However, the issue of digital divide persists among Malaysian university students. Students' personal funding for private education suggests that they have higher accessibility to resources and facilities, whereas students from public universities heavily rely on state funding to have the same resources.[26] It indicates that students from public universities are more likely to experience digital divide than students from private educational institutions. According to the Household Income Survey Report 2022,[27] the B40 household income is generally not more than RM3,440 per month. Students from this socioeconomic group are the most vulnerable group of learners who benefit least from digital learning.[28] Moreover, research on 1090 Chinese students in China[29] shows that through learning online, students who are digitally excluded feel less satisfied with the learning experiences.

Students from lower socioeconomic backgrounds have limited access to technology and become increasingly disadvantaged in the digital world. Not only do they have little to no access to ICT, but they also lack the skills since they are underprivileged as compared to those who have access to ICT on a daily basis. There are two important indicators of digital divide as per Professor Eszter Hargittai, namely digital skills and digital usage, that are overlooked in tackling the said issue. Digital skills encompass the possession of ICT skills and competencies whereas digital usage addresses individuals' actual utilization or engagement in digital or online activities.[30] In Finland, the education sector bridges the gap of digital divide through

[24] A. Devisakti, Muhammad Muftahu, and Hu Xiaoling, 'Digital divide among B40 students in Malaysian higher education institutions' (2024) Education and Information Technologies 1858.
[25] Carmen Boje, Gary Steffen, and Nicolae-George Dragulanescu, 'The Evolution of the Digital Divide in Europe' (2003) Indiana University Purdue University Fort Wayne.
[26] Latha Subramaniam et al., 'The Second and Third Levels of Digital Divide among Malaysian University Students during the Covid-19 Pandemic' (2023) 21(6) TELKOMNIKA Telecommunication Computing Electronics and Control 1326-1333, 1326.
[27] Department of Statistics Malaysia (DOSM), 'Household Income Survey Report 2022' (*DOSM*, 2022) <https://www.dosm.gov.my/uploads/release-content/file_20230728111513.pdf> accessed 25 March 2025.
[28] A. Devisakti, Muhammad Muftahu, and Hu Xiaoling, 'Digital divide among B40 students in Malaysian higher education institutions' (2024) Education and Information Technologies 1861.
[29] Tan Yejun et al., 'Influencing factors of international students' anxiety under online learning during the COVID-19 pandemic: Across-sectional study of 1,090 Chinese international students' (2022) Frontiers in Psychology 13.
[30] Latha Subramaniam et al., 'The Second and Third Levels of Digital Divide among Malaysian University Students during the Covid-19 Pandemic' (2023) 21(6) TELKOMNIKA Telecommunication Computing Electronics and Control 1326-1333, 1327.

integrating digital technology in all classrooms starting at the primary schools to equip students with technical skills and digital literacy.[31]

b. Lack of Infrastructure

During the Covid-19 pandemic, online learning substituted the traditional learning method for higher education students. HEIs were forced to switch to utilize LMSs such as Moodle, Web CT and Blackboard as well as communication tools.[32] Students in rural areas are more likely at a disadvantage given the variety of challenges they face due to poor basic infrastructure and facilities compared to students in urban areas.[33] According to a report titled 'Malaysian users in thinly-populated rural areas connect to 4G just 44% of the time' conducted by Hardik Khatri[34] in 2019, there was a connectivity gap between users residing in rural regions and urban areas. Also, students pursuing higher education often face technical issues, connection problems and low digital literacy. For instance, bad internet connectivity in public universities in 2024 caused students to miss out on learning and resorted to using their own mobile data for access.[35] Students at Universiti Sains Malaysia and Universiti Putra Malaysia expressed their frustration about the interceptions and poor connections of the Internet due to the distance of the hostel from the Wi-Fi modem. Until today, the problem of poor connectivity still exists[36] even though ICT or online learning has become a crucial part of higher education. It is recommended to learn from Singapore, which has the fastest internet speed[37] in the world, to install a nationwide fiber-optic network with the average download speed around 300 to 345Mbps.

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[31] Admin of Finland Education Hub, 'Digital Literacy in Finnish Education: A Model for the World' (*Finland Education Hub*, 19 October 2023) <https://finlandeducationhub.com/digital-literacy-in-finnish-education-a-model-for-the-world/> accessed 20 August 2025.

[32] Sumathi Rathinam et al., 'Trends, Issues, and Challenges in E-Learning in the Malaysian Education System: A Review of Literature' (2023) 2(1) Journal of Social Sciences and Business Quest International University 7.

[33] Adi Jafar et al., 'Assessing the challenges of e-learning in Malaysia during the pandemic of Covid-19 using the geo-spatial approach' (2022) 12(1) Sci Rep 17316.

[34] Hardik Khatri, 'Malaysian users in thinly-populated rural areas connect to 4G just 44% of the time' (*Open Signal*, 31 October 2019) <https://www.opensignal.com/2019/10/31/malaysian-users-in-thinly-populated-rural-areas-connect-to-4g-just-44-of-the-time> accessed 11 August 2025.

[35] Ho Jia Wen, 'Bad Internet connectivity causing problems when studying, say varsity students' *The Star* (Petaling Jaya, 29 September 2024) <https://www.thestar.com.my/news/nation/2024/09/29/bad-internet-connectivity-causing-problems-when-studying-say-varsity-students> accessed 24 March 2025.

[36] *Ibid.*

[37] Marcin Frackiewicz, 'Internet Access in Singapore: A Comprehensive Overview' (*TS2*, 15 May 2025) <https://ts2.tech/en/internet-access-in-singapore-a-comprehensive-overview/> accessed 20 August 2025.

c. Data Breach

With the rise of ICT usage, the risk of data breaches also increases. Schools are often targets of the hacks and breaches as the staff and students have access to the system that stores an extensive amount of data and heavily relies on the online storage systems to store them.[38] In Texas, United States, there was a data breach that compromised sensitive personal information belonging to 47,606 individuals.[39] The rise in cyberattacks is attributed to the sector's increasing reliance on digital systems and the sensitive information they manage, such as personal data, health records, and academic histories.[40]

In Malaysia, there were news reports in 2019 that the personal data of more than a million University Teknologi MARA (hereinafter referred to as "UiTM") students had been leaked online.[41] However, the institution did not resolve the issue given that another breach happened again in 2023 which affected nearly 12,000 UiTM applicants. Apart from the **PDPA 2010**, organizations in Malaysia often do not face any legal actions from leaked data, unless they are being sued.[42] When iPay88, a payment solutions company, experienced security breach that compromised users' cards data in 2022, Bank Negara Malaysia only instructed the former to strengthen their cybersecurity controls,[43] and no further action was taken against the payment gateway company. To handle this challenge, the company that leaks consumers' data should be fined heavily or provide compensation to the affected consumers. TikTok was fined €345 million in September 2023 by the Irish Data Protection Commission for violating children's data privacy under General Data Protection Regulation law.[44]

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[38] Caitleeyn Peetz, 'What Schools Should Know About the PowerSchool Data Breach' (*EducationWeek*, 9 January 2025) <https://www.edweek.org/technology/what-schools-should-know-about-the-powerschool-data-breach/2025/01> accessed 8 May 2025.
[39] Alessandro Mascellino, 'Texas School District Notifies Over 47,000 People of Major Data Breach' (*Infosecurity Magazine*, 6 May 2025) <https://www.infosecurity-magazine.com/news/texas-school-47000-people-data/> accessed 8 May 2025.
[40] MBN Staff, 'Education Sector Faces Over 500 Cyberattacks Daily' (*Mexico Business News*, 7 May 2025) <https://mexicobusiness.news/talent/news/education-sector-faces-over-500-cyberattacks-daily#:~:text=The%20global%20education%20sector%20is,large%20volumes%20of%20sensitive%20data.> accessed 8 May 2025.
[41] Aaron Raj, 'Will regulators take action on Malaysian university for admitting data leak?' (*Tech Wire Asia*, 15 May 2023) <https://techwireasia.com/2023/05/will-regulators-take-action-on-malaysian-university-for-admitting-data-leak/> accessed 8 May 2025.
[42] *Ibid.*
[43] Chester Tay, 'BNM orders iPay88 to strengthen cybersecurity controls after data breach incident' (*The Edge Malaysia*, 7 October 2022) <https://theedgemalaysia.com/article/bnm-orders-ipay88-strengthen-cybersecurity-controls-after-data-breach-incident> accessed 11 August 2025.
[44] Michael Hill and Shweta Sharma, 'The biggest data breach fines, penalties, and settlements so far' (*CSO*, 8 January 2025) <https://www.csoonline.com/article/567531/the-biggest-data-breach-fines-penalties-and-settlements-so-far.html> accessed 20 August 2025.

Conclusion

Overall, the education sector, particularly the higher education sector in Malaysia sees a rising trend of ICT usage that provides benefits to the students and also administration of the HEIs. Despite the trend, there are still certain challenges in implementing e-learning throughout the country. The MOHE and other relevant government agencies should take action to provide affordable and quality education for the future generations to maintain competitiveness on the international level.