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HIGHER EDUCATION AS AN ENTERPRISE – EMBEDDING THE QUALITY ASSURANCE CULTURE

Proceedings of the Seminar on Internal-External Quality Assurance (SieQA) 2021

16-17 March 2021,
Sunway University, Malaysia

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TABLE OF CONTENTS

Preface …vii
Acknowledgements …ix

Introduction: The Changing Context of Quality Assurance

1. Higher Education as an Enterprise: Embedding and Evolving the Quality Assurance Culture for a Changing World
   Wilkinson, G. G. …x

Education Ecosystems

2. Advantages and Challenges of Interdepartmental Team Teaching: A Case Study
   Sim, T. Y. & Ng, B. L. …1
3. Integrating Active Learning and Content Localisation in the Delivery of Responsible Conduct of Research Education in Malaysia
   Chai, L.C., Chau, D.M. & Veerakumarasivam, A. …13
4. Transition Due to COVID-19: Insights Into What Is Important From the Perspective of the Management, Faculty Members, and Students
   Sim, T. Y. & Dewika, M. …28

Delivery Systems

5. Internship During COVID-19
   Choy, T. Y., Diana, G. M. J., Lim, T. H. & Nurul Aini, K. Y. …42
6. Quality Online Learning for Students' Future Success
   Crosling, G. …54

7. Maintaining Academic Integrity in the Conduct of Online Examinations: A Case Study at Sunway College Johor Bahru
How, P. L., Lee, S. L., Ng, K. H., Sathissan, R., Shereen, K. & Wong, S. L. …63

8. Embedding Research Integrity to Ensure Quality of Higher Education in Malaysia
Chau, D. M., Chai, L. C. & Veerakumarasivam, A. …81

9. Assessing Undergraduate Biological Sciences Students' Experiences and Satisfaction with Online Learning amid the COVID-19 Pandemic
Chew, J., Reginald, K., Tong, T. & Veerakumarasivam, A. …92

10. Evaluating the Perceived Effectiveness of Online Learning among Biological Sciences Undergraduates During the COVID-19 Pandemic
Tong, T., Chen, J. E., Lim, W. L., Chew, J. & Veerakumarasivam, A. …107

11. An Overview of Engineering Programme Outcome Assessment Quality
Omar, A.A …122

Sustainability

12. Roles of Leadership and Non-Academic Staff in Providing Quality Higher Education: A Review Paper
Gan, E. …133

13. Developing Workplace Soft Skills in Students of the American Degree Transfer Program
Sockanathan, S., Nadarajah, J., Yap, J. & Radzali, A. A. …146

14. Carbon Footprint Study on Electricity Consumption of Sunway University During COVID-19 Lockdown
Devandran, A. & Dewika, M. …160

15. Student Feedback on Rapid Adaptation of Online Delivery Learning During the COVID-19 Pandemic: Learning Points Towards Better Future Practice
Lau, S. L., Ng, A. L. O., Sim, T. Z. & Veerakumarasivam, A. …169

Education Ecosystems/Delivery Systems

16. Teaching Multiple Subjects Simultaneously Through Assignments
Choy, T. Y. & Lim, S.B. …183

17. A Review of Virtual Teaching Strategies for Gen Z Learners
Teh, Y. Y. …190

Afterword

18. Rethinking Quality Assurance in Higher Education as Enterprise
Cheng, M. W. …201

PREFACE

Great things in business are never done by one person;
they're done by a team of people

Steve Jobs

The higher education sector has been undergoing a paradigm shift in recent years with pressure to become more flexible and enterprising to meet the needs of the 21st century. The COVID-19 pandemic has increased the rate of change and has forced higher education institutions around the globe to quickly adapt their teaching, learning and assessment methods to meet the challenges of these unprecedented times. The need to make rapid changes and implement different forms of delivery and assessments has created tensions between those tasked with implementing the new techniques and their colleagues charged with maintaining academic standards and quality.

However, quality assurance is an integral part of the learning design, development and monitoring processes which ultimately ensures the validity and reliability of higher education learning outcomes. Indeed, when correctly applied, quality assurance processes should provide an effective and flexible framework to support rapid change and enterprise while improving standards in teaching, learning and assessment. Thus, the Seminar on Internal-External Quality Assurance (SieQA) 2021 aimed to share how higher education institutions have been responding during this period of major change and to explore practical strategies that can be used to embed quality assurance processes to create a culture which maximises flexibility, encourages enterprise and raises standards now and in the future.

The SieQA 2021 Committee would like to record our appreciation to YBhg Professor Dr Roziah Mohd Janor, President of the Malaysian Higher Education Institutions Quality Assurance Network (MyQAN), for giving Sunway University the privilege and honour to host this year's edition of

SieQA and the Honourable Datuk Mansor bin Hj Othman, Deputy Minister of Higher Education, who delivered special address during the event. Our gratitude to Professor Dato' Dr Mohammad Shatar Sabran, CEO of the Malaysian Qualifications Agency (MQA), for his special remarks and we also feel honoured to have had Professor Ir Khairul Salleh Mohamed Sahari, Deputy Chief Executive Officer at MQA, Professor Dr Alyssa Peleo-Alampay, Vice President of ASEAN Quality Assurance Association, Dr Choltis Dhirathiti, Executive Director of ASEAN Universities Network, Dr Kyi Shwin, the Secretary-General of the Myanmar National Commission for UNESCO, representing the Myanmar National Accreditation Quality Assurance Committee, and President of Sunway University, Professor Dr Sibrandes Poppema, who shared views and directions during the forum.

To our keynotes address speakers, Professor Dr Graeme Wilkinson, Vice-Chancellor of Sunway University and Professor Datuk Dr Asma Ismail, Chairperson of the Malaysian Qualifications Agency Council, thank you for shedding light on how future higher education institutions could continue embedding and evolving quality assurance as we address new norms post-COVID-19.

The seminar and proceedings would not be possible without the leadership of the Chairperson of SieQA 2021, Professor Dr Elizabeth Lee (CEO, Sunway Education Group), Deputy Chairpersons of SieQA 2021 (Dr Cheng Mien Wee, Ms Ng Beng Lean, and Ms Norlela Abdul Rahman), as well as the committed organising committees with 17 partner Malaysian universities.

This proceedings volume is the formal record of SieQA 2021, and it is hoped that this report will not only provide readers with up-to-date information about quality assurance processes in higher education institutions, but also share ideas, experiences and best practices from quality assurance professionals across Southeast Asia.

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HIGHER EDUCATION AS AN ENTERPRISE: EMBEDDING AND EVOLVING THE QUALITY ASSURANCE CULTURE FOR A CHANGING WORLD

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ABSTRACT

This paper considers the broad requirements of future quality assurance systems in the context of a rapidly expanding global higher education system which has increasingly diverse models of delivery, evolving virtualisation of resources, and rapidly changing customer needs. Higher education is now required to equip students for work in a future where many current jobs and career routes may no longer exist and where many new jobs will require knowledge and skills drawn from multiple disciplines. Quality assurance must be adapted to reflect education that is geared towards creating flexible and adaptable thinkers who can play their part in future society as responsible global citizens who are fully able to take advantage of new career opportunities as they emerge. Traditional quality assurance focused on the delivery of fixed subject knowledge and associated learning outcomes has to evolve towards a system that puts trust in institutions and their academics to be creative and to anticipate trends in commerce and technologies ahead of conventional or traditional thinking. Quality assurance has to be future-proofed, not backward-focused.

Keywords Quality assurance, risk-based approach, interdisciplinary education, future proofing higher education

INTRODUCTION: THE HISTORICAL CONTEXT OF QUALITY ASSURANCE IN HIGHER EDUCATION

Quality assurance is a relatively recent concept in the realm of higher education even though higher education as an idea or human activity is extremely old. Some universities were started in Europe over 800 years ago (such as the University of Bologna and the University of Oxford in the 11th century, and the University of Cambridge in the 13th century). The origins of pedagogic intellectual discourse which might be regarded as the earliest form of higher education can be traced back even earlier, for example to the time of Socrates (470–399 BCE) and other philosophers in ancient Greece. There are, of course, many other examples of public education by philosophers and thinkers throughout history in many different parts of the world. The earliest institutions that could be regarded as universities were essentially communities of scholars that wrote and taught in cloistered medieval buildings. The concept of "quality assurance" did not exist at that time. Quality came from the perceived wisdom of, and trust in, the scholars and "trust" became the key theme that underpinned university education for many centuries to come.

Industrial quality control is a concept that arose principally in the middle of the 20th century and became embedded in quality control systems and standards from around the 1980s. When the author began his career as a lecturer in the United Kingdom (UK) in the 1980s, there was no external quality control agency and quality arose from one's peers in an academic department reviewing each other's work (scrutinising examination papers for accuracy, etc). There was also the occasional involvement of external examiners from other institutions in examination boards to give an independent view as to whether students had been assessed appropriately and treated fairly. The process was one of mutual respect. Quality control was minimally invasive and largely based on the trust and confidence of one academic in another. Students likewise put trust in their lecturers and professors and in the system that educated them and rarely complained, especially given that university education was principally restricted to a small proportion of the young adult population and fees were still heavily subsidised by governments and generally affordable.

But all that changed in the 1990s when quality assurance as an industrial concept came to be applied in higher education. The UK's Higher Education Quality Council was founded in 1992 and this morphed into the current Quality Assurance Agency for Higher Education (QAA) which was established in 1997. The Malaysian Qualifications Agency (MQA) was founded in 2007 and the Australian Tertiary Education and Quality Standards Agency was founded in 2011. So, even though universities have existed for around 900 years, rigorous quality assurance under the control of external agencies has only existed for about 30 years. This came about principally because higher education in many countries evolved in the latter part of the 20th century from being "elite" systems, with less than 15% participation rates, to "mass" systems, with 15%–40% participation rates, and then to "universal" systems, with more than 40% participation rates (Trow, 2000), with the range of institutions and courses expanding rapidly. At the same time, the funding of higher education became a significant issue for governments and costs were increasingly shifted towards the consumers, i.e. the students, who then expected a high-quality experience for their money.

It was this expansion and effective industrialisation and consumerisation of higher education that forced governments to require industrial methods of quality control, to the disappointment of many in academia. The imposition of industrial quality control brought with it a certain degree of rigidity and standardisation that many in higher education continue to debate. It has been noted that some accreditation processes can constrain disruptive innovations in higher education because innovations are rarely perfectly formed at the outset (Horn & Dunagan, 2018). Furthermore, some experts even question whether rigid quality control as exercised by quality assurance agencies globally actually stifles creativity and originality, and hampers innovation in teaching and learning as well as constraining the knowledge and skills acquired by graduates to fixed models that effectively create intellectual clones. This may not be appropriate in a fast-changing world and needs some re-examination as I shall attempt to do in the rest of this paper.

CHALLENGES IN CONTEMPORARY HIGHER EDUCATION

In considering how to shape and embed the quality assurance of higher education for the future, it is necessary to consider some of the challenges facing contemporary higher education, the changing nature of higher education, and also the issues faced by the consumers within the system. Higher education is an enterprise and one that is ultimately tied to the success of a country. It has to be effective for a nation to be successful but currently there are a number of challenges in contemporary higher education. Firstly, the value of higher education to students is increasingly questioned. Anecdotally, many professionals will claim that only a small part of what they learnt in undergraduate study at university has actually been used by them directly in the course of their work—typically as little as 10%. The author counts himself amongst such professionals. To many, a university education has become a rite of passage, something that needs to be gone through to signal superiority and potential in the highly competitive world of work, with the brand of the university on the CV often being regarded as more important than the studies undertaken. In the United States, gaining a higher education has been seen by many as a route to the "American Dream" (Bok, 2013). "Signalling" of status still remains to many a large part of what university is all about. This has resulted in some individuals questioning whether higher education is at all useful or value for money either for governments or for students (Caplan, 2018) and this is an internationally recognised issue.

Secondly, higher education is frequently perceived by industry, or employers in general, as not meeting their needs well either. Graduates are considered to be lacking necessary professional skills and to be ill-adapted to the environment of work. This criticism is heard in many countries. This is surprising given that most graduates in the 21st century emerge from institutions that have been subject to intense quality assurance regimes whose primary purpose has been to guarantee the quality of the education and good outcomes both for the students and for society.

HOW GLOBAL HIGHER EDUCATION IS CHANGING

The COVID-19 coronavirus pandemic that erupted globally in 2019 has in many ways accelerated changes that were already in the pipeline and to some extent overdue in higher education. The pandemic forced most institutions to

deliver academic programmes remotely using the Internet. Programmes have been delivered entirely online or sometimes using a hybrid mode, with some online classes and some face-to-face classes, as well as in dual mode with face-to-face classes also being streamed live on the web. Such changes in delivery modes are undoubtedly here to stay well after the COVID-19 pandemic has gone away. They were necessary to support students learning from home during pandemic suppressing lockdowns, but they are also relevant to distributed learners working from a variety of locations in more normal times such as those who want to learn whilst also working. Flexible delivery modes can support a wider variety of learners than just campus-based young adults and this is increasingly important as society needs lifelong learning to support adults through potentially several changes of career as whole categories of jobs come and go through technological evolution.

In the future, society will need higher education that is flexible, multimodal (face-to-face, online, blended, hybrid, dual) and perhaps based on "learning by doing" through entirely project-based activities. Individual students may want to take short micro-credentials rather than complete degrees, or perhaps to combine micro-credentials into their own individually tailored degrees through learning contracts or compacts that they agree with their employers and their universities. As well as students wanting individually tailored programmes and packages of knowledge, we can expect professional skills training to go the same way. Students might need individual packages of skills that suit their own particular personality types or career type aspirations and the professional skills may be as important to them as segments of specialised subject knowledge, or even more so. Often, professional skills training assumes that all students are extroverts and need to be good at presenting to audiences, but this is not necessarily true or even required given that introvert personality types can also be highly effective in professional contexts (Cain, 2013).

In this view of the future of higher education, institutions will need to configure themselves to deliver the highly individualised learning needed by their customers in the multiple ways that they might want it delivered and using a flexible range of resources to do that. Universities and other kinds of higher education institutions will effectively become aggregators of learning resources and each one may have its own model of what that aggregation process might look like, and what resources they will aggregate. There may be individualistic approaches to this which will challenge the very best quality

assurance procedures. At the same time, the primary customers of higher education, the students, will want to become business partners in their educational process and institutions will need to engage and foster academic stars to support them (Wilkinson, 2021).

ISSUES WITH QUALITY ASSURANCE IN HIGHER EDUCATION

Looking ahead, the fundamental nature of higher education will change and this will pose significant challenges for quality assurance processes and agencies. To date, quality assurance has focused primarily on defining and evaluating the essential components of knowledge that should be taught including the learning outcomes, checking curricula and assessment methods for appropriateness, and verifying that the right resources are in place for a programme of study including the availability of staff with the right qualifications. But hitherto, quality assurance agencies and professional bodies have tended to define quality along strict subject discipline lines, for example in subject "benchmark statements" (QAA) or "programme standards" (MQA). This is understandable as higher education in both the UK and Malaysia has grown along distinct subject lines, with universities organised according to subject-focused departments and degrees offered in single honours subjects. This even goes back many centuries with Oxford University, for example, organised according to schools with Latin names such as Schola Musicae, Schola Moralis Philosophiae, Schola Metaphysicae, Schola Astronomiae et Rhetoricae etc (with the latter combining an unusual pair of subjects!). But as we have seen, learners may no longer want their studies constrained within single subject borders, nor may industry desire such graduates.

Moreover, the evaluation of the quality of learning resources and delivery methods has traditionally focused on campus-based resources and discipline-based staff. With universities acting as aggregators of resources some of which are virtual, the traditional approach to evaluating resources (space, equipment, physical facilities, etc.) may no longer be appropriate. Likewise, in the new era of higher education, it may no longer be appropriate to evaluate staff resources within disciplines when some of the most exciting research developments and industrial innovations occur at the frontiers of disparate disciplines, such as quantum computing (Bernhardt, 2019) or quantum economics (Orrell, 2018), to take just two examples. In quality assurance procedures utilising programme

standards that are subject based, quantum physicists would not be permitted to teach computer science and *vice versa*; yet, in order to train graduates for the new field of quantum computing, such cross-disciplinary teaching should be encouraged and facilitated and indeed it could create graduates who are better able to operate in a cutting-edge field and therefore more able to contribute to advanced knowledge-based industrial growth. Furthermore, when lectures are available from world-leading experts on the web, is it necessary for institutions even to have their own academic specialists? It may be better to give access to such online resources and for individual institutions simply to provide learning advisors who can guide learners in accessing and exploiting such resources. The whole notion of the adequacy of a staff base to deliver aggregated knowledge and skills is a concept that needs to be re-thought in the context of massive amounts of online learning resources. We effectively now have "big resources", not just "big data" for higher education.

THE EVOLUTION OF QUALITY ASSURANCE OF HIGHER EDUCATION

Looking forward, we can see there is a need for higher education quality assurance to evolve and adapt to the changes in the higher education landscape. The changes will need to happen both internally and externally, with institutions assuring quality in new ways and external agencies revising their view of the higher education sector and how it needs to be controlled with the focus on facilitating and enabling the creation of new kinds of graduates for the future development of society and the stimulation of economic growth. A number of key elements required for future quality assurance of higher education are as follows:

1. Basing of quality assurance on risk-based trust (on the basis that the best academics potentially have better ideas on how to create relevant programmes and flexible graduates most able to achieve great things in industry than external quality agencies or internal quality administrators).
2. Ability to assess "big resources" in the widest possible sense (involving the assessment of all kinds of resources available for an educational programme both on campus and distributed widely across the world or the web).
3. Facilitation of experimentation in learning at subject frontiers (essentially trusting academics in frontier fields of development to set the pace in what is taught and how because graduates in such areas could be the ones to start new industries).

4. Breakout from subject borders and recognition that the most exciting developments in technology and business come from multi-disciplinary innovations (which means academics should be allowed to teach in fields other than the ones they started in as they see things differently, and ideas and approaches imported from across disciplines lead to the most exciting leaps forward).

These changes are illustrated in Table 1.

Table 1 *How quality assurance needs to evolve*

Traditional Quality Assurance	Future Quality Assurance
Compliance culture	Enables culture to support creativity
Benchmarks	Supports disruptive innovation
Standards	Is based on trust and risk-based
Risk averse	Embraces "big resources"
Campus-based delivery	Encourages individualised flexible learning (What, where, how)
Rigid resource constraints	
Primarily single subject based	Centres multi-disciplinarity

CONCLUSION

Formal quality assurance in higher education has been around for about 30 years, but it emerged from a time of great expansion in higher education globally and at a time when most universities and other higher education institutions were effectively clones of each other with fixed campus-based resources and fixed single discipline-based programmes. But the world has moved on. Students and the economy demand flexibility in what is learned and how and where, and this has been emphasized even more by the COVID-19 pandemic. The challenge going forward is for quality assurance to evolve to meet the expectations of the new reality where the best education may no longer fit pre-existing moulds and where the employment landscape into which graduates will be delivered is also drastically changing at an unprecedented pace. These are times in which those in charge of quality assurance whether internal or external need to be creative in order to best ensure that higher education institutions and their staff can adequately meet the needs of society and the economy and above all enable disruptive changes that can lead to significant economic growth. There is much work to do but it

is the author's view that all involved in higher education quality need to begin to debate and engage with the issues raised in this paper as a matter of urgency so that the sector evolves. Quality assurance that relies on outdated constraints and does not enable disruptive changes and innovations will be doomed to failure but quality assurance that evolves and adapts appropriately will help future higher education provide what students and society most need.

REFERENCES

Bernhardt, C. (2019*). Quantum computing for everyone*. MIT Press.

Bok, D. (2013). *Higher education in America*. Princeton University Press.

Cain, S. (2013). *Quiet: The power of introverts in a world that can't stop talking*. Penguin Books.

Caplan, B. (2018). *The case against education: Why the education system is a waste of time and money*. Princeton University Press.

Horn, M. B., & Dunagan, A. (2018). *Innovation and quality assurance in higher education*. The Christensen Institute. https://files.eric.ed.gov/fulltext/ED586374.pdf

Orrell, D. (2018). *Quantum economics: The new science of money*. Icon Books.

Trow, M. (2000). From mass higher education to universal access: The American advantage. *Research and Occasional Paper Series, CSHE.1.00*. Center for Studies in Higher Education, University of California, Berkeley. https://cshe.berkeley.edu/sites/default/files/publications/pp.trow.masshe.1.00.pdf

Wilkinson, G. G. (2021). *Managing effectively in academia*. Sunway University Press.

ADVANTAGES AND CHALLENGES OF INTERDEPARTMENTAL TEAM TEACHING: A CASE STUDY

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ABSTRACT

Background Most institution of higher education subjects are delivered by individual lecturers. This is practical from an administrative perspective. However, as the world moves towards interdisciplinary collaboration, it is crucial to have staff contribution from different disciplines to bring further or new insights to a particular subject. Sunway University had the opportunity to deliver a subject called Digital Economy with the Alibaba Business School. The subject covers a wide range of topics including digitalisation, digital marketing, community and business engagement, and business plan development. Therefore, the skills required to deliver this subject range across a few departments. The project owner recruited faculty members from different departments to deliver the subject, each with their own expertise. The case study is based on the learning experience of establishing an interdepartmental team and delivering the subject for two cycles. Based on the case study, two critical factors for implementation were identified—communication and management support. While establishing an interdepartmental team may require more effort, it is a commendable practice for an interdisciplinary subject. The students' response was also positive.

Aim To present a case study of an interdisciplinary team to deliver the subject Digital Economy. The lessons learnt may assist other institutions interested in implementing an interdepartmental teaching practice.

Methods Observations were made on the delivery of the subject by an interdepartmental team. Findings were made based on subject evaluation by students.

Findings The subject evaluation indicated that the students receive the subject well, with an average of 75% satisfaction. The co-ordination work required for an interdepartmental taught subject is more than an individual taught subject, and commitment from various departments is required to ensure the smooth delivery of the subject.

Conclusion The lessons learnt from team-teaching should be shared across departments for an interdisciplinary subject.

Keywords Cross-departmental team teaching, interdisciplinary subject

INTRODUCTION

Based on the observation of the existing structure, most of the subjects delivered within the higher education institutions (HEIs) in Malaysia are taught by individual lecturers. Most of the subjects offered by HEIs in Malaysia are mainly major-related and can be delivered by individual staff. However, interdisciplinary subjects require expertise from different schools or departments. Interdisciplinary collaboration is required to develop and innovate new solutions. This paper attempts to present a case study in which the institution adopted the interdisciplinary team-teaching approach to deliver a subject. The subject is Digital Economy and is delivered by faculty members from Sunway University's Business School, School of Engineering and Technology, and School of Interdisciplinary Studies. Faculty members teaching this free elective subject were required to undergo training, and a mock teaching and assessment which included submission of a case story for the unit the faculty member will be teaching before being certified by the Alibaba Business School (ABC). The University is not allowed to assign faculty

members who are not certified by the ABC to teach the subject. From the onset, the quality of faculty members for each unit within the subject was closely scrutinised by the ABC. The emphasis was on the command of the faculty members of the content and on their process of preparing the content up to delivery in class. The subject offered is a free elective subject at the University for which students from any school or department are eligible to sign up. The discussion for this case study revolves around three perspectives—that of the management, faculty members, and the students.

The paper begins with a survey of the existing landscape for team teaching, followed by the introduction to the subject, discussion on the set up and delivery of the subject, and future work.

LITERATURE REVIEW

Team teaching was promoted for high schools in the United States in the 1960s (Murata, 2002). Other keywords associated with team teaching are collaborative teaching, pair teaching, and co-teaching. For the context of this paper, the phrase "team teaching" will be used. A search for the keyword team teaching reflects that there are two main categories of team teaching between a teacher and a student (Baeten & Simons, 2014, 2016; Dugan & Letterman, 2008; Gucciardi et al., 2016; McKenzie et al., 2020) and collaboration between two or more colleagues (Liebel et al., 2017; O'Hara et al., 2018; Perry & Stewart, 2005; van Amelsvoort et al., 2010). Team teaching between students and teachers is used to address issues such as big class size and to have better student engagement. Collaborations between colleagues can be an interdisciplinary team (Combs et al., 2017; Keeley & Benton-Short, 2020; Maletina et al., 2015; Murata, 2002) or from a single discipline, for example, in nursing (Hellier & Davidson, 2018; Tivener & Gloe, 2015), and computer science (Jang, 2008; Lamprou & Repenning, 2018; Money & Coughlan, 2016). Team teaching is also often reported in the education field in terms of teachers' training, pre-service teachers' engagement, and school curriculum delivery (Härkki et al., 2021; Jang, 2008; Rabin, 2020).

Team teaching has received positive reception from students. Students have the perception that team-taught classes are more interesting, helped their understanding, and provided better support (Schmulian & Coetzee, 2019). In areas where expertise from different departments are required; for example,

healthcare (Jayalakshmi et al., 2020), team teaching is an important way to groom new talents. There are challenges in team teaching, for example, the lack of understanding, pedagogical differences, and unclear role distribution (Rao & Chen, 2020; Shibley, 2006). Therefore, for team teaching to be successful, it is important that the team is coherent and administrative/management support is provided (Murata, 2002).

METHODOLOGY

The writings of the case study are based on the observation of the module coordinator and the subject evaluation provided by the students.

Subject Background

The subject Digital Economy is part of a certification programme by the ABC. The complete certification programme has two parts; Digital Economy and Digital Entrepreneurship. By completing the assessments in Digital Economy, the students qualify to be network members. This opens the door to networking opportunities with other local and international members. The completion of the second part, Digital Entrepreneurship, will see the students setting up a business or consulting a business to embark on an online business journey.

The subject Digital Economy covers the following learning outcomes:

1. Discuss the factor that contributes to the development of digital economy
2. Research and analyse the status of a digital infrastructure element in your country
3. Conduct market analysis and apply different strategies to manage different challenges
4. Develop a vision board of the future digital economy for the country

The topics covered include:

1. The embracing of the digital economy
2. The three features of digital economy—platform support, inclusiveness, and data

3. Business paradigm shift—digital customer and digital marketing, business to consumer, and consumer to business
4. Transformation of the traditional industry—new retail, finance, and manufacturing
5. The transformation of organisation

Based on the learning outcome and topics, this subject involves digital technology, marketing, economy, human resource management, and change management. It is possible for a business lecturer to deliver the subject on his/her own. However, the institution adopted the team-teaching approach to have the expert in each of the area to deliver the subject.

The subject is offered as a free elective to Year Two and above undergraduate students. Therefore, non-business school students would also be taking the subject. The subject was first offered in March 2020 with 94 students. The second offering was in August 2020 with 134 students.

Subject Evaluation

The subject evaluation was conducted anonymously at the end of the semester. The evaluation result was released to the lecturers after the results for students were released. This is to ensure that the students can respond to the evaluation without having to worry that their response will impact their grade. There were two components to the evaluation; the subject content evaluation and the teaching evaluation. The subject content evaluation has 16 questions, and the teaching evaluation has 9 questions. There is a free comment question at the end of each section. The response for the 25 evaluation questions is based on a 5-Likert scale. The response from the students will be presented using statistical analysis.

Subject Assessment

There are five assignments required for Alibaba certification. Three assignments are parked in this subject and another in the next—Digital Economy Project. The three assignments required for this project are: (1) Research and analyse the current development of digital development in the country using political, economic, social, and technological (or PEST) analysis,

(2) identify the gap for a specific industry using strength, weakness, opportunity, and threat (or SWOT) analysis for a specific company, and (3) develop the digital marketing strategy, consumer persona for the company identified in assignment. The qualitative feedback on the assessments will be provided.

DISCUSSION

The challenges and advantages of the programme will be discussed from the following perspective of the various stakeholders: management and leadership team, faculty members, and students.

Management and Leadership Team

As the team consists of faculty members from different schools, co-ordination occurs at a few levels. Management support for the project is important—the project owner communicated with the head of departments on the vision and potential of the programme. However, no specific module leader or driver was officially assigned. This caused a delay in the delivery of the module. The appointment of a module leader and the recognition that the module leader would be provided with the support to deliver this project kickstarted the team-teaching journey.

First of all, communication is important. It is important to communicate with the faculty members to deliver the subject from the head of departments. Identified members to deliver the subject were in the planning discussion with the head of departments. Next, curriculum changes need to be proposed and approved. This requires the collaboration of programme leaders from various schools. Communication breakdown at any level will cause a delay in the delivery. For example, if the programme leaders are not in the project briefing, they may not be informed about the changes required for their programme. On the other hand, some departments require the faculty members teaching the subject to submit the change proposal. Therefore, it is important to explicitly describe the process and procedure required, and the person who is in charge of the delivery of each outcome.

Secondly, recognition and rewards are important motivating factors. As this is an interdepartmental collaboration, the coordinator does not influence the

appraisal of faculty members involved in the programme. The head of departments who are responsible for the faculty members appraisal, on the hand, may not be aware of their performance in the project. Therefore, feedback to faculty members should include the head of departments, especially when it concerns formal feedback like subject evaluation. Delivering this subject well would also mean having a good appraisal for the faculty member. Other ways of appreciation include having luncheon together to recognise the collective team effort to pilot this project.

Thirdly, as mentioned by Murata (2002), administrative support is important for the successful implementation of team teaching. There is a dedicated administrative staff to attend to the matters for the project. The administrative member is responsible for coordinating the learning resources; for example, setting up the subject in the administrative system, coordinating the set-up of the learn management system and the student attendance system, and attending to student requests with regard to administrative matters. As this is the first interdepartmental subject offered to students from different departments, the administrative staff should communicate the new subject to the students. Having good administrative support frees the faculty members to deliver the subject as required.

Faculty Members

A team of five faculty members from different departments and background delivered this subject. Each faculty member brought to the class their expertise (content knowledge), skills, creativity, experience, and attitude for the unit that they chose to teach. This again reflects the diversity of the faculty members. Despite the diversity, the faculty members were able to collaborate well and to ensure students enjoyed the depth, breadth, and stretch of each unit in the subject. The faculty members were also compelled to take responsibility of the preparation of the respective units, as well as the collective management of the subject as a whole.

Often, there is a need to have the attitude of "give-and-take" and to keep each other informed of the dynamic in class and progress of the students. Below are some of the measures taken from the faculty members for the delivery of this subject.

Firstly, to establish clear definitions of roles and responsibilities. Team co-ordination with defined roles of each faculty member ensures a coherent delivery of the subject. All faculty members selected for the delivery of the subject were involved in all the communication. They were part of the team on the planning of the study guide. The study plan specifies the dates for classes, the units to be covered, the release date of assessments, the submission deadline, and the faculty members responsible for the tutorials. Each lecturer was assigned units that are their forte. A detailed study guide ensures that each faculty member is aware of their responsibility. Any additional administrative duty was either evenly distributed or allocated as additional duties to one of the faculty members.

Secondly, to continually learn that students from different department may behave differently. The faculty members experienced first-hand the different behaviour of students from different schools. Even though the same sets of information and instruction were provided, students from one school may have more questions compared to the other, while students from another school would complete the assignment based on the instruction provided. Having a few faculty members on the team provides a learning opportunity for the others where best practices are shared. This includes dealing with students from different schools and providing feedback on students' performance.

Students

This is the first subject hosted by one department and having students from another department. The students would need to navigate their ways around their enquiry. A few steps were taken in the communication; for example, posting an announcement stating the objective of the subject, how it would be delivered, and the person to contact for further enquiries. There were about 100 students enrolled for the first delivery and 150 for the second delivery. During the first and second delivery, the different faculty members learnt about how different faculty members would respond to the students' requests. Some faculty members would re-direct the students' requests to the administrative staff; some faculty members would iron out the details with other faculty members and administrative staff before responding to the student. At the end of the second delivery, the response jurisdiction between the faculty members and the administrative staff was drawn.

The student feedback on the subject evaluation garnered an average of 75% satisfaction. The total number of responses was about 30% from the total number of students in this subject. The students were generally satisfied with the subject. General commendation includes the commitment and the engagement of the teacher for the different units. One student commented, "Diversity of lecturers brings lots of fun and interaction" to the subject. Another commented that the subject "brings a different perspective to a Computer Science student". The students also commented that this subject and the assessment are challenging, and the breadth of the subject is wide. However, the subject is applicable and updated with the latest case studies. Generally, the response from the students is positive.

CONCLUSION

The first attempt of interdisciplinary, interdepartmental team teaching taught the team members that communication is a very important component. Stakeholders from all levels need to be kept in the loop on the objective of introducing this subject to the students and other benefits that come with team teaching. Management decision and support will also determine if the project has adequate resources to move forward and if the staff who pilot this journey are motivated. Finally, there may be different practices across different departments. However, it is advisable to have a set of practices established for the team. Even though the implementation of interdisciplinary, interdepartmental team teaching is challenging, it is an effort worth venturing.

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REFERENCES

Baeten, M., & Simons, M. (2014). Student teachers' team teaching: Models, effects, and conditions for implementation. Teaching and Teacher Education, 41, 92–110. https://doi.org/10.1016/j.tate.2014.03.010

Baeten, M., & Simons, M. (2016). Student teachers' team teaching: How do learners in the classroom experience team-taught lessons by student teachers? Journal of Education for Teaching, 42(1), 93–105. https://doi.org/10.1080/02607476.2015.1135226

Combs, S. E., Kessel, C., Wilkens, J. J., Multhoff, G., Schmid, T. E., Vaupel, P., Trott, K. R., Berberat, P., & Atkinson, M. J. (2017). Master of Science (MSc) program in radiation biology: An interdepartmental course bridging the gap between radiation-related preclinical and clinical disciplines to prepare next-generation medical scientists. Frontiers in Oncology, 7. https://doi.org/10.3389/fonc.2017.00226

Dugan, K., & Letterman, M. (2008). Student appraisals of collaborative teaching. College Teaching, 56(1), 11–15. https://doi.org/10.3200/CTCH.56.1.11-16

Gucciardi, E., Mach, C., & Mo, S. (2016). Student-faculty team teaching–A collaborative learning approach. Mentoring and Tutoring: Partnership in Learning, 24(5), 441–455. https://doi.org/10.1080/13611267.2016.1270899

Härkki, T., Vartiainen, H., Seitamaa-Hakkarainen, P., & Hakkarainen, K. (2021). Co-teaching in non-linear projects: A contextualised model of co-teaching to support educational change. Teaching and Teacher Education, 97. https://doi.org/10.1016/j.tate.2020.103188

Hellier, S., & Davidson, L. (2018). Team teaching in nursing education. Journal of Continuing Education in Nursing, 49(4). https://doi.org/10.3928/00220124-20180320-09

Jang, S. J. (2008). Innovations in science teacher education: Effects of integrating technology and team-teaching strategies. Computers and Education, 51(2), 646–659. https://doi.org/10.1016/j.compedu.2007.07.001

Jayalakshmi, L., D, K., & Kumar, V. (2020). Interdepartmental collaboration in a teaching hospital - A force field analysis. National Journal of Physiology, Pharmacy and Pharmacology. https://doi.org/10.5455/njppp.2020.10.07191202020072020

Keeley, M., & Benton-Short, L. (2020). Holding complexity: Lessons from team-teaching an interdisciplinary collegiate course on urban sustainability. Social Sciences, 9(5), 76. https://doi.org/10.3390/SOCSCI9050076

Lamprou, A., & Repenning, A. (2018). Teaching how to teach computational thinking [Paper presentation]. Annual Conference on Innovation and Technology in Computer Science Education, ITiCSE, 69–74. https://doi.org/10.1145/3197091.3197120

Liebel, G., Burden, H., & Heldal, R. (2017). For free: Continuity and change by team teaching. Teaching in Higher Education, 22(1), 62–77. https://doi.org/10.1080/13562517.2016.1221811

Maletina, L., Karmanova, Y., & Kashpur, V. (2015). Implication of interdisciplinary team teaching of an ESP course. Mediterranean Journal of Social Sciences, 6(5). https://doi.org/10.5901/mjss.2015.v6n5p556

McKenzie, S., Hains-Wesson, R., Bangay, S., & Bowtell, G. (2020). A team-teaching approach for blended learning: An experiment. Studies in Higher Education. https://doi.org/10.1080/03075079.2020.1817887

Money, A., & Coughlan, J. (2016). Team-taught versus individually taught undergraduate education: A qualitative study of student experiences and preferences. Higher Education, 72(6), 797–811. https://doi.org/10.1007/s10734-015-9976-5

Murata, R. (2002). What does team teaching mean? a case study of interdisciplinary teaming. Journal of Educational Research, 96(2), 67–77. https://doi.org/10.1080/00220670209598794

O'Hara, K. J., Anderson, S., Musicant, D., Stubbs, A., & Way, T. (2018, January). Team-teaching with colleagues in the arts and humanities: Panel [Paper presentation]. SIGCSE 2018—Proceedings of the 49th ACM Technical Symposium on Computer Science Education, 265–266. https://doi.org/10.1145/3159450.3159617

Perry, B., & Stewart, T. (2005). Insights into effective partnership in interdisciplinary team teaching. System, 33(4), 563–573. https://doi.org/10.1016/j.system.2005.01.006

Rabin, C. (2020). Co-teaching: Collaborative and caring teacher preparation. Journal of Teacher Education, 71(1). https://doi.org/10.1177/0022487119872696

Rao, Z., & Chen, H. (2020). Teachers' perceptions of difficulties in team teaching between local- and native-English-speaking teachers in EFL teaching. Journal of Multilingual and Multicultural Development, 41(4), 333–347. https://doi.org/10.1080/01434632.2019.1620753

Schmulian, A., & Coetzee, S. A. (2019). To team or not to team: An exploration of undergraduate students' perspectives of two teachers simultaneously in class. Innovative Higher Education, 44(4), 317–328. https://doi.org/10.1007/s10755-019-9466-2

Shibley, I. A. (2006). Interdisciplinary team teaching: Negotiating pedagogical differences. College Teaching, 54(3), 271–274. https://doi.org/10.3200/CTCH.54.3.271-274

Tivener, K. A., & Gloe, D. S. (2015). Designing simulations for athletic training students through interprofessional teaching collaboration. Athletic Training Education Journal, 10(3), 249–255. https://doi.org/10.4085/1003249

van Amelsvoort, M., van Wijk, C., & den Ouden, H. (2010). Going dutch or joining forces? Some experiences with team teaching in the Netherlands. Business Communication Quarterly, 73(1), 96–101. https://doi.org/10.1177/1080569909358100

INTEGRATING ACTIVE LEARNING AND CONTENT LOCALISATION IN THE DELIVERY OF RESPONSIBLE CONDUCT OF RESEARCH EDUCATION IN MALAYSIA

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ABSTRACT

Background In response to rising concerns regarding the state of integrity of research ecosystems, there have been efforts to foster a culture of responsible conduct of research (RCR). Many research institutes around the world have begun to integrate RCR education into their training programmes of research professionals. However, such educational programmes are significantly lacking in Malaysia.

Aim This study describes the development of an active-learning based RCR educational module with localised content aimed at fostering a culture of RCR in Malaysia.

Methods A committee was formed by the Young Scientists Network-Academy of Sciences Malaysia to establish the framework, content and delivery approach of an RCR module via a series of module writing workshops. The RCR educational module was then tested and reviewed by a panel of researchers over three review workshops. The feedback sessions were conducted via focus group discussions. The impact of RCR awareness workshops in shaping positive RCR attitudes and behaviour was also measured via pre-post workshop surveys.

Findings The Malaysian Educational Module on RCR, consisting of ten chapters, was developed as an instructor's guide to teach RCR and as a reference material. This module includes many case studies and role plays, which are based on common ethical issues and scenarios faced by Malaysian researchers. These and many other activities in the module were designed to enable ethical reflection. Active learning-based RCR workshops were able to affect positive attitudinal and behavioural changes amongst workshop participants.

Conclusion This module potentially encourages researchers to embrace their major role in serving humanity through ethical research and service and it is a valuable resource to foster research integrity in the country.

Keywords Responsible conduct of research, research integrity education, active learning

INTRODUCTION

In recent years, while local academics have continued to increase their research output, the frequency of research misconduct has also been reported to be on the rise. Some research misconduct cases have attracted significant media spotlight that have spurred public distrust towards science and the scientific community. Traditionally, research integrity focused mainly on research misconduct that includes fabrication, falsification and plagiarism (Office of Science and Technology Policy, 2000). However, questionable research practices (QRPs), such as irresponsible peer review, duplicate publications, irresponsible authorship, poor mentorship and conflicts of interest in academia-industry research projects are more prevalent and thus collectively cause greater harm to the ecosystem (National Academies of Sciences, Engineering, and Medicine [NASEM], 2017; Macleod & Mohan, 2019). Thus, the concept of responsible conduct in research (RCR) is used more commonly today to broaden the scope of research ethics and integrity. Research institutions play an important role in fostering an environment that promotes ethical and quality research. There are many ways to foster this environment, including developing policies and guidelines on research integrity, setting up a

support system to provide oversight and reporting, having good whistleblowing mechanisms, and providing the right education to create a culture of integrity.

Although researchers are commonly trained to identify research questions, design research methodology and conduct research, RCR education is often not a major component of their training (Fischer & Zigmond, 1996; Gifford, 1994; Hensel, 1991). The United States NASEM states that RCR education should be "an integral part of research because RCR education aims to ensure that the knowledge, skills, and awareness essential to responsible research are intentionally, explicitly, and accurately conveyed" (NASEM, 2017). In order to cultivate research integrity, educational programmes are needed to not only develop the cognitive ability for ethical sensitivity and reasoning, but it is also needed to integrate, internalise and prioritise the ethical values in order to translate it into responsible actions (NASEM, 2017). In other words, RCR education programmes need to positively affect attitude and behavioural changes in researchers and provide researchers with the abilities to address and manage stochastic and systemic issues related to RCR.

In recent years, active learning has been identified as a preferred teaching pedagogy over traditional didactic teaching approaches. Active learning improves learners' motivation to learn, provides learners a sense of ownership of their learning process and creates excitement in the learning process (Bonwell & Eison 1991; Michel et al., 2009). Active learning induces critical and analytical thinking as well as improves problem-solving and meta-cognitive skills. A large-scale meta-analysis demonstrated that active-learning pedagogy is effective in improving learning (Freeman et al., 2014). Thus, there has been increasing efforts to apply active learning in the teaching of research ethics and integrity (Antes, 2009; Kalichman, 2014; Nebeker, 2014).

In Malaysia, efforts by higher education institutions (HEIs) to incorporate research integrity education in the mainstream training of researchers is still in its infancy when compared to training in research writing and publications. The teaching of research ethics and integrity is challenging due to the lack of classroom models on how to teach research ethics dilemma and how to handle debates on research integrity. Thus, in recognition of the importance of propagating RCR in the Malaysian research ecosystem and to address the lack of a formalised educational module to provide guidelines and models of RCR education in Malaysia, the Young Scientists Network-Academy of Sciences

Malaysia (YSN-ASM) RCR programme developed an active-learning based Malaysian Educational Module on RCR. This paper describes the rationale, development, content and aspirations of the module.

MATERIALS AND METHODS

Development of the Malaysian Educational Module on RCR

In 2013, the US National Academy of Sciences, Engineering and Medicine (USNASEM), in collaboration with the Academy of Sciences Malaysia (ASM) and Higher Education Leadership Academy (AKEPT) conducted a 5-day active learning-based workshop in Kuala Lumpur to facilitate the capacity building of RCR-trained researchers who recognise the importance of responsible science as a basis for global scientific excellence. Following the workshop, USNASEM granted pilot grants to facilitate participants (including the authors) to organise mini RCR workshops in their respective local institutions. Feedback from participants of these local workshops indicated to an urgent need for a more formalised educational module to mainstream RCR education in the country; leading to the establishment of the Young Scientists Network-Academy of Sciences Malaysia (YSN-ASM) RCR Programme. In May 2016, YSN-ASM established a formal collaboration with AKEPT to develop the inaugural Malaysian Educational Module on RCR. A core committee was established to develop the module framework, content and pedagogical approach. Multiple resources were referenced to develop the content of the module as listed in Chau et al. (2018). A series of RCR awareness workshops were conducted in 2015 and 2016 to pilot the draft RCR educational module.

Pre-post Workshop Surveys

Pre-post workshop questionnaire-based surveys were conducted during the RCR awareness workshops to assess the participant's RCR attitude and behaviour before and after attending the workshops. The aim of the surveys was to determine if the active learning-based RCR instruction of localised content was able to create a positive shift in RCR attitude and behaviour amongst workshop participants. The questionnaire was anonymous and informed consent was obtained from the participants. This study was

approved by Sunway University Research Ethics Committee (Ethics Approval Number: SUREC 2020/093). Statistical analysis was conducted on the entire cohort using SPSS version 21.

Reviewing Workshops for Module Improvement

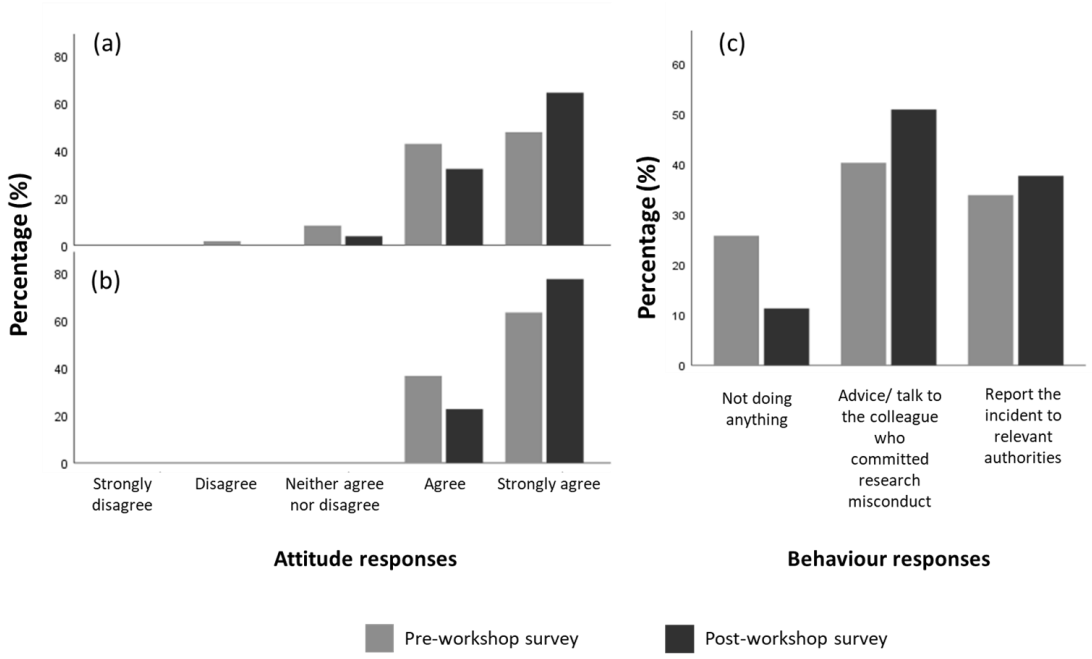
Three workshops were conducted at AKEPT between September 2016 and November 2017 to review and refine the RCR module. A total of 40 researchers from 13 local HEIs took part in the review process. Each workshop was conducted in seminar rooms with roundtable settings to facilitate collaborative group work. Individual chapters of the modules were given to each group of reviewers to run and test the active learning activities and evaluate the content of the module. Feedback sessions were conducted in focus groups to collect feedback on the:

1. Relevance and suitability of the learning objectives
2. Clarity of instructions
3. Variety and suitability of the active-learning activities
4. Relatability to a Malaysian context levels

RESULTS

Analysis of the pre-post surveys showed a general positive RCR attitude and behaviour shift post-workshop (Figure 1). The percentage of respondents who strongly agreed with the statement "I am responsible to ensure that my colleagues conduct research in an ethical manner" increased from 47.5% (pre-workshop) to 64.2% (post-workshop). The percentage of respondents who strongly agreed with the statement "Formal training on RCR should be conducted in my university/ institution" increased from 62.3% (pre-workshop) to 77.4% (post-workshop). When the respondents were asked about their willingness to whistle-blow if they suspected a colleague was committing research misconduct, the percentage of respondents who would resort to inaction reduced from 25.8% (pre-workshop) to 11.3% (post-workshop) with more respondents choosing either to advice/talk to their colleague who committed research misconduct or to report the incident to relevant authorities

Figure 1

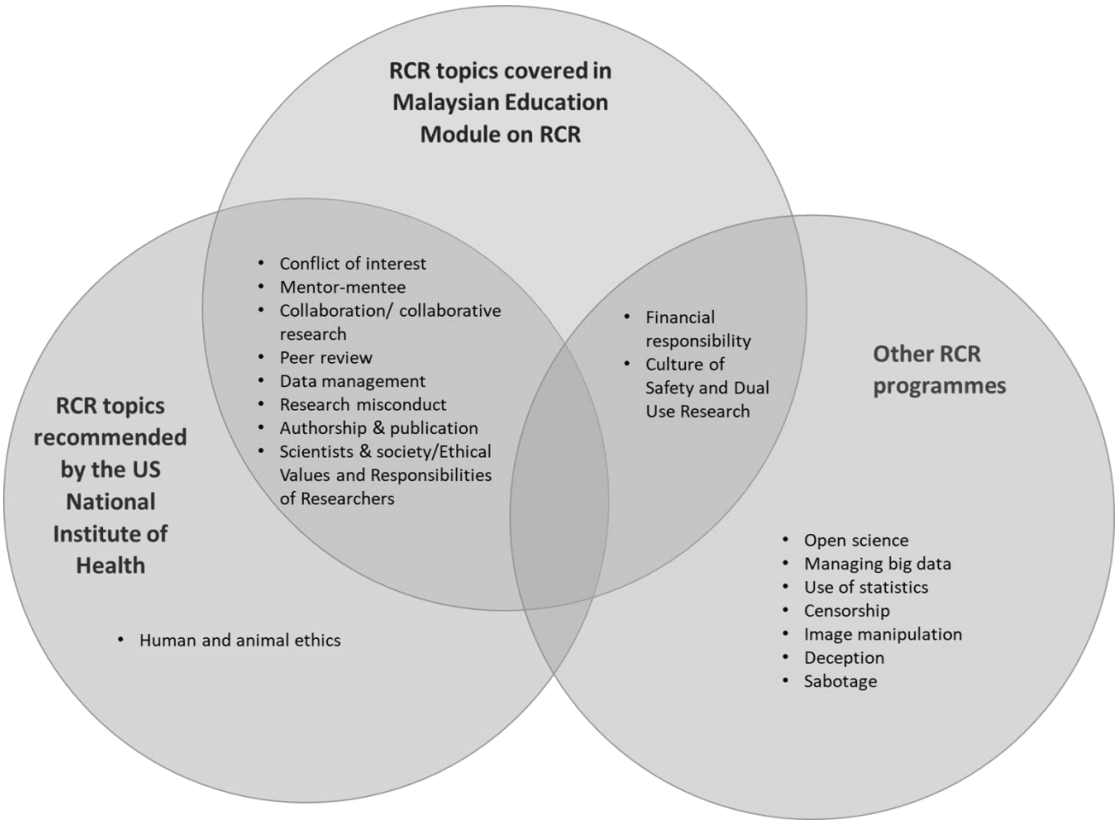


Pre-workshop (grey) and post-workshop (black) survey responses

Note. Pre-workshop (blue) and post-workshop (red) survey responses to attitude items on (a) "I am responsible to ensure that my colleagues conduct research in an ethical manner"; (b) "Formal training on RCR should be conducted in my university/ institution"; and an RCR behaviour item on (c) "What will you do if you suspect a colleague commits research misconduct?"

After considering the feedback and recommendations from the review workshops, ten chapters were included in the finalised version of the Malaysian Educational Module on RCR; covering almost all the topics recommended by the US National Institute of Health with the exception of human and animal subjects. Additional topics on financial responsibility and safety culture that includes dual-use elements in research were included in the module. Few other topics covered in other RCR programmes such as open science, big data management, use of statistics and censorship (Kalischman, 2016) were not explicitly included in the module. Figure 2 summarises the shared and unique RCR topics across various training modules or programmes.

Figure 2



Venn diagram of distribution of RCR topics

Note. Venn diagram of distribution of RCR topics in various RCR programmes or training modules including the Malaysian Educational Module on RCR.

Each chapter consisted of a synopsis, key messages, learning objectives, active-learning activities (complete with relevant materials such as handouts, case studies, step-by-step instructions and model answers), materials to prepare before class, conclusion and extra resources for further reading. Some of the relevant active-learning activities that were included in the module are described in Table 1.

Overall, the feedback from the participants from the review workshops were positive. Most reviewers expressed an interest to use this module to teach RCR in their institutions. Generally, the participants commented that the active-learning approach was effective in engaging participants to discuss and reflect on research integrity and ethical dilemma in research. During the workshops, participants were actively engaged in all the activities and the discussions often extended beyond the classroom. Some specific feedbacks provided by the participants that were taken into consideration to improve the module include:

1. It is important to localise the content in the active-learning activities such as case studies and role play by using local names and creating scenarios based on prevalent and relevant issues in Malaysia.
2. The active learning activities should be more inclusive to a wider range of disciplines including the social sciences and humanities to ensure that the scenarios are relatable to a diverse group of participants.

Table 1 *Selected active learning activities found in the RCR module that support localised content and higher-order cognitive skills*

No.	Active learning activities	Size of classroom	Description
1.	Sticky notes	Individual, small or big groups	This activity allows every participant a fair chance to respond without fearing the need to speak up in front of the class that encourages better participation. It is a good way to collect responses from a big group in a short time. Instructors can obtain a general idea of the participants' responses and their understanding of the topics in real-time. Participants can also learn alternative or different viewpoints from their peers.
2.	Polling	Individual, small or big groups	This activity is used to probe participants' opinions of a particular question or prompt. Anonymous polling creates a safe space for participants to cast their votes; reflecting their honest opinions. In some cases, this activity may be preceded by brainstorming or sticky notes activities. The instructor may use this activity to survey the participants' knowledge or attitudes towards a topic before the start of lessons.
3.	Case studies	Individual, pairs or small groups	This activity engages participants to reflect and analyse a situation critically. This requires participants to apply and integrate knowledge and tools that they have learnt to address in real lifelike situations. Different opinions and ideas are shared through group discussions. This allows participants to learn from each other and correct their misconceptions. It encourages participants to apply higher-order cognitive skills.
4.	Self-reflections	Individual	This activity allows participants to contemplate on their own

			without external interference to assess their own thoughts, experiences, and knowledge to gain deeper insights; or how they feel about a certain experience. It can be used at the beginning of a lesson to focus the participants' thoughts and prepare them for the ensuing lesson; or it can be used in the middle or at the end of a lesson to synthesise, process and internalise the knowledge gained.
5.	Role play	Pairs or small groups	This is a higher-order cognitive activity where participants fully embody the assigned role and consider perspectives from a different lens. Although it requires more time and effort to plan and execute, participants gain a deeper appreciation of the complexities of the scenario and develop a deeper understanding of the core concepts of the lesson. It also presents an opportunity for the participants to develop their soft skills such as communication, coordination, teamwork, and problem-solving skills.

Note. Adopted and modified from Chau, D.M., Chai, L.C., Veerakumarasivam, A. (Eds.). (2018). *Malaysian Educational Module on Responsible Conduct of Research*. Academy of Sciences Malaysia, Kuala Lumpur.

DISCUSSION

Responsible conduct of research as a concept extends beyond the cognitive awareness of the philosophy of ethics and professional best practices. It is about a holistic appreciation of the value of responsible practices in the conduct of research and embodying them in real life. It requires pervasive ethical reflexivity and a sense of collective responsibility to uphold research integrity, even in the most inconvenient of circumstances. Thus, robust RCR education that stimulates experiential learning is essential in ensuring that researchers are equipped with the necessary skills and abilities to resolve or mitigate various issues related to research integrity. This would require an educational approach that focuses on nurturing the learners' ability to develop ethical knowledge, attitudes and behaviour and prepare them for dealing with unprecedented circumstances (NASEM, 2017). Increasingly, it is also equally important to create a scientific ecosystem that not only promotes the professional conduct of research but also the socially responsible conduct of research; whereby research needs to serve its higher purpose of serving humanity.

The finalised Malaysian Education Module on RCR includes major traditional and contemporary RCR topics but does not include human and animal subjects. This was a deliberate decision. In Malaysia, standards and guidelines on animal and human research ethics are well established. Institutional Review Boards, the Malaysian Medical Council and the Ministry of Health are responsible for the monitoring and overseeing of research involving human subjects (Malaysian Medical Council, 2006). Researchers are required to apply for ethical approval before conducting research involving human subjects. On the other hand, the Malaysian Animal Welfare Act 2015 (AWA, 2015), along with the Animal (Amendment) Act 2013 (AA, 2013) are the principal legislations that govern the care and use of laboratory animals in Malaysia. Since there were already existing training programmes on human and animal ethics and coupled to the complexity of existing legislations and the challenge of engaging with multiple players in a crowded field, the topic on human and animal subjects were not included in this Module.

This Module aims to encourage robust dialogue and ethical reflexivity to influence positive attitude and behaviour change. Active learning and the efforts to localise the content was found to be effective in achieving this aim. The pre-post surveys that were conducted to assess the effectiveness of the

active learning-based RCR awareness workshops demonstrated a post-workshop positive shift in the attitudes of respondents towards their individual role in upholding research integrity. Respondents were also more willing to confront their suspected colleagues or report their research misconduct to the relevant authority's post-workshop; indicating to a positive RCR behaviour shift post-workshop.

This RCR module provides multiple case studies that were carefully curated based on examples from the real-life experiences of researchers in Malaysia in dealing with questionable research practices, research misconduct and ethical dilemma. Contextualising research integrity using case studies helps researchers connect ethical principles to actual relatable scenarios. This helps researchers to better recognise and identify ethical issues and, in the process, improve their ethical sensitivity and reasoning in real life. In the process of discussing and debating these cases that the researchers might have encountered in their research journey, it engages researchers to reflect on their own experiences and seek ways to resolve the issue(s). All the case studies provided in the module required learners to integrate and describe the ethical values and principles in making an ethical decision. This is a critical step towards fostering integration and internalisation of ethical principles and values in practice (NAS, 2002).

In addition, role plays were frequently used in this module. Role play engages researchers to embody different roles or characters to help them widen their perspectives, to consider and understand viewpoints of various stakeholders in handling and managing ethical issues in research. In reality, ethical issues are often complex in nature and involves multiple stakeholders, such as principal investigators, local and international collaborators, post-doctoral fellows, post-graduate students, research assistants, funders, university top management, ethical committees, industry partners, media and the public. Therefore, role play helps researchers to understand how different interests from different stakeholders can influence individual and collective decision-making. Learners will simulate the experience of the challenge and dilemma and therefore, when the researchers face ethical issues in real life, they will be better prepared to manage these issues. The module stresses heavily on collaborative research and the ability to negotiate and make difficult but ethically sound and defensible decisions. Thus, this module is not only suitable

to train researchers, but it is also suitable for research managers and administrators.

The self-reflection element was embedded in most of the active learning activities described in this module. Self-reflection helps researchers to revisit their previous experience with research ethics and integrity issues to form new and deeper understanding, to construct new meaning and solutions (Toros & Medar, 2015), as well as to correct any misconceptions and misperceptions.

The active learning activities provided in this module constantly encourages ethical reflection so that researchers will be able to develop their cognitive abilities of ethical sensitivity and reasoning, improving self-knowledge, and having the humility and capacity for self-criticism. The various activities developed and provided in the module challenge the researchers' moral thinking by putting researchers in complex ethical dilemma(s) in research, moral dialogue, cooperative learning and conflicts. This process instigates high level of ethical reflections and engages researchers to think "how to solve?" and "what is ethical and why?", all important considerations for the successful fostering of a culture of responsible conduct of research.

CONCLUSION

In conclusion, to create a research ecosystem that values and upholds research integrity, multipronged strategies that include policies, guidelines and legislation, reward and punishment mechanisms, oversight, management and education are required. However, having a formalised training and educational programme that can effectively shape attitudes and influence RCR behaviour provides the fundamental pillars for the fostering of a culture of responsibility in research. We need a new generation of researchers who are able to reflect on the multiplicity of contemporary ethical challenges in realising their role and to have the capacity to decipher strategies to limit the negative consequences and maximise the positive impact. It is our hope that this educational module, rooted in real life practicalities that need to be addressed will help to realise the promise of science; at a personal, institutional and community level.

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REFERENCES

Animals (Amendment) Act 2013. (AA). (2013). Laws of Malaysia. The Attorney General's Chambers, Malaysia.

Animal Welfare Act 2015. (AWA). (2015). Laws of Malaysia. The Attorney General's Chambers, Malaysia.

Antes, A., Murphy, S., Waples, E., Mumford, M., Brown, R., Connelly, S, & Devenport, L. (2009). A meta-analysis of ethics instruction effectiveness in the sciences. *Ethics & Behavior, 19*, 379–402. https://doi.org/10.1080/10508420903035380

Bonwell, C. C., & Eison, J. A. (1991). *Active learning: creating excitement in the classroom*. ASHE-ERIC Higher Education Report No. 1, Washington, D.C.: The George Washington University, School of Education and Human Development. https://files.eric.ed.gov/fulltext/ED336049.pdf

Chau, D.M., Chai, L.C., & Veerakumarasivam, A. (Eds.). (2018). *Malaysian educational module on responsible conduct of research*. Academy of Sciences Malaysia, Kuala Lumpur.

Fischer, B.A., & Zigmond, M.J. (1996). Teaching ethics: Resources for researchers. *Trends in Neurosciences, 19*, 523–524.

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). *Active learning increases student performance in science, engineering, and mathematics* [Paper presentation]. Proceedings of the National Academy of Sciences of the United States of America, 111, 8410–8415. https://doi.org/10.1073/pnas.1319030111

Gifford, F. (1994). Teaching scientific integrity. *The Centennial Review, 38*, 297–314.

Hensel, N. (1991). *Realizing gender equality in higher education: The need to integrate work/ family issues*. In ASHE-ERIC Higher Education Report No. 2. Washington, DC: School of Education and Human Development, George Washington University.

Kalichman, M. (2014). Rescuing RCR education. *Accountability in Research. 21*(1), 68–83. https://doi.org/10.1080/08989621.2013.822271

Macleod, M., & Mohan, S. (2019). Reproducibility and rigor in animal-based research. *ILAR Journal, 60*(1), 17–23. https://doi.org/10.1093/ilar/ilz015.

Malaysian Medical Council. (2006). *Guideline of the Malaysian medical council: MMC guideline 009/2006 – Clinical trials and medical research.* https://mmc.gov.my/wp-content/uploads/2019/11/Clinical-TrialsBiomedical-Research.pdf

Michel, N., Cater, J.J., & Varela, O. (2009). Active versus passive teaching styles: An empirical study of student learning outcomes. *Human Resource Development Quarterly. 29*(4), 397–418. https://doi.org/10.1002/hrdq.20025

National Academy of Sciences. (2009). *On Being a Scientist: A Guide to Responsible Conduct in Research (Third Edition).* Washington, DC: National Academies Press.

National Academies of Sciences, Engineering, and Medicine (NASEM). (2017). *Fostering Integrity in Research.* Washington, DC: National Academies Press.

National Institutes of Health. (2009). *Update on the requirement for instruction in the responsible conduct of research.* Accessed on February 28, 2021. https://grants.nih.gov/grants/guide/notice-files/not-od-10-019.html#:~:text=For%20the%20purpose%20of%20this,Basic%20Principles.

Nebeker, C. (2014). Smart teaching matters! Applying the research on learning to teaching RCR. *Journal of Microbiology & Biology Education. 15*, 88–92. http://dx.doi.org/10.1128/jmbe.v15i2.849

Toros, K., & Medar, M. (2015). Social work students' thoughts on self-reflection: A qualitative study based on reflective journaling. *International Journal of Humanities and Social Science, 5*, 89–96. http://www.ijhssnet.com/journals/Vol_5_No_3_March_2015/11.pdf

TRANSITION DUE TO COVID-19: INSIGHTS INTO WHAT IS IMPORTANT FROM THE PERSPECTIVE OF THE MANAGEMENT, FACULTY MEMBERS, AND STUDENTS

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ABSTRACT

Background COVID-19 was first made known to the world in January 2020, right before the Lunar New Year celebration. The first lockdown was in Wuhan, in the province of Hubei, China, on 23rd January 2020 before the lockdown was subsequently imposed in other cities within Hubei. By March 2020, almost half of the countries around the world enforced lockdown to curb the spread of the virus. Malaysia's lockdown was announced on 18th March 2020, forcing classes to be moved online. This paper shares the perception of what remains important for different stake holders during the crisis. In this paper, we present three perspectives—the management, faculty members, and the students.

Aim To provide an insight into what are considered important arising from the transition of lessons to an online environment due to the COVID-19 lockdown, from the perspective of the management, faculty members, and students.

Methods Collection of insights from the management and faculty members based on observation and feedback. Feedback from students was collected via subject evaluation and semester evaluation.

Findings The transition from an offline teaching and learning environment to an online one was challenging. However, the transition did not leave an impact on the delivery of classes to students as the students were supportive

of the change. However, subject evaluation for the next two semesters continued to decline. For students, they missed communications with their peers. For faculty members, they found the increased workload and the need to handle both work and household chores to be challenging. The management perceived that setting the directions on what the centre needs to do to make the required transition was important.

Conclusion The case study identified that institutional support and decision are important and that the faculty members deliver beyond what is required to ensure the effective delivery of teaching and learning services to the students. Meanwhile students are supportive of the changes. It would be interesting to find out more on how the lockdown has impacted the faculty members and the students in the long run, as the subject evaluation trend declined from when the transition took place to when it stabilised in the August–December 2020 semester.

Keywords COVID-19, online learning, transition to online, management perspective, faculty members' perspective, students' perspective

INTRODUCTION

COVID-19 was first made known to the world in January 2020, right before the Lunar New Year celebration. The first lockdown was in Wuhan, in the province of Hubei, China, on 23rd January 2020 before the lockdown was subsequently imposed in cities within Hubei. By March 2020, almost half of the countries around the world enforced lockdown to curb the spread of the virus. Malaysia's lockdown was initially planned between 18th March 2020 and 14th April 2020, but had since been extended multiple times. With the lockdown, many businesses needed to transform to continue delivering services to the customers in order to survive. Institutions of higher education are no exception. The literature review will review the strategy adopted by institutions of higher education in coping with the COVID-19 lockdown. This is followed by a case study in a private higher education within Malaysia. The case study presents the various perspectives of the management, faculty members and students. Different stakeholders involved in the transition were

requested to identify important issues, or elements for the transition. Finally, conclusion from the case study will be presented.

LITERATURE REVIEW

The COVID-19 pandemic caused dramatic consequences for millions of people's work-life balance globally in all aspects. The pandemic has resulted in schools and universities being shut by mid-March 2020 globally (Martinez & Broemmel, 2020) including Malaysia. Education has recorded a hard hit by the COVID-19 pandemic with 1.53 billion students out of school and 184 nationwide school terminations, affecting 87.6% of the world's absolute selected students (Seke, 2020). The lockdown has resulted in dramatical changes to our country's education with the distinctive rise of e-learning, whereby teaching is undertaken remotely and on digital platforms. The providers of education programmes could not have envisioned how the global pandemic would bring to light the challenges of adapting the shift from a face-to-face teaching model to a remote teaching practice. The shift was not an easy task to be implemented in a short period of time. It created a situation whereby the management, faculty members, and students felt compelled to embrace the digital academic experience to continue the teaching-learning process. However, Mishra et al. (2020) reassured that everyone must learn how to live with and survive the present crisis as it is only the beginning; in the long run, no one can afford any negligence towards the digital transformation in higher educational institutions. Corbera et al. (2020) encouraged the management, faculty members, and students to think about how academics can transform work ethos now and in the future. They claimed that this disruptive time can become an opportunity to foster a culture of care, help us refocus on what is most important, and redefine excellence in teaching and research. In doing so, academic practice can be made more respectful and sustainable. While some countries may have transitioned smoothly, others may face many obstacles in managing the shift.

In Chile, Sepulveda-Escobar & Morrison (2020) performed a study on 27 English as a Foreign Language (EFL) teacher candidates undertaking remote teaching placements aiming at exploring the challenges and opportunities of a virtual teaching experience. The results indicated that factors such as the lack of direct interaction with learners and the sudden change of setting were among those that most strongly affected the participants' own learning process. Despite the challenges presented, it was suggested that this once-in-

a-lifetime experience would contribute positively, at least to a certain extent, to their teaching experience and future careers.

In Korea, Lee (2020) claimed that online lectures became feasible with the availability of the technology at affordable prices. If the outbreak of COVID-19 occurred decades ago, it would not have been impossible to give lectures online as there were no high-speed Internet connection, high-powered computers, tablets or personal computers with stylus pens, and video conferencing software. The study showed that there were difficulties in teaching online initially; however, over time students were routinely prepared and managed to cope with studies without interruption.

Research by Ugwu (2021) from Somalia concluded that instability in the country's social, economic, and political conditions creates an unfavourable environment for e-learning to thrive. Although e-learning was gradually making its way into, its implementation faced a myriad of challenges including a poor network infrastructure, lack of reliable electricity, self- efficacy factors, poverty, and other cultural factors.

Nevertheless, in Malaysia, this sudden shift away from the classroom to an online teaching learning process was acceptable even though it has given an impact on the management, faculty members, and students. Hence, this paper presents a case study on the adaptation, implementation, and challenges faced by the management, faculty members, and students of the Center for American Studies (hereinafter CAE), School of Interdisciplinary Studies, Sunway University in embracing this shift.

METHODOLOGY

The writings of the case study are based on the observation of a department within a private higher education institute in Malaysia. The three triangulation aspects are the management, faculty members, and students.

Management and Faculty Members

The case study is based on the reporting and experience of CAE, School of Interdisciplinary Studies, Sunway University. The centre has 16 faculty members, and four administrative staff. The student number fluctuates between 250 students and 300 students, depending on the time of the year.

The programme offered in the centre is the American Degree Transfer Program (ADTP) Arts and the ADTP Science/Engineering. The ADTP is not a terminating degree programme. The students will transfer to other institutions or countries for their degree completion. Based on historical data between 2010 and 2020, 75% of the students transferred to the United States, 11% to Canada, 5% to Australia, 5% to Malaysia, and 4% to other countries.

The programme covers a wide range of subjects, for example Arts, Humanities, Social Sciences, Mathematics, Business, Psychology, Computer Science, and Engineering. Therefore, the faculty members are from various academic backgrounds. The programme is led by the Head of centre who is assisted by two programme leaders—one for ADTP Arts and another for ADTP Science/Engineering.

Students

There are two sources of student feedback—subject evaluation and students' feedback on the online semester.

The subject evaluation measures students' satisfaction towards a subject. There are two sections in the evaluation. The subject content evaluation has 16 questions, while the teaching evaluation has nine questions. There is a free comment question at the end of each section. The response for the 25 evaluation questions is based on a five-Likert scale. The evaluation is conducted at the end of the semester. Any comments for improvement will only be implemented in the following semester, as the subject evaluation result will only be made known to the lecturers after the grades are released.

The centre conducted another two surveys to specifically gather students' feedback concerning the online semester. The surveys are anonymous where students provide feedback concerning the delivery of the semester.

DISCUSSION

The movement control order (MCO) was announced in Malaysia on 16th March 2020, and was effective between 18th March 2020 and 1st April 2020. The MCO had since been extended multiple times. Below is presentation of

the case from the perspective of the management, faculty members, and students.

Management

Firstly, the support and direction from the university management is crucial. The management co-ordinated a town hall meeting on contingency teaching plan on 11th March 2020, a week before the announcement of MCO. The town hall meeting initiated the preparation work on a contingency plan. The Academic Enhanced Division (AED) prepared briefing and practical sessions related to bringing classes online. The briefing sessions focused on the pedagogical consideration and approaches when teaching online. There are three parts to the briefing sessions, and each part was conducted four times. The practical session covers producing educational video (with eight repeated sessions) and conducting live sessions (with nine repeated session). A summary of the training provided are as below:

1. Part 1: Blended Learning Pedagogy/Producing Educational Videos for Learning
2. Part 2: Peer Assessment of Videos/Conducting Live Sessions using BB Collaborative
3. Part 3: Creating Online Tasks/ Calculating Students Learning Time for Blended Learning
4. Practical Session: Conducting Live Session
5. Practical Session: Producing Educational Videos

Secondly, team support is important in drawing new guidelines and sharing best practices. The ADTP was having a term break between 16th and 20th March 2020. The break provided the programme's faculty members additional time to plan for online delivery. Students were informed that classes would resume at a later date, and the faculty members met daily between 11 am and 12 pm for two weeks to share how the classes would be conducted. During this time, the Head of the centre and the programme leaders prepared an online guide for both faculty members and students. A sample of online class plan was shared with the team members for planning purposes. The online sharing session provided a practice ground for the faculty members.

The following strategies were adopted to provide clarity and consistency for the students:

1. Faculty members will update the study guide with new dates and information if classes are asynchronous (delayed class) or synchronous (live class).
2. A new online class folder was created to deposit content for the online classes. The folder is organised by weeks or class, and contains the following items:
    a. Statement if the class is synchronous or asynchronous
    b. Instructions for the students
    c. Instructions for attendance taking
    d. Availability of the content
3. All synchronous classes will be conducted using the tool BBCollab provided by the learning management system. They will be recorded for students' viewing and revision.

Thirdly, it is important to ensure that the students receive the required administrative support. The administrative team set up consultation hours using BBCollab on the learning management system. An announcement was sent to the students to inform them of the change. Administrative support for students was provided via online consultation, from Monday to Friday between 4 pm and 5 pm, where the students could log on to the common online consultation room to clarify doubts.

Fourthly, it is important to ensure the integrity of online examinations. The team piloted the software LockDown Browser that is also supported by the learning management system. LockDown Browser would not allow the student to leave the online test and use other applications without first completing the test. Faculty members who are more adventurous took the challenge to pilot the system. The testing was conducted among faculty members, by enrolling them into other subjects as students. Next, the pilot was conducted with small classes, before it was rolled out to the department. The instructional guide was provided by the faculty member who piloted the system. For the June–July 2020 and August–December 2020 semesters, Respondus Monitor, an automated proctoring system was implemented to ensure online exam integrity. Respondus Monitor is the extension of LockDown Browser with video monitoring function.

Last but not least, it is important to ensure that the students have the option to "shop" for their subjects. During the first week of a new semester, students were allowed to visit classes before making a final decision on the subjects to

be enrolled in. In a physical face-to face situation, students will visit the classes as per the location stated in the timetable. The challenge is that the access to the learn management system according to subject enrolment and the option for students to self-enrol had been disabled. Therefore, the department provided a list of guest links to all the subjects offered by the department. The students can visit the classes using the guest link for week one and week two. They should be enrolled on the learning management system by week three. This general list of guest links saves communication effort between lecturer and students, where students would need to write to individual lecturers for access.

Faculty Members

The 16 faculty members of CAE embraced the online teaching and learning process either in synchronous or asynchronous teaching/learning, or both. In the synchronous mode, communication devices are used at the same time, enabling an immediate sending and receiving of message among the participants, as if they were in the same room. Video or audio call and Zoom meetings are examples of the synchronous mode of teaching and learning. This is different from the asynchronous mode where the information sent by a participant may not be seen or responded to immediately by the receiving participant(s). Examples of asynchronous communication systems include e-mail, online messages (WhatsApp, Facebook, Telegram, Twitter, etc.), and short message service (Ugwu, 2021). The department decided to use the institution learning management system as the main content provider and channel for synchronous or asynchronous classes. Faculty members were very accommodative, cooperative, and flexible in the delivery of both the synchronous and asynchronous modes according to students' needs.

Firstly, the need to learn and adapt new solutions is important. The sudden shift from a classroom to an online teaching learning process has placed highly educated people in a tailspin, in tears, with little knowledge of what was required to move online (Wieland & Kollias, 2020). Most faculty members use presentation programmes such as Microsoft PowerPoint for their face-to-face lectures. PowerPoint slides and recording work for both synchronous and asynchronous online teaching/learning activities. However, for calculation-based subjects such as Mathematics, Physics, Engineering, and Chemistry, the tool may need to be paired with a stylus or a writing notepad hardware. Faculty members are creative in providing solutions. Most of the faculty members did

not have a tablet or writing pad when the lockdown was announced. However, most of them have a handphone with recording features. Faculty members who needed to present the workings of calculations to the students recorded the workings by taking a video of themselves writing down the solutions on a piece of paper. Therefore, solutions were created using the simplest tool available.

Secondly, the assessments need to be modified to support online learning. The Ministry of Education and the university released circulars to academic staff, allowing special provisions for changes in assessment. The procedure to table the changes was simplified. The lecturers moved from face-to-face assessments to online assessments; for example, using video or live online presentations, online tests, and quizzes. Report writing was less of an issue, as students are familiar with submitting Turnitin or Safe Assign reports. In order to ensure the integrity of online tests and final examination, LockDown Browser was used, randomising exam questions without the implementation of backtracking. Backtracking was only implemented if the examination questions were of the same type and required a similar duration to answer. The student will be able to estimate the maximum duration of time should be spent for each question before moving on to the next question.

Thirdly, communication with students is an important factor, especially during the deployment assessments like Test, Project, Lab and Field Work. It is a new experience for both faculty members and students to deploy assessment online. During this time, the Head of the center and the programme leaders prepared an online guide for both faculty members and students. The online guide described the expectations and the steps to successfully deploy and complete the assessment. Faculty members also used online consultations and WhatsApp to reduce the miscommunication of instructions to students. The use of the WhatsApp group chat has its set of complications. The students now have access to the private numbers of the faculty members and expect instant replies. Faculty members were informed that while WhatsApp messaging may smoothen communication, it is not an expectation for faculty members to reply to students outside of office hours.

Fourthly, the move online required high commitment from the faculty members. Almost all faculty members worked more than the required 40 hours a week. Preparation for and deployment of both synchronous and asynchronous online teaching/learning process have taken up many man hours compared to face-to-face classes. Sepulveda-Escobar and Morrison

(2020) claimed that 15 participants of his research work mentioned how working from home "challenged them to reorganise their working hours and the time spent in front of the screen" which was considerably increased, reaching around 15 hours a day, causing physical complications. Moreover, most faculty members are parents themselves. With educational institutions and day care centres closed, they need to juggle between the delivery of online teaching and handling their own children who are also attending online classes. On top of that, the faculty members also need to attend to daily household chores.

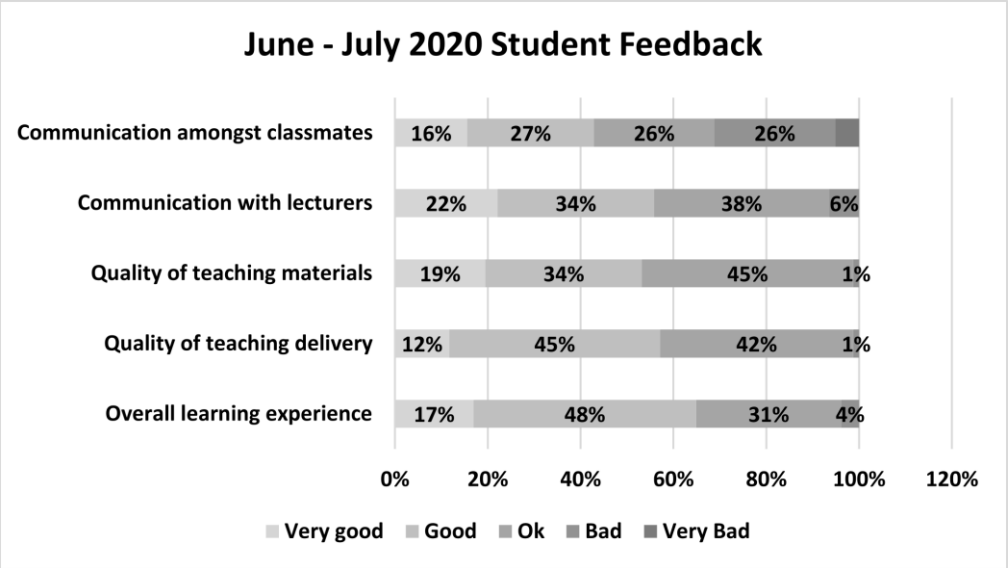
Lastly, the MCO has also caused mental stress to faculty members. The sudden shift from working in the physical classroom and office to an online teaching/learning environment from home has caused mental stress to faculty members. Instead of being free to meet and mingle with students and other colleagues face to face, interactions can now only take place online while being confined within the four walls at home. The added workload to prepare for asynchronous classes, as well as the need to handle the care of children or the elderly at home increased the responsibility required. The institution's provision of free independent counselling services to the general staff is an encouraging move to observe the mental well-being of the staff.

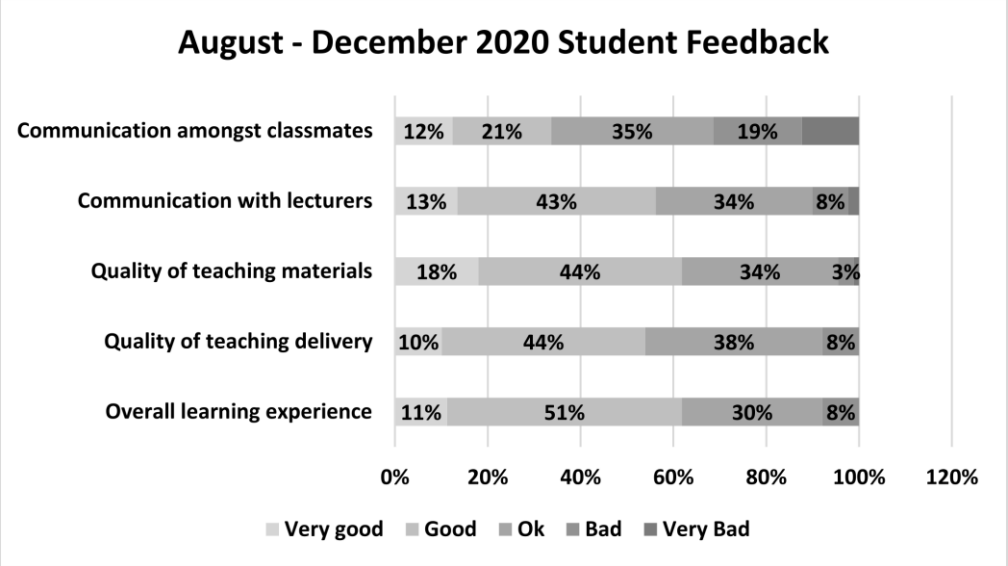
Students

A survey was conducted at the end of the June–July 2020 semester, and another at the end of the August–December 2020 semester. As seen in Figure 1, 79 students responded for the June–July semester, while 89 students responded for the August–December semester. Based on the students' feedback, they rated the semester as "Very Good" and "Good" more than "Bad" and "Very Bad". The item rated most poorly is communication among classmates. It is also observed that the feedback for the June–July 2020 survey is generally better than the August–December 2020 semester. The students are satisfied with the delivery of the semester and the overall learning experience.

Figure 1

Students' feedback for the June–July 2020 and August–December 2020 semesters

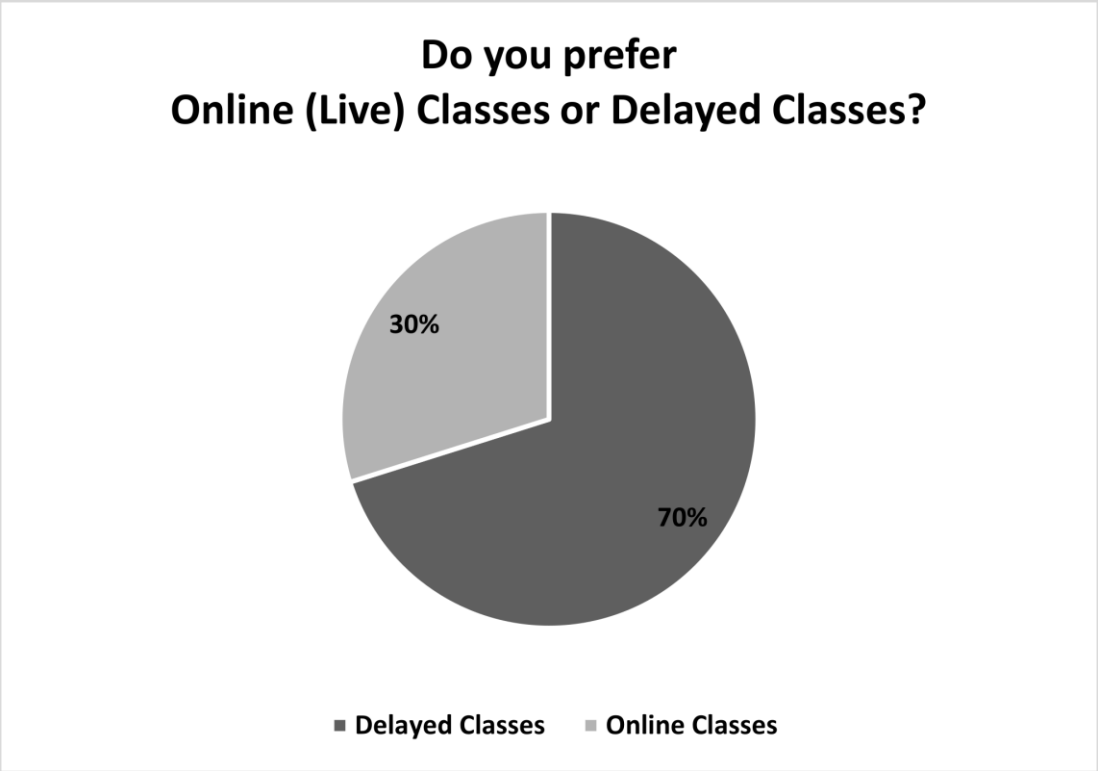




Internet connectivity was an issue for the students. Although Internet coverage in Malaysia is over 80% (Malaysian Communications and Multimedia Commission, 2020), most of coverage is mobile penetration as opposed to broadband. Due to this limitation, CAE opted to provide delayed classes instead of online classes. This is consistent with the feedback provided during the June–July 2020 semester, where 70% of the students preferred delayed classes to online classes. The main reasons for preferring delayed classes are network issues and the students being back home in different time zones.

Figure 2

Students' feedback for the June–July 2020 semester



Based on the subject evaluation comparison between 2019 (where the semester was conducted face to face) and 2020 (where the semester was conducted online). The score for 2020 was lower for the June–July and August–December semesters (Table 1). The subjects are generally delivered by the same faculty member. Comments received for the year 2020 that negatively reflected the students' experience are "irony of watching pre-recorded video for a communication subject", "the internet was bad", and "the lack of live classes … make focusing on this subject hard". The availability of a stable Internet connection is key to conducting effective online classes, but not all students or faculty members have this facility.

Table 1 *Average score for subject evaluation*

Semesters	2019 (%)	2020 (%)
January–May	81.33	82.57
June–July	85.32	80.62
August–December	85.58	79.76

CONCLUSION

The paper has presented the transition from offline to online teaching and learning delivery during the lockdown in Malaysia. The paper triangulates the perspectives of the management, faculty members, and students. The management highlighted the importance of communication and the reasons behind the decisions made. The key is to have decisions made as a team and to instantly communicate the decisions to faculty members and students. The faculty members highlighted the challenge of increased workload in delivering online classes, especially via the asynchronous delivery. With additional workload and responsibilities at home, mental stress has also increased. Effective communication with the students regarding class and assessments is also important. It is interesting to note that the subject evaluation rating continued declining as the semester progressed during lockdown. The students' evaluation for the January–May semester was the best, followed by the June–July 2020 semester, with the August – December 2020 semester faring the poorest. However, more analysis is required to identify the reason for the trend. Communication with coursemates had the lowest rating. The case study has identified that institutional support and decision are important and that the faculty members deliver beyond what is required to ensure the effective delivery of teaching and learning services to the students. Meanwhile students are supportive of the changes.

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The authors declare no conflict of interest.

REFERENCES

Corbera, E., Anguelovski, I., Honey-rosés, J., & Ruiz-mallén, I. (2020). Academia in the time of COVID-19: Towards an ethics of care. *Planning Theory & Practice*, *00*(00), 1–9. https://doi.org/10.1080/14649357.2020.1757891

Lee, M. W. (2020). Online teaching of chemistry during the period of COVID-19: Experience at a national university in Korea. *Journal of Chemical Education*, *97*(9), 2834–2838. https://doi.org/10.1021/acs.jchemed.0c00881

Martinez, J., & Broemmel, A. (2020). Pencils down: Educators respond to uncertainty amidst COVID-19 school closures, *49*(1), 109–133.

Malaysian Communications and Multimedia Commission. (2020). *Internet users survey 2020: Malaysian communications and multimedia commission*. https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/Internet-Users-Survey-2018-(Infographic).pdf

Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during lockdown period of COVID-19 pandemic. *International Journal of Educational Research Open*, *1*, 100012. https://doi.org/10.1016/j.ijedro.2020.100012

Seke, M. M. (2020). Would we be able to absorb the new normal brought by COVID-19 as another educational revolution? *International Journal of Advanced Corporate Learning (IJAC)*, *13*(4), 68. https://doi.org/10.3991/ijac.v13i4.16525

Sepulveda-Escobar, P., & Morrison, A. (2020). Online teaching placement during the COVID-19 pandemic in Chile: Challenges and opportunities. *European Journal of Teacher Education*, *43*(4), 587–607. https://doi.org/10.1080/02619768.2020.1820981

Ugwu, N. F. (2021). E-Option for health education amidst COVID-19: An examination of Somalia contexts, *49*(1), 86–94.

Wieland, N., & Kollias, L. (2020). Online learning before, during and after COVID-19: Observations over 20 years. *International Journal of Advanced Corporate Learning (IJAC)*, *13*(2), 84. https://doi.org/10.3991/ijac.v13i2.16779

INTERNSHIP DURING COVID-19

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ABSTRACT

Background The global coronavirus pandemic disrupted many, if not all, higher education programmes. Education institutions scrambled to deliver teaching online. However, the subject of Internship requires students to work under commercial supervisors in actual organisations and industrial environments. The Malaysian Qualifications Agency provided guidelines for internship by allowing higher education providers to "replace industrial training with other appropriate alternatives that involve both industrial collaboration and supervisory by industry practitioners".

Aim This paper discusses how Sunway Diploma Studies (SDS) organised, supervised, and assessed students' internship subject module online during the pandemic.

Methods There is scarce research on the design of online teaching for internship programmes. A review of literature was conducted to identify current research on internship programme design.

Findings This paper reviewed six decisions to consider when designing good assessments; and three proposals for assessments specific to internship. In addition, SDS industrial project for internship showed how the internship subject module could be supervised and assessed online while meeting to current practice requirements. Essentially, industrial projects were proposed by SDS to commercial organisations. This created online internship

placements for students during the pandemic when many organisations withdrew internship offers.

Conclusion This paper shows that internship programmes can be organised, supervised and assessed online in collaboration with commercial organisations during global coronavirus pandemic. Furthermore, online internship placements were created for students.

Keywords Internship, pandemic, COVID-19, online teaching, programme design

INTRODUCTION

The global coronavirus pandemic disrupted many, if not all, higher education programmes. Education institutions scrambled to deliver teaching online. However, the subject of internship requires students to work under commercial supervisors in actual organisations and industrial environments. The Malaysian Qualifications Agency (MQA) provided guidelines for internship by allowing higher education providers to "replace industrial training with other appropriate alternatives that involve both industrial collaboration and supervisory by industry practitioners" (Malaysian Qualifications Agency, 2020, para. 11). This paper discusses how Sunway Diploma Studies (SDS) organised, supervised, and assessed students' internship subject modules online during the pandemic.

Internship is the placement of a student in an organisation for the purpose of gaining practical work experience (Griffin & Coelhoso, 2019). Internship is also known as work placement, industrial training, industrial attachments, and other terms. For example, in an academic internship programme, students are given work assignments in an organisation like a permanently employed employee. The student's work will be monitored by a supervisor in the host organisation, and by a lecturer. Internships can be paid or unpaid. Recent research documented the advantages of internship programmes. One of the advantages is to help students gain necessary employability skills in preparation for joining the workforce (Jackson, 2015). Employability skills are

also known as soft skills. Examples of valuable soft skills include curriculum vitae writing, self-presentation, interviewing techniques (Dacre Pool & Sewell, 2007); and career decision-making skills and opportunity awareness (Clarke, 2017). Recent research in this field supports the use of internships to help develop these soft skills. For example, prospective employees with internship experience were rated higher in job suitability and employability skills, compared to recruits who had not participated in academic internships (Pinto & Pereira, 2019). The advantages of internship programmes are so important that the MQA, while maintaining that internship is optional, strongly encouraged higher education institutions to provide internship programmes (Malaysian Qualifications Agency, 2014). Currently, there is much research on the use of internships in academic study programmes. For example, there is research on effective internship finding methodology (Stremersch & Van Hoye, 2020); the implications of using commercial internship placement services (McDonald, 2020); the use of entrepreneurial learning in internships (Ramsgaard & Østergaard, 2018); the use of internships in the construction industry (Mengistu & Mahesh, 2019); the effectiveness of internship programmes (Griffin & Coelhoso, 2019); and the challenges faced by higher education institutions in developing countries and potential ways to overcome these challenges (Chand & Deshmukh, 2019). In Malaysia, Ngui et al. (2017) investigated the role of academic internship programmes in generating sustainable development in developing countries.

During the global coronavirus pandemic of 2020, many academic internship programmes were disrupted. Many universities, including Malaysian universities, had to adapt to coronavirus restrictions in order to continue the education and development of their students. Social distancing measures were enforced by the Malaysian government and many businesses took cost-cutting measures (Aiman, 2020). These measures included employee retrenchment and cutting back on internship hiring. In the United States, half of all internship openings were cut; in the United Kingdom, more than half were cut (Chan, 2020). Under these circumstances, teaching online was assumed to be not possible for internship subject modules. There is scarce research on the design of online teaching for internship programmes. A literature review was conducted to identify current research on internship programme design.

MATERIALS AND METHODS

A review of current literature showed that the Assessment Design Decisions Framework by Bearman et al. (2014) proposes six decisions for the design of good assessments. The six decisions are: (1) context of the assessment; (2) purpose of the assessment; (3) learning outcomes; (4) assessment tasks; (5) feedback processes; and (6) key interactions. In addition, the literature review found three additional considerations particular to the design of internship assessments: (7) pre-internship programme; (8) collaboration with host industrial supervisor; and (9) the use of logbooks as assessment. The following will discuss these nine decisions.

Firstly, every aspect of a higher education institution will influence or be influenced by assessment strategies (Bearman et al., 2014). The context of the assessment includes the lecturers, the students, and the culture of the institution. In turn, the perception of the institution and the programme will be influenced by the assessment. In particular, internship assessments will be seen by supervisors in commercial organisations who are external to the institution. These supervisors may be the future employers of the students.

Secondly, the purpose of assessment includes guiding learning so that students meet the prescribed learning outcomes (Bearman et al., 2014). Therefore, the articulation of the purpose of an assessment is strategic and needs to be prescribed carefully. Thirdly, assessments should be designed to help students achieve programme and module learning outcomes (Bearman et al., 2014). Both lecturers and students are focused on meeting the grading requirements of the subject and ultimately the programme requirements.

Fourthly, assessment tasks are the foundation in the design of assessments (Bearman et al., 2014). The tasks may consist of both formative and summative assessments. Formative assessments help students achieve learning outcomes, while summative assessments contribute to grading (Black & Wiliam, 2003). Fifthly, feedback is an important component of assessment design (Bearman et al., 2014). For internship assessments, a host industry supervisor from an external organisation forms an essential part of the assessment grading (Yiu & Law, 2012). In such assessments, students learn by undertaking assessment tasks. The tasks are reviewed by supervisors who provide feedback information to the student. The student then applies this additional learning in performing assessment tasks again.

Sixthly, the success of an assessment requires maintaining key interactions with stakeholders (Bearman et al., 2014). Lecturers need to carefully explain an assessment to their students for successful completion. They also need to explain the assessment strategy rationale to their colleagues during programme reviews. The above discussed the six decisions for the design of good assessments.

Next, the three additional considerations particular to the design of internship assessments are discussed.

Seventhly, a pre-internship programme helps inform and prepare students for their assessment tasks before commencing the internship proper. Many education institutions have incorporated pre-internship orientation into their internship programmes (Mekawy & Bakr, 2014). Pre-internship preparation lets students know what to expect and boosts students' confidence before commencing their internships (Monday et al., 2020). Eighthly, internship programmes are collaborations with external host organisations and are jointly assessed by the institution's academic supervisor and the host industrial supervisor whereas, usually in other subjects, assessments are conducted wholly by internal staff. Supervisors are critical in guiding interns to meet their academic and social needs (Spector & Infante, 2020). However, a survey research by Donina (2015) found that only half of the host industrial supervisors plan their interns' assignments and a third of the higher educational institutions do not contact the host organisations. Therefore, academic supervisors should maintain contact and collaborate with their corresponding host industrial supervisors.

Finally, logbooks are traditionally important in internship programmes. Lecturers rely on logbooks for formative and summative assessment to keep track of student learning throughout the duration of internship programmes when students are not on campus. Students' perspectives and experiences about their internship provide important insights for the continual improvement of the programme (Hora et al., 2020). In medical education, logbooks are already widely used and found to be effective for learning during internships (Jud et al., 2020).

RESULTS AND DISCUSSION

The previous section discussed the current practice for the design of good assessments as proposed in the Assessment Design Decisions Framework; and three specific considerations for the design of internship assessments. This section will discuss findings that the SDS industrial project for internship conforms to the requirements of current practice.

Firstly, the context of the design of the SDS industrial project for internships was largely influenced by the shortage of internship placements. Most internship programmes are designed whereby students apply to commercial organisations for internship positions. Even during normal circumstances, institutions have difficulty in finding internship placements for their students (Chand & Deshmukh, 2019; McDonald, 2020). However, during the global coronavirus pandemic, many commercial organisations decided to rationalise their operations, such as by reducing support for academic internships. Thus, internship opportunities became even more limited. In response, SDS proposed industrial projects to these organisations. The industrial projects are proposals to help organisations contribute or enhance their performance, such as helping organisations to explore or provide research into areas such as customer satisfaction or competitor analysis. The final agreed industrial project will have a requirement for five or six internship placements. Internship placements are then provided for students where there were previously no internships available. Therefore, the design of the SDS industrial project for internships was conceived with careful appreciation of the context (Bearman et al., 2014).

Secondly, the purpose of the SDS industrial project is to help students gain practical work experience, enhance employability by developing soft skills, and give students a way to practise and demonstrate their learning in a safe environment during the COVID-19 pandemic. Thus, the carefully crafted purpose of the internship programme will continually guide and support the teaching and achievement of learning outcomes as shown by Bearman et al. (2014).

Thirdly, the SDS industrial project fulfils the prescribed internship learning outcomes, such as applying subject learning in a practical situation. Additionally, the industrial project also helps prepare students for work conditions in a pandemic environment using online ICT tools and techniques. In this way, the SDS industrial project has adapted its assessment

methodology to match changing conditions while fulfilling the prescribed internship learning outcomes as proposed by Bearman et al. (2014).

Fourthly, in the SDS industrial project for internship, students are required to write a job application and resume in order to practise and improve job searching skills. The students are also required to log their actions and update both their assigned organisation supervisor and academic supervisor via a weekly progress report. At the end of the internship programme, students are required to write a self-reflective report summarising what they have experienced and learnt from the programme. Hence, the project consists of relevant assessment tasks as discussed by Bearman et al. (2014).

Fifthly, the feedback process is where a student submits an assessment task; the lecturer comments or grades the assessment tasks and the student learns from the feedback (Bearman et al., 2014). In the SDS industrial project, the internship team initially provides assessment and feedback through the pre-internship preparation courses; both the host industry supervisor and the academic supervisor are available for feedback to students throughout the duration of the internship; and finally, both supervisors provide formal feedback through summative assessment tasks including appraisals, logbook, and final project reports.

Sixthly, similar to other subjects in the programme, the industry project undergoes prolonged and ongoing improvements during formal meetings such as programme assessment meetings, informal lecturer discussions, student representative meetings, and meetings with current and potential host industry supervisors. This ensures robust key interactions with stakeholders (Bearman et al., 2014). The above discussions show that the SDS industrial project for internship conforms to current practice of good assessment design as proposed in the Assessment Design Decisions Framework (Bearman et al., 2014).

Seventhly, in the SDS industrial project, the pre-internship phase also includes the assessment tasks of preparing a resume and writing a job application cover letter. This enhances the work-focused experience of the internship and provides additional learning opportunities. That is, students learn some of the soft skills of job searching. The success rate of student achieving internship placements and student feedback shows that the SDS pre-internship programme was good practice as discussed by Mekawy and Bakr (2014), and Monday et al. (2020).

Eighthly, internship programmes academic supervisors should maintain contact and collaboration with the host industrial supervisors. The design of the SDS industrial project for internship requires the academic supervisor to discuss with the host organisation to jointly create industrial projects. These projects include exploring customer satisfaction or competitor analysis. The host organisation then agrees to a specific industrial project and appoints their internal host supervisor. The host supervisor then works with the academic supervisor to create the specific details. In addition, the host industrial supervisor grades the intern's performance through an appraisal and, secondly, through the group industrial project report. The two assessments are worth a total of 40% of the total internship marks. Hence, collaboration with external host supervisors is ingrained in the design of the project as discussed by Donina (2015), and Spector and Infante (2020).

Finally, the SDS industry project requires students to proactively submit weekly progress reports via email to both their academic supervisor and their host industry supervisor. This ensures that the students regularly reflect upon and document their learning. Supervisors will be able to provide formal and informal feedback, and guidance to students who experience the industry for the first time. This is good practice as encouraged by Hora et.al. (2020) and Jud et.al. (2020).

The discussions in this section show that the SDS industrial project for internship included three assessments of current practice which are specific to internship; and conforms to current practice of good assessment design.

CONCLUSION

During the global coronavirus pandemic which disrupted higher education programmes, it was assumed that internship subject modules cannot be taught online. A review of literature showed that the creation of good assessments entails six decisions of: understanding the context of the assessment; the purpose of the assessment; determining the learning outcomes; the assessment tasks; the feedback processes; and organising key interactions with stakeholders. Specifically, for internship programmes, research shows the need for pre-internship preparation courses; the need for academic

supervisors to jointly create and discuss internship tasks with host industrial supervisors; and the benefits of self-reflection logbooks for interns.

Conventional practice was for institutions to guide and facilitate students to seek internship placements with external industrial organisations. This was not feasible during the global coronavirus pandemic as many organisations were already downsizing severely, reducing the available internship placements which were already limited during normal non-pandemic environments. SDS created industrial projects which proposed to help organisations to contribute or enhance their performance. These projects created internship placements for students. Furthermore, a review of the SDS industrial project for internship found that the project conformed to current practice of good assessment design; and included three assessments of current practice which are specific to internship.

The SDS industrial project for internship successfully provided internship placements for many SDS students. This paper concludes that internship programmes can be organised, supervised and assessed online in conjunction with commercial organisations during global coronavirus pandemic. Future research could examine the effectiveness of online internship projects as compared to conventional internship placements.

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REFERENCES

Aiman, A. (2020). Demand for interns up, says recruiter. *Free Malaysia Today*. http://www.freemalaysiatoday.com/category/nation/2020/07/09/demand-for-interns-up-says-recruiter/

Bearman, M., Dawson, P., Molloy, E., Boud, D., Joughin, G., Bennett, S., & Hall, M. (2014). *Guide to the assessment design decisions framework*. http://www.assessmentdecisions.org/guide/

Black, P., & Wiliam, D. (2003). In praise of educational research: Formative assessment. *British Educational Research Journal, 29*(5), 623–637. https://doi.org/10.1080/0141192032000133721

Chan, K. (2020). Internships get cancelled or go virtual because of pandemic. *The Star*. http://www.thestar.com.my/tech/tech-news/2020/06/16/internships-get-canceled-or-go-virtual-because-of-pandemic

Chand, V. S. & Deshmukh, K. S. (2019). Addressing the undergraduate internship challenge in developing countries: A "learning-by-doing" project-based online internship model", *Education + Training*, *61*(9), 1064-1077. https://doi.org/10.1108/ET-12-2018-0254

Clarke, M. (2017). Rethinking graduate employability: The role of capital, individual attributes and context. *Studies in Higher Education, (43)*11, 1923–1937. http://doi.org/10.1080/03075079.2017.1294152

Dacre Pool, L., & Sewell., P. (2007). The key to employability: Developing a practical model of graduate employability. *Education and Training, 49*(4), 277–289. http://doi.org/10.1108/00400910710754435

Donina, A. (2015). The role of tourism and hospitality companies in ensuring an effective internship process. *Journal of Education, Culture and Society, 6*(1), 281–290. http://doi.org/10.15503/jecs20151.281.290

Griffin, M., & Coelhoso, P. (2019). Business students' perspectives on employability skills post internship experience: Lessons from the UAE. *Higher Education, Skills and Work-Based Learning*, *9*(1), 60–75. http://doi.org/10.1108/HESWBL-12-2017-0102

Hora, M. T., Parrott, E. & Her, P. (2020). How do students conceptualise the college internship experience? Towards a student-centred approach to designing and implementing internships, *Journal of Education and Work*, *33*(1), 48–66. http://doi.org/10.1080/13639080.2019.1708869

Jackson, D. (2015). Employability skill development in work-integrated learning: Barriers and best practice. *Studies in Higher Education, 40*(2), 350–367. https://doi.org/10.1080/03075079.2013.842221

Jud, S. M., Cupisti, S., Frobenius, W., Benn, S., Winkler, A., Antoniadis, S., Beckmann, M. W. & Heindl, F. (2020). Logbooks alone are not enough: Initial experience with implementing a logbook for medical students in a clinical internship in gynecology and obstetrics. *European Journal of Medical Research*, *25*(15), 1–8. http://doi.org/10.1186/s40001-020-00413-6

Malaysian Qualifications Agency. (2014). *Program standards: Business studies*. http://www2.mqa.gov.my/QAD/PS/PS%20Business%20Studies%20BI.pdf

Malaysian Qualifications Agency. (2020, March 29). *Advisory Note No. 1/2020: Guidelines on the delivery of higher education programmes during and post Covid-19 Movement Control Order*. https://www.mqa.gov.my/pv4/document/advisoryNotes/Advisory%20Note%20No.%201-2020%20(Versi%20BI)%20Guideline%20on%20Delivery%20of%20Programmes.pdf

McDonald, P. (2020). Open market internships: What do intermediaries offer? *Journal of Education and Work, 33*(1), 33–47. http://doi.org/10.1080/13639080.2019.1702151

Mekawy, M. A., & Bakr, M. M. (2014). Planning internship programs: Tourism students' perceptions. *Tourism: An International Interdisciplinary Journal, 62*(1), 41–61.

Mengistu, D. G., & Mahesh, G. (2019). Construction education in Ethiopia: Knowledge and skills level attained and effectiveness of internship program. *Higher Education, Skills and Work-Based Learning*, *9*(3), 510–524. http://doi.org/10.1108/HESWBL-06-2018-0062

Monday, L. M., Gaynier, A., Berschback, M., Gelovani, D., Kwon, H. Y., Ilyas, S., Shaik A. N., & Levine, D. L. (2020). Outcomes of an online virtual boot camp to prepare fourth-year medical students for a successful transition to internship. *Cureus, 12*(6). http://doi.org/10.7759/cureus.8558

Ngui, K. S., Voon, M. L. & Lee, M. H. (2017). Integrating community engagement with management education: A case study of ENT30014 social innovation internship. *Education and Training*, *59*(6), 579–589. http://doi.org/10.1108/ET-04-2016-0078

Pinto, L., & Pereira, P. (2019). I wish to do an internship (abroad): Investigating the perceived employability of domestic and international business internships. *Higher Education, 78*(3), 443–461. http://doi.org/10.1007/s10734-018-0351-1

Ramsgaard, M. B. & Østergaard, S. J. (2018). An entrepreneurial learning approach to assessment of internships. *Education and Training, 60*(7), 909–922. http://doi.org/10.1108/ET-11-2016-0164

Spector, A. Y. & Infante, K. (2020). Community college field placement internships: Supervisors' perspectives and recommendations, *Social Work Education, 39*(4), 462–480. https://doi.org/10.1080/02615479.2019.1654990

Stremersch, J., & Van Hoye, G. (2020). Searching hard versus searching smart: The role of search process quality in an internship context. *International Journal of Selection and Assessment, 28*(1), 31–44. http://doi.org/10.1111/ijsa.12274

Yiu, M., & Law, R. (2012). A review of hospitality internship: Different perspectives of students, employers, and educators. *Journal of Teaching in Travel & Tourism, 12*(4), 377–402. http://doi.org/10.1080/15313220.2012.729459

QUALITY ONLINE LEARNING FOR STUDENTS' FUTURE SUCCESS

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ABSTRACT

Background The rapid technological evolution coupled with COVID-19 has seen an abrupt shift to online learning in higher education worldwide. In the future with ever-increasing automation, graduates will require capacities such as creative, critical thinking and problem solving, underpinned by abilities to communicate and collaborate in teams, often cross-national and cross-disciplinary.

Aim In Malaysia, the importance of creative, critical thinking and problem-solving capacities are evident in the Malaysian Qualifications Agency academic programme quality standards. With online learning during the pandemic and perhaps blended learning post-pandemic, the study aims to assess whether online learning is preparing students with 21st century capacities.

Methods This paper draws on two collaborative team studies through the Centre for Higher Education Research, Sunway University. The first, implemented pre-COVID-19, explored academic staff's use of blended/online learning tools in their teaching. The second, undertaken during COVID-19's online learning, was on students' experiences and satisfaction with their online learning.

Findings The findings from both studies are that overall, both teachers and students are satisfied with blended/online learning, but there is room for improvement. In the first study, the online tools staff mostly used supported

efficient programme management rather than creative and critical thinking. The second study found that students rated less well the communication, interactivity and collaboration in their online learning experience.

Conclusion There are positive features in the findings of both studies, but both indicate that online learning needs to, through curriculum and teaching and learning approaches with various online tools available, support student and team interactivity, communication and collaboration, and the development of skills in critical and creative thinking as these are vital for nations and their competitiveness globally.

Keywords Online learning, graduate attributes, creative and critical thinking, communication, collaboration and problem solving

INTRODUCTION

An important aspect in judging the quality of a higher education institution (HEI) is that it develops in its students the capabilities that enable them to participate successfully in their societies post-graduation. In relation to such capacities, this paper explores online learning in higher education (HE). The importance of these capabilities is poignantly emphasised in today's world of the knowledge society, where the massive evolution of technology in Industrial Revolution 4 (Schwab, 2017; Ministry of Higher Education Malaysia, 2018) is changing the world rapidly and profoundly across all aspects of life. Schwab (2017) comments that the world is at a crossroads; the coming together of data and massive computer storage with human cognitive power will continue to transform all levels of society, through processes such as automation, artificial intelligence, and the Internet of Things. For HEIs, this means that as well as deep and thorough grasp of the knowledge and skills of their disciplines of study, graduates require skills that fit them for the current and future world (Crosling et al., 2019). Encapsulated as skills for the 21st century, the capabilities include critical and creative thinking, and communication and collaboration skills at cross-national and cross-disciplinary levels (Brynjolfsson & McAfee, 2014). These are skills that are integral to the knowledge society and vital for a nation's competitiveness and sustainability.

The COVID-19 pandemic and the need for social distancing in recent times have seen the ubiquitous use of online learning to replace face-to-face teaching and learning (TL). While technology has undoubtedly been a much-needed lifeline, the impact of online learning on students' experience of HE and educational outcomes is a topic of consideration. Anecdotal reports from students show that many appreciate the flexibility that online learning provides for them off campus, but they miss the interaction with their teachers and fellow students that is not readily fostered in online learning. In exploring online learning and students' outcomes as seen in the 21st-century skills outlined above, this paper uses examples of the findings of two studies undertaken through Sunway University's Centre for Higher Education Research. These studies explore online learning from the perspectives of two of the key parties in HE TL: the teachers and the students. The first is a pre-pandemic study of HE teachers' views and uses of blended learning in a Malaysian HEI; the second is a study of the experiences of students with online learning in a Singaporean HEI during the pandemic.

Higher Education Quality and Skills for the Future

The significance of the preparation of HE students for their lives beyond graduation is evident in its inclusion as a measure via the HEI's employer reputation in HEI quality rankings. Graduates' employability and employment prospects are encapsulated in the employer reputation of HEIs' grading to determine their global ranking ("QS university rankings", 2021). The development of such graduate attributes is strongly related to the students' experience of their educational programmes and TL. This relationship is seen in the Malaysian Qualifications Agency (MQA) quality standards for academic programmes, Code of Practice for Programme Accreditation (COPPA) (Malaysian Qualifications Agency [MQA], 2008). Requiring compliance of all programmes in Malaysian HEIs, Section 1 of COPPA on Programme Development and Delivery states that programmes must develop in students the ability to analyse, solve problems, evaluate, and make decisions critically and creatively based on evidence. They must have a "quest for knowledge" and "continually upgrade knowledge and skills required for the current rapid advancement in global knowledge" (MQA, 2018, p. 6). Section 1.2 of COPPA on Curriculum Contents & Structure at point 1.2.1 requires that the subject content, approach and TL methods are appropriate and consistent to support programme learning outcomes. These need to reflect the above educational

goals and learning outcomes, and there must be a variety in TL methods to achieve the domains of learning outcomes, and to ensure students take responsibility for their own learning.

The importance of TL for education quality and in developing in students relevant graduate attributes is captured in the Creative Learning Ecosystem[1], a framework of societal resources that interacts and forms a milieu for advancing quality HE, which then sets in motion creative and innovative capabilities and responses. One of these six resources, the Intellectual Capital[2] component—in this paper refers to creative development of ideas through interactions, discussions and exchanging ideas (Crosling et al., 2015)—is aligned with MQA requirements as outlined previously. It is supported by TL that is active, applied, and experiential (Crosling et al., 2015). More specifically in developing the "micro ecosystem" of the Intellectual Capital resource in the Creative Learning Ecosystem that aims to prepare students for the future, it includes the following that are entwined with active, applied and experiential learning which connotes communication and collaboration in learning (Brynjolfssen & McAfee, 2014):

1. Developing students' understanding that the knowledge base continually and rapidly evolves;
2. Supporting dynamic team environments, interaction, and experiential learning, underpinning critical and creative thinking;
3. Developing students' critical and creative thinking as seen in the ability to evaluate, and to address unstructured problems;
4. Developing communication/collaborative skills which support effective cross-national and multidisciplinary teams, often operating remotely;
5. Cultivating curious, resilient, persistent, adaptable, and flexible in thinking mindsets;
6. Developing ability to self-promote, take risks, and work alone in physical or remote teams (Wilkinson, 2017)

STUDY METHODS

The first study drawn on in this paper and implemented pre-COVID-19, "Academic Staff and Blended Learning: Enhancing Student Learning in Higher Education"

[1] Based on the Innovation-Helix Model (Nair, 2011)

[2] Other components in the Creative Learning Ecosystem are: Infra/Infrosstructure, Interaction, Institutions, Incentives, Integrity (Crosling et al., 2015)

(Crosling et al., under review), involved 142 academic staff (43% of the total staff population) across all disciplines of an HEI in Malaysia. Using a mixed method approach and survey that derived qualitative and quantitative data, the survey studied how and why the academic staff in the undergraduate programmes use blended learning (that is, online tools) in their TL. Pre- and pilot tests were conducted, and the project was ethics-approved. The study allowed respondents to indicate as many of the 22 online tools listed in the survey that they had used in TL. The tools used by the respondents were then graded according to their function, using Lee and Lim's (2011) function, but applied in this study for HE studies.

The second study implemented during COVID-19, "Online Learning in COVID-19 in Higher Education: A Case Study for Learning Enhancement", was of 119 students across all disciplines of an HEI in Singapore. Through a mixed method approach via survey, qualitative and quantitative data were derived of the students' views, experiences, and satisfaction with their online learning during the pandemic. Singapore's high level of Internet infrastructure and this HEI's experience with online learning meant that the study's findings were less distorted by these factors. Pilot test and ethics approval were obtained for the project.

RESULTS

Study 1

The results relevant to this paper on online learning and graduate attributes for the future show that while blended learning/online tools were used quite extensively by the teachers at the HEI, the most frequently used tools most often supported the efficient management of the programme. Relevant tools for this category include emails, access to resources or links to other sites, announcements and calendar access, access to course modules or online teaching materials, and access to library facilities, online tools for marking, recording lectures, and plagiarism tools. The next most-used category of tools assisted students' understanding of the subject content, and included videos in teaching, quizzes or access to online response systems, online surveys or question sessions, Skype or video-enabled tools. The category used least frequently by the teachers included tools that support communication, collaboration and higher-level thinking—all of which underpin critical and creative thinking. These included tools for social networking for students, online discussions, collaborative classrooms to offer synchronous

interactions, collaborative tools such as wikis/blogs, and the creation of e-portfolios. Overall, the study respondents indicated 1,025 usages by the 142 staff respondents of the various tools listed in the survey. The numbers of responses according to category are seen in Table 1 (Crosling et al., under review).

Table I *Categories of online tools used according to educational function*

	Function/Category of Online Learning Tools Used	Number of Academic Staff/Teachers' Responses
1.	Promoting management and efficiency of educational programme	N=634
2.	Promoting students' subject content understandings and learning	N=227
3.	Promoting communication and active learning and supporting creative thinking	N=164
4.	Total number of responses from 142 respondents across range of online tools listed on survey item	N=1025

Study 2

The findings from the study show that overall in this HEI, where staff are experienced in online learning and there is good Internet infrastructure, it is expected that students would indicate their satisfaction with online learning for all the items in the survey. The survey items included questions about students' computer efficacy, online learning's flexibility, suitability for learning, usefulness, ease of use, fit, and students' attitude. From the quantitative results, the mean scores for survey items that refer to communication and collaboration afforded by online learning were lower than for other items. Collaboration via teamwork and communication are experiences and skills that support critical and creative thinking, and respondents were moderately positive towards using online learning for collaboration (overall mean = 3.56). About 70% of the respondents found online learning appropriate for exchanging course-related information, but only 50.4% thought that online learning improves student group work, and a

smaller percentage of students thought it encourages forming groups by those with similar academic interests and needs. For communication, respondents were moderately positive about online learning for communication (overall mean = 3.66). More than 70% agreed that online learning improves communication of announcements about courses and classes, and more than 60% said that online learning improves course material delivery, resources, and class discussions. However, several (19.3%) did not agree that online learning improves communication between teachers and students.

For the challenges the respondents faced in online learning, two of the major themes arising are: (1) pedagogy, where respondents commented that online learning limits students' engagement with and grasp of subject content, especially for "hands-on" subjects, and (2) interaction and communication, where students commented on gaps in online learning for social interactivity and connectivity. Drawing together the survey quantitative and qualitative findings, the study recommendations for effective online learning include the need for increased interactivity, active and independent learning, the need for greater positive learning reinforcement, and, emanating from the flexibility in study provided by online learning, greater attention in online learning to personalised learning, addressing diverse learning preferences and a range of media approaches (Azizan et al., in progress).

CONCLUSION

One important gauge of the quality in HE TL is the need to prepare students with attributes that will serve them well on graduation to meet the needs of their societies and countries. With the rapid development of technology and automation impacting on all levels of society worldwide, graduates require skills and attributes to support their effective participation. These include what are known as 21st-century skills, with graduates having capabilities for communication and collaboration to work independently or with cross-national and cross-disciplinary teams in addressing unstructured problems and issues as they arise in the rapidly changing world. The capacity for critical thinking supports the analysis of problems and the devising of solutions through creative thinking. These require capacities for curiosity, flexibility to move away from previously effective solutions, and resilience and persistence to continue with issues that at times seem insoluble.

With COVID-19's impact on HEIs worldwide, it is ironic in some ways that online learning has been afforded by the world of technology and automation, for which graduates need to be prepared with relevant attributes. But the need to develop attributes for the changing world remains, and the question is whether online learning can successfully develop such attributes. Two studies explored in this paper, one conducted pre-COVID-19 among HEI teachers and the other implemented during COVID-19 among HEI students, provide glimpses of the current status in regard to graduate attributes and online learning. There are positive features in the findings of both studies, but both indicate that online learning, through curriculum and TL approaches with the various online tools available, needs to support student and team interactivity, communication and collaboration, as well as the development of skills in critical and creative thinking. These are vital for nations and their global competitiveness, which impacts socioeconomically on the lives of people.

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REFERENCES

Azizan, S. N., Lee, A. S. H., Crosling, G., Atherton, G., Arulanandam, B., & Abdul Rahman, R. B. (in progress). Online learning in COVID-19 in higher education: A case study for learning enhancement.

Brynjolfsson, E., & McAfee, E. (2014). *The second Machine Age: Work, progress and prosperity in a time of brilliant technologies*. Norton & Company.

Crosling, G., Nair, M., & Vaithilingam, S. (2015). A creative learning ecosystem, quality of education and innovative capacity: A perspective from higher education. *Studies in Higher Education, 40*(7), 1147–1163. https://doi.org/10.1080/03075079.2014.881342

Crosling, G., Shuib, M., & Rahman, S. A. (2019). Introduction. In S. A. Rahman, M. Shuib, & G. Crosling (Eds), *Creativity in education*. Penerbit Universiti Sains Malaysia.

Crosling. G., Lee, A.S.H., Passey, D. & Azizan, S.N. (under review). A study on the use of blended learning/online learning tools in a higher education institution in an ASEAN country.

Lee, A. S. H., & Lim, T. M. (2011). *Enhance task-technology fit model by task categorization characteristics for a proposed knowledge creation and sharing model via weblogs* [Paper presentation]. 2011 7th International Conference on Information Technology in Asia, pp. 1–6. IEEE.

Malaysian Qualifications Agency. (2018). *Code of practice for programme accreditation*. Agensi Kelayakan Malaysia (Malaysian Qualifications Agency).

Ministry of Higher Education Malaysia. (2018). *Framing Malaysian higher education 4.0: Future proof talents*. Department of Higher Education Malaysia.

Nair, M. (2011). Inclusive innovation and sustainable development: Leapfrogging to a high-income economy. In MOSTI & PIKOM The National ICT Association of Malaysia, *ICT strategic review 2012/13: Innovation for digital opportunities*.

QS university rankings: Asia—methodology. (2021, April 15). *QS Top Universities*. https://www.topuniversities.com/asia-rankings/methodology

Schwab, K. (2017) *The fourth industrial revolution*. Portfolio Penguin.

Wilkinson, G. (2017). Access and the new employability skills. In G. Crosling & G. Atherton, *Current and emerging themes in global access to post-secondary education*. Emerald Publishing International.

MAINTAINING ACADEMIC INTEGRITY IN THE CONDUCT OF ONLINE EXAMINATIONS: A CASE STUDY AT SUNWAY COLLEGE JOHOR BAHRU

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ABSTRACT

Background Maintaining academic integrity in the conduct of online examinations is a daunting task even for the most reliable educational institutions. Due to the prolonged school closure caused by the COVID-19 pandemic, educational institutions were compelled to undergo drastic restructuring of the teaching and learning (T&L) processes including the conduct of examinations. As examinations serve as an integral part of students' learning, educational institutions promptly adopted online examinations in replacement of paper-based examinations. Maintaining academic integrity and quality in the delivery of online examinations then became one of the priorities at Sunway College Johor Bahru.

Aim This study aims to investigate whether the four mechanisms identified as best practices in the conduct of online examinations at Sunway College Johor Bahru have helped in achieving the required standards.

Methods An online survey was conducted among 39 academic staff from the Pre-University Programme, focusing on gathering feedback on the effectiveness of the four mechanisms which are the use of a secure online examination platform, complemented with lockdown browser, online proctoring, and the recording of proctoring.

Findings All 20 questionnaire items focusing on the effectiveness of the four mechanisms received positive mean responses with a mean value of above three. More than 84% of the respondents also indicated that the use of the four mechanisms interdependently has helped maintain academic integrity and quality in the conduct of online examinations.

Conclusion This study confirms that Sunway College Johor Bahru has maintained quality and academic integrity in the conduct of online examinations by implementing the four mechanisms.

Keywords Online examinations, academic integrity, lockdown browser, secure examination conduct, proctoring, examination quality

INTRODUCTION

The advent of the deadly and transmittable coronavirus (COVID-19) pandemic has posed a global threat to the education system. To combat circulation of this deadly disease, most countries enforced various restrictive measures, one of which included the suspension of all educational activities such as classroom lectures, workshops, etc. (Elsalem et al., 2021; Esposito & Principi, 2020). Prolonged school closure has led educational institutions globally to seek alternatives to support the optimisation of students' learning experience. As Information Technology (IT) and Learning Management System (LMS) are almost pervasively used as college-level instructional resources and student learning processes (Green, 1996; Mtebe, 2015), educational institutions globally have taken advantage of technological advances by shifting the entire teaching and learning (T&L) process from physical to a virtual platform. With that, students spend long hours online to attend classes, attempt questions, submit assignments, and to sit for examinations as a formal closure at the end of the course.

A challenge posed by the pandemic to most educational institutions globally was the method of conducting high-stake examinations to serve as "a holistic and qualitative appraisal of whether specified learning outcomes were achieved" (Perera-Diltz & Moe, 2014). Since examinations are recognised as

an integral part of the learning process, online examinations (also known as E-exams) have been adopted as the prime mode of delivery (Elsalem et al., 2021) in replacement of paper-based examinations.

E-exams are defined as a system where all aspects of the examinations are conducted using digital devices and submitted electronically (Cwil, 2019; Nguyen et al., 2017) through the web or the intranet (Ayo et al., 2007). With the increasing obtainability of online examination platforms options, E-exams are being increasingly implemented as a means of administrating examinations. Williamson (2018) stated that students who take E-exams usually make use of "their individual electronic devices in their own homes", thus creating a potential ground for unethical behaviour.

One significant matter concerning the examination environment is the need to protect academic integrity. Academic integrity is a vital prerequisite of academic quality as it implies that students have achieved "the learning intended to develop the necessary competencies and skills for a specific profession" (Guerrero-Dib et al., 2020). Ensuring academic integrity in E-exams must be a priority for reliable educational institutions as a lack of it diminishes the "quality of education and the reliability of assessment" (Shariffuddin & Holmes, 2009). This posed a challenge for educational institutions as there were concerns raised regarding academic dishonesty (Chirumamilla et al., 2020) when transitioning from paper-based to online examinations.

Hence, to maintain academic integrity in E-exams, Brown (2018) suggested that educational institutions consider four essential elements while developing the structure of E-exams. These include restricting access to the Internet while doing the examination, verifying the identity of candidates sitting for the examination, preventing communication between candidates during examinations, and hampering the use of secondary devices while taking tests.

In the process of planning the online examination structure, Sunway College Johor Bahru has identified four complementary mechanisms that can work impeccably to ensure a positive collective outcome. First and foremost, a secure platform is essential to carry out examinations. Having a secure examination platform enables candidates to make use of their own digital device, thus negating the need to spend on new computing facilities (Frankl & Schratt-Bitter, 2012). Secure examination platforms also ease the conduct of examinations, ranging from delivery of the exam to efficient data

management tasks which include marking and storing the information (Shraim, 2019).

Secure examination platform offers a range of diverse types of questions that include standardised questions such as multiple-choice questions (MCQs), single-choice questions, free text questions, and many more (Frankl & Schratt-Bitter, 2012). To maintain standards, candidates are also given a preset time limit to attempt these questions. Being able to incorporate diverse types of questions in the online examination reduces the risk of academic dishonesty. Farzin (2017) stated that the possibility of cheating is reduced when questions are presented to each candidate in a different order compared to their peers, or alternatively candidates are given a randomly chosen question for the question bank.

Technological tools available in the examination platform are used to mark students' answers accurately, thus improving reliability (Dermo, 2009; Baleni, 2015) of the scoring and robustness of test results (Shraim, 2019). They are beneficial as they reduce the burden of correction workload, thus saving time. This scoring system is mostly viable for MCQs and short-structured questions (Farzin, 2017). This enables educators to dedicate more time on marking free-text questions and reduce marking errors.

Secondly, the use of lockdown browsers is undeniably imperative in the conduct of online examinations. Lockdown browser is a special software that restricts student access to other websites, accessing other computer functions, applications, and files, and provides access only to resources or software approved by the examiner (Dawson, 2015) to prevent academic dishonesty. Nevertheless, lockdown browsers cannot prevent students from referring to their hardcopy course notes, accessing another device (mobile phone, iPad, etc.) to browse for relevant answers, or involving others for potential collusion via phone communication, photo sending, etc. during the examination. Apart from that, lockdown browsers also cannot prevent candidates from doing a cold boot attack (Dawson, 2015) to bypass them and cheat.

Hence, lockdown browsers should be complemented with the use of proctoring. One of the reasons candidates can cheat during examinations, regardless of whether the examination is paper-based or virtual, is due to poor or no proctoring practices (Dendir & Maxwell, 2020; Harmon et al., 2010). The tasks of "detecting and preventing cheating require the presence of a proctor" (Bawarith et al., 2017). Proctoring is the only way to "protect the

integrity of grades" by safeguarding that no substitute is taking the examination, candidates are not copying from other sources such as paper-based cheat sheets, or collaborating on the examination (Harmon et al., 2010). Hence, proctoring serves as the third complementary mechanism that makes the online examination conduct process notably more thorough in defending academic integrity.

Online proctoring may include web video recording and live online proctoring. The fourth mechanism, i.e. recording of the online examination process entirely from the reporting time until the end of examination, is mandatory as it serves as the main reference in the reflection of the actual situation during the online examination. The accessibility of a web-camera on students' electronic device needs to be activated to record the examination environment and students' behaviour during the period of the examination. In its effort to increase standards and academic integrity, the recording can be reviewed at a later stage for two reasons, i.e. for future enhancement of examination conduct and when there are suspicious activities or malpractices.

Problem Statement

For a post-secondary institution, ensuring that students and staff are acting in an academically integrous manner reinforces an institution's reputation such that an academic transcript, degree, or certificate has a commonly understood meaning, and certain knowledge and skills can be inferred of its holder. As a reputational educational institution in the southern region of Peninsular Malaysia, it is vital that the outcome of online examinations genuinely reflects the capabilities of students as they prepare for further studies or employment.

The key concern then is the academic integrity and quality of the delivery of online examinations. To a certain extent, the conduct of online examinations presents some limitations that potentially risk the act of academic dishonesty. Academic dishonesty relates to "any kind of cheating that occurs in relation to a formal academic exercise" (Munir et al., 2011) such as cheating in an examination. Hence, if the quality and integrity of online examinations are questionable, and no remedy efforts are being taken by institutions to rectify this, the outcome of online examinations would not reflect the genuine capabilities of the candidate. This will in turn disadvantage the students during university placement or employment and, from a worse perspective, tarnish

the reputation of the educational institution. Hence, the question remains as to what remedies should education institutions undertake to ensure that online examinations are conducted with quality and academic integrity.

Objective

Sunway College Johor Bahru upholds its core value as being passionate for excellence in its delivery of services by implementing four mechanisms recognised as complementary tools to maintain the quality standards and integrity in the conduct of online examinations. These measures were undertaken given the limitations of resources, such as time and available institutional support during the pandemic.

1. The online examination platform (Exam.net)
2. The lockdown browser (Secure Exam Browser, SEB)
3. The online proctoring platform (Google Meet)
4. The proctoring recording (Apowersoft)

In addition, observation through recorded proctoring videos will also be used to determine the effectiveness of online proctoring in detecting malpractices. Thus, the objective of this paper is to deliberate on whether the practices applied during the administration of online examinations are of good standard to safeguard quality and maintain academic integrity.

MATERIALS AND METHODS

Sunway College Johor Bahru first used online examinations using the Exam.net platform with proctoring in May 2020. In preparation for the examinations, all students are required to have two devices, which are a personal computer or laptop installed with lockdown browsers namely Safe Exam Browser (SEB) and a smartphone installed with Google Meet for proctoring purposes. Lecturers (referring to subject lecturers) on the other hand would have uploaded the examination papers to Exam.net whilst the invigilator creates the Google Meet link for proctoring. Thereafter, a briefing and trial run of the examinations will be conducted by the lecturers for the students. The trial run serves as an important measure to ensure the smooth running of the examinations in terms of technicality and for the students to familiarise themselves with the Exam.net platform.

On the day of the examination, the lecturer informs the candidates of the Google Meet link and they can enter the platform as early as 40 minutes prior to the commencement of the paper. The invigilator takes the attendance and performs a thorough surrounding check of the environment and permitted materials. The smartphone will be placed in a proper position, unmuted, showing the computer screen and the workstation. The Google Meet session will be recorded so that a replay of the session can be made at a later stage if the need arises. The invigilator-to-student ratio is 1:16 so that all students can be viewed on the computer screen simultaneously. The lecturer of the candidates will enter the Google Meet session as well to verify the identity of the students. The lecturer manning the Exam.net platform then gives an Exam Key via WhatsApp Web to the candidates 15 minutes prior to the commencement of the examination, allowing them to enter the Exam.net platform with SEB activated. The candidates will then wait at the lobby of Exam.net until the commencement of the examination.

If a disconnection occurs during the examination, whether in Google Meet or Exam.net, the lecturer can "force submit" the students' papers. When this happens, the students must communicate with the lecturer using WhatsApp Web to obtain a new Exam Key to re-enter onto Exam.net. Force submit is a necessary measure to disallow candidates from continuing to attempt the paper at the point of disconnection. In addition, no additional time will be compensated for the entire process of reconnecting to deter the candidates from intentionally disconnecting during the examination. Once reconnected, another surrounding check will be conducted to ensure compliance with standards. At the end of the examination session, the lecturer force submits all candidates' answers and ends the examination.

During the duration of the examination, the invigilators and the lecturers are in close communication using WhatsApp to communicate any irregularities and, at the same time, an IT specialist is on standby to provide prompt technical support. All queries about the examination questions can be forwarded to the lecturer using the Exam.net chat function. At the end of the examination, recording, invigilator's report, and attendance sheet will be stored securely and will only be accessible to the Head of Department and Programme Coordinator. If a suspected malpractice is observed by the invigilator, he/she will need to inform the Head of Department to enter the Google Meet session for observation. The lecturer is also informed to note the progress of the candidate on the examination paper in Exam.net. The

invigilator or the Head of Department reserves the right to request for another surrounding check or any remedial actions relevant to the suspected malpractice. A review of the recording is then done to confirm whether the malpractice happened.

In this paper, a questionnaire will be targeted to the 39 lecturers from the Pre-University programmes involved in the conduct of the recent online examination. Their responses will be quantitatively analysed to determine the compliance with standards and quality of the delivery of the online examinations compared to best practices worldwide. There are a total of 20 questionnaire items and a five-point Likert scale was created where three is the mid-point value showing the neutral position. Any value above three indicates agreement whereas any value below three indicates disagreement (Dermo, 2009). These questions are divided onto four principal areas which are critical in maintaining academic integrity in the conduct of online examinations.

The areas are the use of online examination platform (Exam.net) with lockdown browser (SEB), proctoring (Google Meet), and recording of the proctoring (Apowersoft).

RESULTS

All 39 respondents participated in the survey gave a 100% response rate. Table 1 below shows that all 20 questionnaire items received positive mean responses with a mean value of above three. The table also summarises the distribution of the percentage on disagreement and agreement on the 20 items being tested. The standard deviation across all the questionnaire items is low, indicating that the data is clustered closely around the mean.

Table 1 *Participants' responses on assessing academic integrity and quality in conducting online exams*

Questionnaire Items	Likert Scale 1 SD	2 D	3 N	4 A	5 SA	Mean	sd
1. **The online exam platform (Exam.net) is able to:**	**%**	**%**	**%**	**%**	**%**		
• adapt to all question types so that the students' understanding can be measured effectively.	0	36	26	28	10	3.13	1.03
• record any irregularities during exams (student remains idle for a long period of time).	0	5	36	41	18	3.72	0.83
• restrict students from continuing to attempt the exam (force submit) if any irregularities occur during the exams.	3	3	10	33	51	4.28	0.94
• provide a user-friendly interface for students to attempt the exam without any shortcomings.	0	15	18	54	13	3.64	0.9
• capture students' responses automatically on a timely manner to enable students to resume attempt at any time (with new key) without having to retype the answers.	0	0	5	38	56	4.51	0.6
2. **Lockdown browser (Safe Exam Browser-SEB) is able to:**							
• ensure that the students cannot open any other browsers during exam.	0	0	3	31	67	4.64	0.54
• stop students from opening another tab (websites) in the same browser.	0	0	0	36	64	4.64	0.49
• prevent students from accessing any materials saved in their local device used for the exam (laptop/personal computer).	0	0	10	28	62	4.51	0.68
• give the invigilator the security to focus on exam environment and check for any irregularities rather than on other exam related matters.	0	3	13	31	54	4.36	0.81
• help identify students who have intentionally left the exam platform.	0	3	15	26	56	4.36	0.84

3. **The proctoring platform (Google Meet) is able to:**							
• confirm the identity of the students.	0	3	10	31	56	4.41	0.79
• ensure that the exam environment is conducive, and the setup meets the required standards.	5	10	5	46	33	3.92	1.13
• confirm the students do not have access to unauthorised materials (books, cheat sheets, additional devices, unauthorised materials etc.).	8	15	10	54	13	3.49	1.14
• identify if students attempt to contact external parties for help during the exams.	8	5	15	44	28	3.79	1.15
• help invigilators detect exam disruptions or misconducts through visual and audio.	5	3	13	46	33	4	1.03
4. **The proctoring recording (using Apowersoft) is able to:**							
• identify malpractice amongst students or to confirm malpractice by reviewing recorded video post exam.	0	0	15	46	38	4.23	0.71
• serve as a reference for future exam conduct and improvement.	0	0	5	46	49	4.44	0.6
• help to record the overall exam conduct for quality assurance (invigilators instructions, exam commencement and ending times etc.	0	0	10	41	49	4.38	0.67
• eliminate any doubts for a suspected malpractice cases raised post exam.	0	3	13	54	31	4.13	0.73
• serve as an evidence in the investigation of any exam misconduct.	0	0	8	44	49	4.41	0.64

Note. SD: Strongly disagree, D: Disagree, N: Neutral, A: Agree, SA: Strongly Agree, sd: Standard deviation

The questionnaire also suggested a few combinations of the ideal implementations of online examination to maximise academic integrity and quality of the examinations. Participants were asked to choose one of the given options from a list, as shown in Table 2.

Table 2 *Participants' responses on ideal implementation of online examination based on different measures*

Ideal implementation of examinations so that the integrity and quality of the exams are not compromised.	Percentage (%)
Online platform + lockdown browser + proctoring + proctoring recording	85
Online platform + lockdown browser + proctoring	10
Online platform + proctoring + proctoring recording	3
Online platform + lockdown browser	3
Online platform + proctoring	0
Online platform	0

Thirty-three out of 39 (85%) of the respondents agreed that online examinations should be executed with the online examination platform, lockdown browser, proctoring, and proctoring recording so that the integrity and quality of the online examinations will not be compromised. This finding is in accordance with literature reviews on best practices for maintaining standards and quality for the conduct of online examinations.

DISCUSSION

From the results of the survey, a whopping 84% (mean = 4.28, sd = 0.94) of the lecturers responded positively (mean value above 3) that the platform can restrict students from continuing the attempt if any irregularities occur. These irregularities include disconnection from the proctoring device, being idle for too long on the examination platform, disconnection from the examination platform, and any other suspected malpractice observed by the invigilator or lecturer. This is an excellent measure to deter students from cheating as the time taken to reconnect would not be compensated. Thus, if the candidate intentionally disconnects to look at notes/other references, he/she will not be able to attempt the questions online as the paper has been force submitted by the lecturer at the point when the disconnection occurs.

Another noteworthy matter would be that 94% (mean = 4.51, sd = 0.60) of the respondents either agreed or strongly agreed that the examination platform is able to capture students' responses automatically and on a timely manner. This means that whenever an unintentional disconnection occurs, the platform is user friendly enough to allow students to reattempt the paper

without having the need to retype all answers. This means the full ability of the students can be tested even when unforeseen circumstances occur.

The versatility of the Exam.net platform in delivering diverse types of questions, however, can be deliberated upon as only 38% (mean = 3.13, sd = 1.03) of the lecturers had a positive response that it was able to adopt various question types. It will be noteworthy then to probe over this area for further improvements as the findings of Frankl & Schratt-Bitter (2012) stated that to maintain standards, a good platform should be able to adopt MCQs, single-choice questions, free-text questions, questions requiring mathematical equations and formulas, graphs, and many more. Due to various constraints, a few question types, especially those requiring complex mathematical computations, were difficult to implement. Nonetheless, there were provisions made to test the candidates in as many question types as possible (i.e., by slightly modifying questions and requirements).

The online examination platform Exam.net allows the lecturers to view the progress of the candidates in real time. This is a particularly important feature of the online examination platform as malpractices can be detected whilst observing the progress of the students. For example, a malpractice was confirmed when a candidate completed three fourths of the MCQ paper within the first five minutes from the commencement of the examination. This was picked up immediately by the lecturer and highlighted as a malpractice. This incident is an inevitable evidence to show that the standards and quality of the online examinations are not compromised.

The usage of a lockdown browser, the Safe Exam Browser (SEB), was well received by the majority of respondents as a critical measure to maintain integrity, quality and standards in online examinations. Ninety-eight per cent (mean = 4.64, sd = 0.54) of the lecturers indicated their positive response that with SEB, the candidates cannot open any other browsers during the examinations. In addition, 100% (mean = 4.64, sd = 0.49) of the lecturers positively believe that there was no way the students could cheat by opening other tabs or materials saved in the local device during the examinations. This is indeed an especially important measure to curb the attempt to cheat amongst the candidates. Most importantly, a candidate cannot attempt the paper on Exam.net unless it ran on SEB, thus compelling the students to install this function on their personal computer or laptop prior to the commencement of the examination session. These findings are in line with

best practices worldwide and the high percentage of agreement on this area also showed that the usage of SEB is indeed critical to maintaining the academic integrity in the conduct of online examinations.

The third area for maintaining quality and academic integrity of online examinations is proctoring. The efficiency of the proctoring platform (i.e. Google Meet) is debatable as only 67% (mean = 3.49, sd = 1.14) of the lecturers responded positively to the questionnaire item stating that online proctoring platform could conclusively confirm that the candidates do not have access to unauthorised materials during the examination. There was also some disagreement on whether the proctoring platform could effectively help invigilators to detect malpractices. A few reasons were put forward as to why the invigilators felt that way. One of it was that the position of the camera viewing the students was not wide ranging enough. The invigilator could only view the working area and the computer screen and hence it was not conclusive that there were no other unauthorised materials placed at areas not in view. Although a thorough surrounding check was conducted to ascertain the absence of a third party or unauthorised materials, malpractices could still have happened after the surrounding check is completed as the view of the working area was very restricted.

Another reason the respondents felt that the proctoring could have been more conclusive is the instability of Internet connection. Often during a proctoring session, the instability of the Internet connection of the candidates could result in a disconnection in audio or visual, or both. A candidate who is disconnected in the middle of the examination would present a leeway for them to cheat. Thus, it was imperative for the students to be briefed prior to the examination period to use stable Internet connectivity. In addition, it was also difficult for the invigilators to instantly detect if a candidate has disconnected from the meeting as invigilating online is quite a daunting task for some. The college adopted an invigilator-to-student ratio of 1:16, which is smaller than the invigilator-to-student ratio of 1:25 currently adopted for physical examinations. The rationale for this is that Google Meet only permits a maximum of 16 participants that can be viewed simultaneously on one screen.

Thus, the invigilators do not need to toggle between screens for proctoring. Hence, to pinpoint the exact candidate who has left the meeting, the invigilator would need to first match the attendance list to the list of participants on the proctoring platform. This would take some time and this time lapse gives an

opportunity for malpractices. With the limitations stated above, it is clear why there are differing opinions on the effectiveness of the proctoring platform in maintaining integrity in the conduct of online examinations, reflected with a slightly higher standard deviation compared to the other areas.

Despite the many limitations of the proctoring platform, it is also reassuring to note that quite a few malpractice cases were detected throughout the course of the online examinations using this platform. This serves as the best evidence to show that proctoring helps maintain academic integrity in the conduct of online examinations. It is also worthy to note that 87% (mean = 4.41, sd = 0.79) of the respondents felt positive that online proctoring was able to confirm the identity of the candidates. This is in line with the findings of Harmon et al. (2010) which states that proctoring is the only way to safeguard against substitutes taking the examination. Hence, though there are many high-tech and costly proctoring software available in the market which provide a more comprehensive proctoring system, Sunway College Johor Bahru has chosen Google Meet as the platform in the interest of cost and ease of implementation.

The final area for discussion is the function of proctoring recording. From the survey, 95% (mean = 4.44, sd = 0.60) of the respondents agreed that the recording serves as a reference for future examinations. A significant 93% (mean = 4.41, sd = 0.64) of respondents are also positive that the proctoring recording serves as evidence in the investigation of any misconduct. Reviewing the recording to provide evidence for misconduct proves that this measure is critical in maintaining academic integrity. Ninety per cent (mean = 4.38, sd = 0.67) of the respondents also agreed that the recording serves as a platform for discussion for the betterment of future examination sessions.

Therefore, it is imperative that future online examinations should include four aspects, namely having an online exam platform with SEB, proctoring and proctoring recording, as 85% of the respondents agreed that these measures were critical factors needed to maintain quality and academic integrity.

Moving forward, it would be necessary to consider a platform with greater adoptability of question types. Provisions should be made to papers requiring complex mathematical computation and graphing so that all types of skills required can be tested on the online examination platform. In addition, the method of proctoring can also be more conclusive, with the use of a wider

range view or by investing in a paid proctoring software. Reducing the invigilator-to-student ratio during examinations can also help maintain integrity as greater attention can be allocated to viewing the examination surroundings and the candidates. In addition, proper disciplinary procedures should be in place and candidates should be briefed so that malpractices can be deterred.

Finally, costing becomes a major limitation in the conduct of online examinations as a comprehensive examination platform and conclusive proctoring software can be expensive. As the quality and integrity of the examinations cannot be compromised, educational institutions would have to weigh the need for costly online examination and proctoring platforms against the quality that complementary platforms can provide. If modifications can be made to complementary platforms to maintain quality, then learning institutions can choose to adopt free platforms. albeit with some inconveniences.

CONCLUSION

Maintaining academic integrity in the conduct of online examinations is an uphill task for educational institutions. Due to that, conclusive and calculated measures to meet standards need to be implemented for the execution of online examinations. This study confirms that Sunway College Johor Bahru has maintained quality and academic integrity in the conduct of online examinations by implementing four mechanisms recognised as complementary tools. These mechanisms are the usage of online examination platform with a lockdown browser, proctoring, and proctoring recording. Academic integrity in the conduct of examinations is an important aspect in the delivery of a course as the outcome of the examination determines the grades that a student will get. A good pass in the examination means that a student has achieved the desired course and learning outcomes, indicating that the student is well groomed to take on the challenges of working life and adulthood. In addition, employers benchmark the eminence of an employee based on academic scores, and a reliable learning institution should always execute an all-encompassing and fair assessment method. This is to ensure that the capabilities of the students are reflected well by their academic grades. Hence, it is vital that Sunway College Johor Bahru continues to conduct examinations with the highest integrity possible, so that graduates can achieve the standards required for gainful employment in the future.

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REFERENCES

Ayo, C., Akinyemi, I. O., Adebiyi, A., & Ekong, U. (2007). The prospects of E-examination implementation in Nigeria. *The Turkish Online Journal of Distance Education*, *8*. http://eprints.covenantuniversity.edu.ng/2093/1/article_10.pdf

Baleni, Z. G. (2015). Online formative assessment in higher education: Its pros and cons. *Electronic Journal of E-Learning*, *13*(4), 228–236. https://files.eric.ed.gov/fulltext/EJ1062122.pdf

Bawarith, R., Abdullah, B., Anas, F., & Gamalel-Din, S. (2017). E-exam cheating detection system. *International Journal of Advanced Computer Science and Applications, 8*. https://doi.org/10.14569/IJACSA.2017.080425

Brown, V. (2018). Evaluating technology to prevent academic integrity violations in online environments. *Online Journal of Distance Learning Administration*, 21(1), EJ1173456.

Chirumamilla, A., Sindre, G., & Nguyen-Duc, A. (2020). Cheating in e-exams and paper exams: The perceptions of engineering students and teachers in Norway. *Assessment & Evaluation in Higher Education*, *45*(7), 940–957. https://doi.org/10.1080/02602938.2020.1719975

Cwil, M. (2019). Teacher's attitudes towards electronic examination: A qualitative perspective. *International Journal of Learning and Teaching*, *1*, 77–82. https://doi.org/10.18178/ijlt.5.1.77-82

Dawson, P. (2015). Five ways to hack and cheat with bring-your-own-device electronic examinations. *British Journal of Educational Technology*. *47*(4), 592–600, https://doi.org/10.1111/bjet.12246

Dendir, S., & Maxwell, R. S. (2020). Cheating in online courses: Evidence from online proctoring. *Computers in Human Behavior Reports, 2*, 100033. https://doi.org/10.1016/j.chbr.2020.100033

Dermo, J. (2009). E-assessment and the student learning experience: A survey of student perceptions of e-assessment. *British Journal of Educational Technology*, *40*, 203–214. https://doi.org/10.1111/j.1467-8535.2008.00915.x

Elsalem, L., Al-Azzam, N., Jum'ah, A. A., & Obeidat, N. (2021). Remote E-exams during COVID-19 pandemic: A cross-sectional study of students' preferences and academic dishonesty in faculties of medical sciences. *Annals of Medicine and Surgery, 62*, 326–333. https://doi.org/10.1016/j.amsu.2021.01.054

Esposito, S., & Principi, N. (2020). School closure during the coronavirus disease 2019 (COVID-19) pandemic: An effective intervention at the global level? *JAMA Pediatrics, 174*(10), 921. https://doi.org/10.1001/jamapediatrics.2020.1892

Farzin, S. (2017). Attitude of students towards E-examination system: An application of e-learning. *Science Journal of Education*, *4*(6), 222. https://doi.org/10.11648/j.sjedu.20160406.19

Frankl, G., & Schratt-Bitter, S. (2012, October 26). Online exams: Practical implications and future directions. https://www.semanticscholar.org/paper/Online-Exams%3A-Practical-Implications-and-Future-Frankl-Bitter/170e30e22e47c0ef70d2ff018e1937d94bcf04ab

Green, K. C. (1996). The coming ubiquity of information technology. *Change: The Magazine of Higher Learning, 28*(2), 24–28. https://doi.org/10.1080/00091383.1996.9937746

Guerrero-Dib, J. G., Portales, L., & Heredia-Escorza, Y. (2020). Impact of academic integrity on workplace ethical behaviour. *International Journal for Educational Integrity*, *16*(1), 2. https://doi.org/10.1007/s40979-020-0051-3

Harmon, O. R., Lambrinos, J., & Buffolino, J. (2010). Assessment design and cheating risk in online instruction. *Online Journal of Distance Learning Administration*, *13*(3). https://www.learntechlib.org/p/52616/

Mtebe, J. S. (2015). Learning management system success: Increasing Learning Management System usage in higher education in Sub-Saharan Africa. *International Journal of Education and Development Using Information and Communication* Technology, *11*(2), 51–64. https://files.eric.ed.gov/fulltext/EJ1074158.pdf

Munir, M., Ahmad, Z., & Shahzadi, E. (2011, February 8). A study on academic dishonesty of university students. https://doi.org/10.13140/2.1.1196.8002

Nguyen, Q., Rienties, B., Toetenel, L., Ferguson, R., & Whitelock, D. (2017). Examining the designs of computer-based assessment and its impact on student engagement, satisfaction, and pass rates. *Computers in Human Behavior*, *76*, 703–714. https://doi.org/10.1016/j.chb.2017.03.028

Perera-Diltz, D., & Moe, J. (2014). Formative and summative assessment in online education. *Journal of Research in Innovative Teaching, 7*(1). https://digitalcommons.odu.edu/chs_pubs/37

Shariffuddin, S., & Holmes, R. (2009). Cheating in examinations: A study of academic dishonesty in a Malaysian college. *Asian Journal of University Education*, *5*, 99–124. https://education.uitm.edu.my/ajue/wp-content/uploads/2019/04/Cheating-in-Examinations-A-Study-of-Academic-Dishonesty-in-a-Malaysian-College-.pdf

Shraim, K. (2019). Online examination practices in higher education institutions: Learners' perspectives. *Turkish Online Journal of Distance Education*, 185–196. https://doi.org/10.17718/tojde.640588

Williamson, M. (2018). Online exams: The need for best practices and overcoming challenges. *The Journal of Public and Professional Sociology*, *10*(1). https://digitalcommons.kennesaw.edu/jpps/vol10/iss1/2

EMBEDDING RESEARCH INTEGRITY TO ENSURE QUALITY OF HIGHER EDUCATION IN MALAYSIA

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ABSTRACT

Background The Academy of Sciences Malaysia established the Young Scientists Network-Academy Sciences of Malaysia (YSN-ASM) Responsible Conduct of Research (RCR) Programme in 2015 to create awareness on RCR in Malaysia. One of the key objectives of this programme was to facilitate the establishment of a formal RCR education in higher education institutions in Malaysia.

Aim A survey was conducted to provide a preliminary landscape of the RCR knowledge and awareness among researchers in higher education institutions in Malaysia.

Methods A series of three RCR workshops were conducted in 2015 and the participants were invited to answer a pre-workshop questionnaire. The participants were asked a range of questions concerning their knowledge and awareness of RCR.

Findings A total of 62 participants took the survey and the results show that only around 30% of the respondents had previously attended courses related to research ethics. The majority of them attended these courses during their postgraduate studies. Almost 70% of the respondents claimed that their universities did not provide them with a clear guidance on how to report suspicious research conduct. On defining and explaining key concepts of

RCR, the majority of the respondents were able to define plagiarism correctly but most of them were not able to describe or explain other terms, especially the concept of Dual-Use Research of Concern.

Conclusion Our study shows that there is a need to create more awareness and improve the knowledge level of RCR amongst researchers in Malaysia. There is also a need to ensure that clear institutional guidelines on detecting and reporting research misconduct are established and communicated to the researchers.

Keywords Responsible conduct of research, research misconduct, research integrity, research ethics

INTRODUCTION

Malaysia has seen rapid progress in its research, development, and commercialisation landscape. The Malaysian government has continually strengthened its efforts in increasing research funding, training of highly qualified scientists, and improving the infrastructure for high-impact science (Academy of Sciences Malaysia, 2015). To further promote scientific excellence and increase research output, higher education institutions (HEIs) and individuals are frequently incentivised to publish. The government's collective initiative to promote a robust culture of research, development, and commercialisation has led Malaysian researchers to dramatically increase their research productivity over the past decade, as assessed based on the number of research articles published and patents filed (National Science and Research Council, 2013; Academy of Sciences Malaysia, 2015). Nevertheless, there is a growing concern that the increased focus on output is detracting away from the altruistic purpose of research. It is thought that if researchers are rewarded for achieving surrogate outputs, motivation to achieve the intended outcomes will eventually diminish. Furthermore, it is alarming that increased individual incentivisation in the background of increased competition for research funding may drive researchers to irresponsible conduct of research (Edwards & Roy, 2016).

Recently, the Malaysian research ecosystem was rocked by a report that listed Malaysia as the country with the 5th highest percentage of predatory journal articles relative to the total articles published between 2015 and 2017 (Macháček & Srholec, 2021). Although the "publish or perish" culture is perceived as the root cause of this unfortunate practice, the issue of predatory journals represents only the tip of the iceberg of a much more pervasive and chronic issue of research integrity. Concerns over irresponsible research practices are not unique to Malaysia. In fact, research misconduct has been found to be pandemic, where significant cases have been reported in many institutions of repute around the world (Fanelli, 2009; Kennedy, 2006; Saunders & Savulescu, 2008; Service, 2003). Due to the complexity of the various interactions and processes that exist in the research and development (R&D) ecosystem, increasing policy and legal frameworks alone is insufficient to mitigate research misconduct. Where there is a need for adequate legal frameworks, there is a greater need to foster a culture of research integrity through responsible conduct of research (RCR) education (Chau et. al., 2018). The quality of science education at HEIs is dependent on the ability to foster a responsible R&D ecosystem that nurtures and educates socially and professionally responsible researchers who champion research integrity and excellence. Failure to maintain research integrity will result in significant erosion of trust with severe social, economic, and political ramifications.

In 2013, the United States National Academies of Sciences, Engineering and Medicine (NASEM) in collaboration with the Academy of Sciences Malaysia (ASM) and the Higher Education Leadership Academy Malaysia (AKEPT) established the Education Institute for Responsible Science in Kuala Lumpur. A similar institute had previously been established by NASEM for the Middle East and North Africa (MENA) region (Berger et al., 2013; Clements et al., 2013). In 2015, the ASM established the Young Scientists Network-Academy of Sciences Malaysia RCR Programme to create awareness on RCR through the delivery of workshops, seminars, and talks as well as to create an RCR education module for Malaysian researchers and students. In this study, we report the data obtained from a survey that was conducted to provide a preliminary landscape of RCR knowledge and awareness among researchers in HEIs in Malaysia.

MATERIALS AND METHODS

Subjects: A series of three RCR awareness workshops were conducted in October, November and December of 2015. The workshops were opened to academics from public HEIs in Malaysia. The workshop participants were asked to complete a questionnaire and they were briefed about the purpose of the study and also the intended use of the findings of the study. The participants were assured of the anonymity of the survey and their participation in this study was on a voluntary basis. The participants were asked to sign a consent form if they agreed to participate in the survey. Only those who signed the consent form were invited to complete the questionnaires. This study was approved by Sunway University Research Ethics Committee (Ethics Approval Number: SUREC 2020/093).

Questionnaire: The questionnaire consisted of different sections including demographics, knowledge and practice in the context of RCR. The participants were asked if they had attended any RCR or research ethics-related courses before. They were also asked if their university provided them with clear guidance on how to report suspicious research misconduct. Finally, the participants were asked if their institutions provided any form of formal training on RCR or research ethics.

RESULTS

General demographics

A total of 62 participants from seven major public HEIs in Malaysia attended and completed the inaugural series of Young Scientists Network-Academy of Sciences RCR awareness workshops. Correspondingly, 62 survey questionnaires were collected from these three workshops. The demographics of the participants are presented in Table 1. Of the 62 respondents, 56.5% were females and 43.5% were males. The majority of the respondents were 40 years old or less (n=54, 87.1%), holding junior academic positions such as lecturer and senior lecturer (n=54, 87.1%).

Table 1 *Respondents' demographic distribution*

Items		N	%
Gender	Male	27	43.5
	Female	35	56.5
Age	≤ 30 years old	14	22.6
	31-40 years old	40	64.5
	> 40 years old	7	11.3
	Missing	1	1.6
Position	Lecturer	11	17.7
	Senior lecturer	43	69.4
	Associate professor	3	4.8
	Professor	0	0.0
	Post-doctoral fellow	2	3.2
	Research fellow	0	0.0
	Senior research fellow	0	0.0
	Others	3	4.8

Previous Training Experience and Awareness of Institutional Guidance on RCR

Only about one-third (n=21, 33.9%) of the respondents reported that they had previously attended training that was related to research ethics (Table 2). For those who have attended RCR-related courses, most of them attended courses related to animal ethics, human ethics, and plagiarism. The majority of those who had attended previous training underwent this training during their post-graduate studies (n=16, 76.2%), followed by after they had begun their academic careers at their universities (n=10, 47.6%). On the issue of reporting suspicious research conduct, almost 70% of the respondents claimed that they were not aware of any clear guidance set out by their institution on how to report suspicious research conduct.

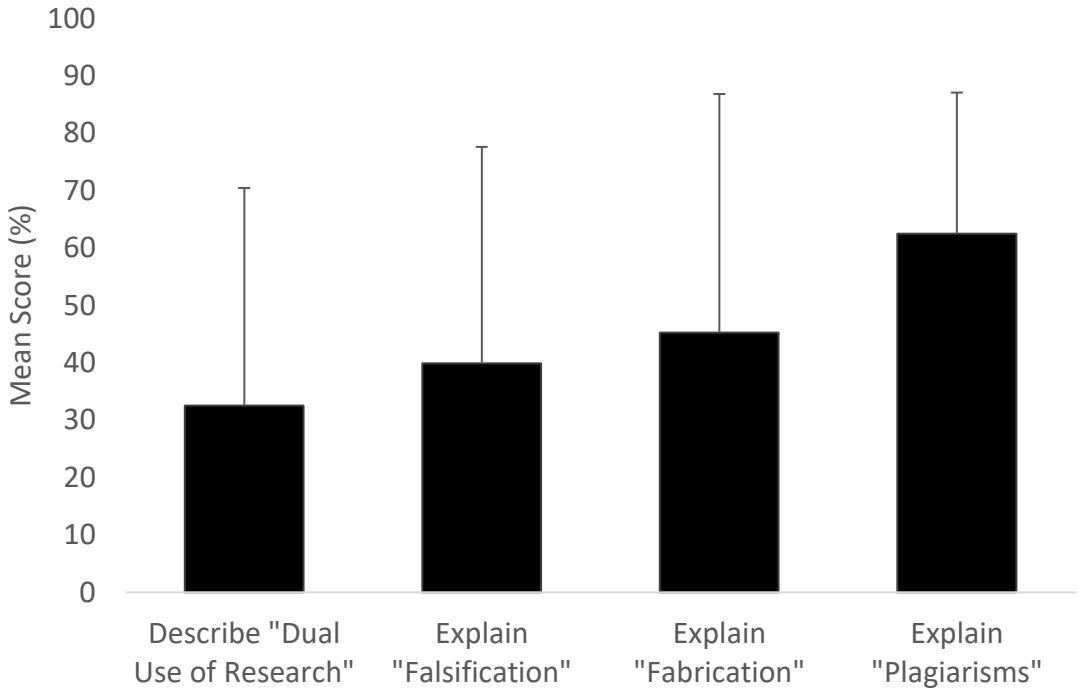
Table 2 *Respondents' previous exposure to research ethics-related training and awareness of institutional guidelines on the reporting of suspicious research conduct.*

Items	Options	N	%
Have you ever attended any course/training that discusses ethical issues concerning research?	No	41	66.1
	Yes	21	33.9
If the respondents answer "yes", they proceeded to answer the question below:			
When did you attend such course/training? (May choose more than one option)	During undergraduate study	0	0.0
	During post-graduate study	16	76.2
	During post-doctoral training	0	0.0
	After I became an academic staff at the university	10	47.6
	Others	0	0.0
My university provides me with clear guidance on how to report suspicious research conduct.	No	39	68.4
	Yes	18	31.6
	Item nonresponse	5	8.1

Gaps in RCR knowledge

The respondents were asked to provide the description or explanation of several key RCR concepts or terms. Responses were graded by three independent assessors. The mean knowledge score of the 62 respondents was 30.0% of a maximum possible total of 100.0%. The highest individual score was 70.8% while the lowest score was 0.0%. The majority of the respondents were able to explain plagiarism adequately. However, the majority of the respondents were not able to explain fabrication (62.9%) and falsification (59.6%) adequately. The topic in which the respondents performed poorest was the concept of dual-use research of concern (DURC), whereby 93.5% of the respondents failed to describe this term adequately. The corresponding mean scores of the respondents' attempt at describing or explaining the terms: falsification, fabrication, plagiarism and DURC are presented in Figure 1.

Figure 1
Mean score of respondents' attempts at describing or explaining DURC, falsification, fabrication, and plagiarism; error bars are SD



DISCUSSION

About two-thirds of respondents have never attended any RCR-related courses. It was not surprising that the majority of previous training involved animal and human ethics as both these areas are governed by well-established regulatory policies in Malaysia as well as abroad. Typically, researchers who conduct research using animal or human subjects must attend courses related to animal or human ethics. Plagiarism, on the other hand, is also a wide-spread issue in Malaysia due to the relatively low English language proficiency as well as poor understanding of what constitutes plagiarism. Therefore, many universities have begun to offer courses to teach scientific writing with an emphasis on plagiarism.

The majority of respondents attended RCR-related training during their post-graduate studies. This is in line with the period whereby the majority of respondents would have begun their intensive research experience as postgraduate students. Although not specified in this questionnaire, it is likely that these respondents had received these trainings abroad because we are not

aware of any public HEI in Malaysia that provides a structured research ethics course as part of the general training of all scientists when this study was conducted. Although research methodology courses are offered in some Malaysian universities, these courses tend to emphasise more on research design and statistical methodology rather than on research ethics. Therefore, we recommend the need to incorporate research ethics as a core component in these research methodology courses. Nevertheless, in recent years, a number of HEIs have begun to develop research ethics course that incorporates essential RCR concepts in the training.

Disconcertingly, more than two-thirds of the respondents claimed that they were not aware of any clear guidance set out by their institution on how to report suspicious research conduct. This finding might not necessarily mean that the universities do not have any guidelines; instead, it could be that these guidelines have failed to reach the respondents' consciousness. The failure to communicate these guidelines, if available, could be caused by either a lack of institutional effort in transmitting this information or a general lack of awareness on the part of the individual researcher to seek and obtain this information (Eastwood et al., 1996).

In terms of RCR knowledge, the mean knowledge scores reflect the significant gaps in research integrity training. While the majority of the respondents were able to explain plagiarism adequately, most struggled to adequately explain or describe various terms. Similar findings were observed in comparable studies that were conducted in Norway (Hofmann et al. 2013) and Egypt (El-Shinawi et al., 2016), in which approximately 60% of the respondents (doctoral and medical students) did not understand the difference between falsification and fabrication. This failure indicates a poor understanding of the basic concepts of research misconduct. The inability to accurately define these terms clearly explains why many Malaysian researchers use both these terms interchangeably.

The topic in which the respondents performed poorest was the concept of DURC, whereby 93.5% of the respondents failed to define this term correctly. Dual-use research of concern is defined as research that is conducted for legitimate purposes but can be misused for harmful purposes (The United States Government, 2014). The term is typically used in life sciences but it can be extrapolated to all branches of science. This globally emerging topic is a

new concept to most Malaysian researchers, especially those who are not actively involved in biosafety and biosecurity. Nevertheless, in the background of the impending terror and security threats posed by the advent of new genetic, nanomaterial, artificial intelligence, and 3D-printing technologies that are easily replicable, knowledge on DURC needs to be made mainstream.

CONCLUSION

The rapid rise in R&D activity in Malaysia has put a spotlight on the need to address issues concerning RCR such as research misconduct, irresponsible authorship and publication practices, and dual-use research of concern. While some respondents had undergone RCR-related courses and were able to define key RCR concepts, the vast majority failed to adequately describe or explain most of the RCR terms; suggesting a significant gap in knowledge. Therefore, more efforts are needed to ensure the greater spread of RCR awareness and to develop a systematic RCR training programme for all researchers in Malaysia. One of the key areas of RCR is the fostering of social responsibility; encouraging researchers to expand their role in serving public and other external stakeholder interest. This includes the responsibility of researchers in ensuring that science and technology improves quality of life, promotes equity and social justice, and safeguards security and safety. While researchers strive to maximise the positive potential of science and technology while progressing their individual careers, creating trust through the fostering of RCR in the Malaysian R&D ecosystem is equally imperative. The quality of training of future generation of scientists is inextricably linked to the successfully embedding of research integrity into the soul of our national R&D ecosystem.

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REFERENCES

Academy of Sciences Malaysia. (2015). *Science outlook action towards vision.* Academy of Sciences Malaysia, Kuala Lumpur.

Berger, K. M., Husbands, J., Sture, J., Khan, E., & Cohen, M. (2013). *Future opportunities for bioengagement in the MENA region*. American Association for the Advancement of Science Washington DC.

Chau, D.M., Chai, L.C., Veerakumarasivam, A. (Eds.). (2018). *Malaysian educational module on responsible conduct of research*. Academy of Sciences Malaysia, Kuala Lumpur.

Clements, J. D., Connell, N. D., Dirks, C., El-Faham, M., Hay, A., Heitman, E., Stith, J. H., Bond, E. C., Colwell, R. R., Anestidou, L., Husbands, J. L., & Labov, J.B. (2013). Engaging actively with issues in the responsible conduct of science: Lessons from international efforts are relevant for undergraduate education in the United States. *CBE-Life Sciences Education*, *12*(4), 596–603. https://doi.org/10.1187/cbe.13-09-0184

Eastwood, S., Derish, P., Leash, E., & Ordway, S. (1996). Ethical issues in biomedical research: Perceptions and practices of postdoctoral research fellows responding to a survey. *Science and Engineering Ethics*, *2*(1), 89–114. https://doi.org/10.1007/BF02639320

Edwards, M. A., & Roy, S. (2016). Academic research in the 21st century: Maintaining scientific integrity in a climate of perverse incentives and hypercompetition. *Environmental Engineering Science*.

El-Shinawi, M., Mohamed, K. O., Fouad, Y. A., Fahmy, Y. M., Asar, H. A., Khalil, M. G., ... & Mohamed, M. M. (2016). Assessing the awareness of Egyptian medical students about responsible conduct of research and research ethics: Impact of an educational campaign. *Accountability in Research*, *23*(4), 199–218. https://doi.org/10.1080/08989621.2015.1127762

Fanelli, D. (2009). How many scientists fabricate and falsify research? A systematic review and meta-analysis of survey data. *PLOS One*, *4*(5), e5738. https://doi.org/10.1371/journal.pone.0005738

Hofmann, B., Myhr, A. I., & Holm, S. (2013). Scientific dishonesty: A nationwide survey of doctoral students in Norway. *BMC Medical Ethics*, *14*(1), 1. https://doi.org/10.1186/1472-6939-14-3

Kennedy, D. (2006). Editorial retraction. *Science*, *311*(5759), 335. https://doi.org//10.1126/science.1124926

Macháček V, & Srholec M. (2021). Predatory publishing in Scopus: Evidence on cross-country differences. *Scientometrics*, *7*, 1–25. https://doi.org/10.1007/s11192-020-03852-4

National Science and Research Council. (2013). *PRA performance evaluation: unlocking vast potentials, fast-tracking the future.* Universiti Teknologi MARA Press, Shah Alam, Selangor Darul Ehsan

Saunders, R., & Savulescu, J. (2008). Research ethics and lessons from Hwanggate: What can we learn from the Korean cloning fraud? *Journal of Medical Ethics*, *34*(3), 214–221. http://doi.org/10.1136/jme.2007.023721

Service, R. F. (2003). Scientific misconduct. More of Bell Labs physicist's papers retracted. *Science (New York, NY), 299*(5603), 31. https://doi.org/10.1126/science.299.5603.31b

The United States Government. (2014). *United States government policy for institutional oversight of life sciences dual use research of concern.* https://www.phe.gov/s3/dualuse/documents/durc-policy.pdf

ASSESSING UNDERGRADUATE BIOLOGICAL SCIENCES STUDENTS' EXPERIENCES AND SATISFACTION WITH ONLINE LEARNING AMID THE COVID-19 PANDEMIC

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ABSTRACT

Background In response to the public health threat of rising COVID-19 infections, higher education institutions (HEIs) around the world switched to online learning to limit the negative impact on students' academic progression.

Aim This study aimed to understand the online learning experiences and satisfaction levels of biological sciences undergraduates in a private HEI in Malaysia. The aim supports the academic department's quality assurance process for the enhancement and improvement of existing online teaching and learning approaches.

Methods An anonymous and self-administered online questionnaire containing both Likert scale and open-ended questions was developed. The recruitment of respondents was done via convenience sampling and participation was completely voluntary.

Findings A total of 120 respondents, representing 62% of the existing biological sciences undergraduate population, responded to the online survey. Overall, the respondents were satisfied with their online learning experience

(7.08 ± 1.88) and scored the academic department highly (7.88 ± 1.69) in terms of helpfulness in supporting their online learning journey (scale 1 to 10, with 10 being the highest satisfaction level). Despite the respondents having generally expressed their satisfaction regarding their online learning experience, certain areas such as the impact of online classes on students' motivation for their learning warrants further investigation.

Conclusion The current study provides a benchmark against which the efficacy of various interventional strategies planned by the academic department can be assessed in the future. As the realities of the current pandemic continue to impact how HEIs around the world operate, continual evaluation of online teaching and learning as well as student engagement strategies is necessary to ensure students' satisfaction and ultimately, the delivery of quality education.

Keywords Online learning, student satisfaction, undergraduates, biological sciences

INTRODUCTION

Conventional teaching and learning (T&L) activities typically involve face-to-face (F2F) interactions in which students and lecturers come together and engage in a physical learning space. Blended learning involves the use of technology-supported materials or activities to complement or replace F2F learning; whereby online delivery, including the use of Blackboard learning management system, collaborative online platform Padlet, and real-time online game based learning platforms, would typically cover 30-79% of course content (Apandi & Raman, 2020; Boettcher & Conrad, 2016). The pandemic has led to the rapid migration from F2F or blended learning to 100% online and/or remote learning (Dhawan, 2020). For example, HEIs in Malaysia stopped F2F T&L delivery following the implementation of the Movement Control Order (MCO) on 18th March 2020 as an attempt to curb the spread of COVID-19. Since then, classes have been conducted solely or partially online; depending on the guidance by the relevant authorities based on the evolving COVID-19 situation. In many instances, the move to online learning was rapid. As a result, many challenges faced by both learners and instructors

emerged. These challenges include technology-related issues, distractions during remote and online learning, heavy workload during the transition period, changes to the assessment and supervision approaches, and the incompatibility of online T&L activities with certain disciplines that require the use of laboratories and specialised equipment (Adedoyin & Soykan, 2020; Aguilera-Hermida, 2020).

Despite these challenges, online T&L offers various advantages, including time and location flexibility as well as the ability to cater to the needs of a heterogenous audience (Dhawan, 2020). Online T&L has also driven academics to explore innovative teaching pedagogies such as the use of collaborative platforms and virtual reality teaching aids to provide an engaging learning experience (Martin et al., 2017; Scull et al., 2020). Online T&L is the new normal, and it is no longer an option but a necessity (Dhawan, 2020). Accepting this fact is essential for academic leaders to progressively transform from the initial frantic and rapid transition to a more holistic and concerted approach to online T&L.

The purpose of this study is to characterise the online T&L experiences, specifically in terms of motivation, engagement with classmates and lecturers, as well as the general satisfaction levels of undergraduate students who were enrolled in biological sciences programmes offered by an academic department at a private HEI in Malaysia. Students were asked to rate how helpful the academic department was in supporting them during these unprecedented times as well as to share the various unique challenges that they may have faced. The student feedback and comments provide valuable insights for the development of effective mechanisms to improve student engagement and satisfaction, and the achievement of learning outcomes.

MATERIALS AND METHODS

Following the implementation of MCO, the Department of Biological Sciences at a private higher education institution (HEI) switched to a fully online T&L delivery. During the recovery MCO (RCMO), although certain categories of students were progressively allowed to return to campus, a dual-mode delivery was introduced as many students were still unable to return to campus for a variety of reasons.

Study design: An anonymous, self-administered questionnaire was disseminated between February and March 2021 to undergraduate students who enrolled in three biological sciences bachelor's degree programmes at the HEI.

Questionnaire development and data collection: The questionnaire aimed at assessing students' satisfaction and experiences with online learning. In the first part of the questionnaire, respondents' demographic information such as age, year of study as of February 2021, and nationality (Malaysian or International) were collected. The second part consisted of five-Likert scale questions aimed at characterising the respondents' experiences and satisfaction levels with their online learning. In the final part of the questionnaire, an open-ended question was asked to understand the unique challenges that respondents faced regarding their online learning experience during the pandemic. The questionnaire typically took between 5 and 10 minutes to complete. The recruitment of respondents was done via convenience sampling, whereby the questionnaire was shared on the students' online management platform. Participation was voluntary and no compensation was provided. Data collected were analysed using Microsoft Excel to obtain descriptive statistics including mean, mode, and standard deviation.

RESULTS

A total of 120 students responded to this survey. The number is equivalent to 61.9% of the total undergraduate students (i.e. 29.2%, 42.7% and 29.2% were Year 1, 2 and 3 students, respectively) enrolled in the degree programmes. International students accounted for 22.5% of the respondents. The age range of the respondents was between 18 and 25, with an average age of 21 $\pm$1.5 years.

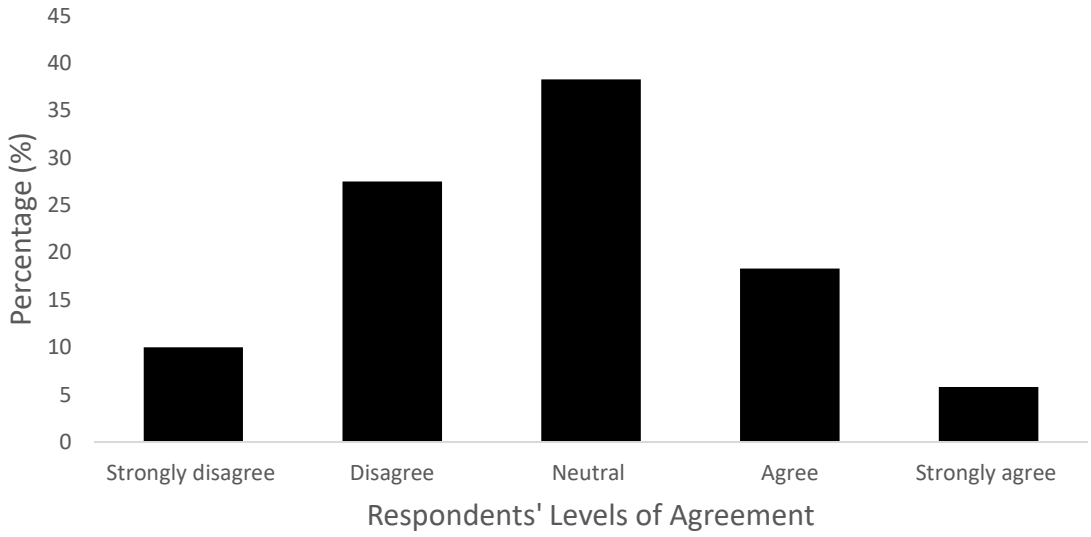
Does online learning keep students motivated to learn new knowledge and skills?

Respondents were asked to select either 'Strongly Disagree', 'Disagree', 'Neutral', 'Agree' or 'Strongly Agree' to the statement '*Online classes keep me motivated to learn new knowledge and skills*'. The highest proportion of respondents (38.3%) selected 'Neutral', indicating that online learning may not have motivated students to learn new knowledge and skills (Figure 1). More respondents disagreed that online classes motivated them to learn (10.0% strongly disagreed and 27.5% disagreed) as compared to those who agreed

(18.3%) and strongly agreed (5.8%). A similar pattern was observed across all years of study (data not shown).

Figure 1

Percentage distribution of respondents' agreement levels to the statement 'Online classes keep me motivated to learn new knowledge and skills'

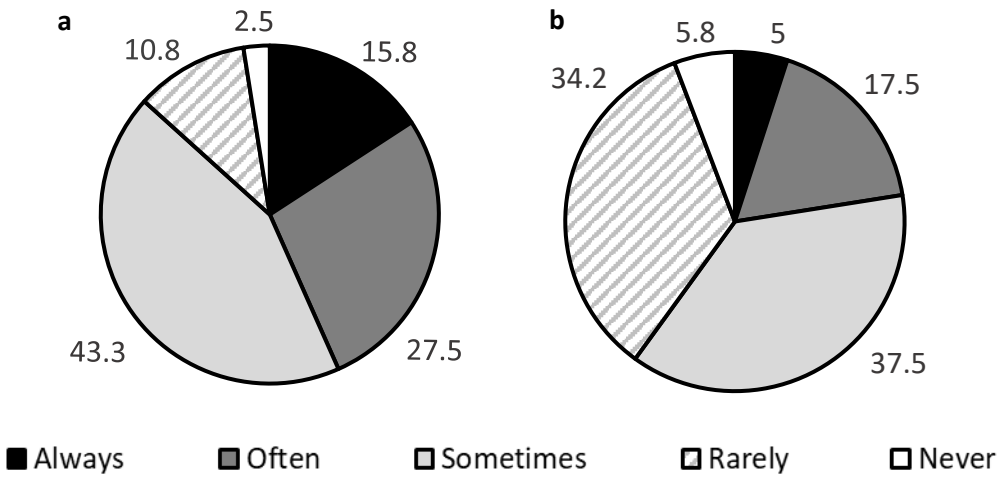


How Challenging Was It for Students to Engage with Their Classmates and Lecturers During Online Learning?

Respondents were asked to select either 'Always', 'Often', 'Sometimes', 'Rarely' or 'Never' to the statement '*During the pandemic, I find it challenging to engage with classmates*. Evidently, engagement with their classmates was impeded during online learning, with 15.8% of respondents selecting 'Always', 27.5% 'Often', and 43.3% 'Sometimes'. About 13.3% of respondents claimed that they 'Rarely' or 'Never' found it a challenge to engage with their classmates (Figure 2a). When respondents were asked to evaluate the engagement with their lecturers, the majority (60%) of them found it challenging (5% 'Always', 17.5% 'Often', and 37.5% 'Sometimes') (Figure 2b), although to a lesser extent as compared to peer-to-peer engagement (Figure 2a); 40% of the respondents claimed that they 'Rarely' or 'Never' found it a challenge to engage with their lecturers.

Figure 2

Percentage distribution of respondents' response to the question on how challenging it was to engage with (a) classmates and (b) lecturers during the pandemic



What Other Challenges Did the Students Face During Online Learning?

To identify other challenges associated with online learning, an open-ended question on challenges faced by respondents was posted. Of the 120 respondents, 80 responded to this question. Four themes emerged from the collated responses:

(i) Engagement with classmates and lecturers

Many respondents felt that the move to online learning reduced their interaction and engagement with classmates and lecturers compared to F2F classes. Generally, Year 1 respondents cited that the low engagement with peers stemmed from not having formed a tangible bond or friendship with them. As a consequence, respondents found it challenging to work with '*strangers*' for their group work assignments. Interestingly, Year 2 and 3 respondents also provided feedback pertaining to challenges to group work assignments. Although they had the advantage of getting to know their classmates in previous F2F lessons, they found that the lack of equally motivated group members made it challenging for the '*high-achiever*' students to score higher marks in group assignments.

In terms of lecturer engagement, the respondents' responses were mixed. While a number of respondents' feedback indicated that they felt engaged

during online classes, as the lessons were fun and engaging, others noted that certain lessons seemed monotonous and lacked engaging online activities. Consequently, the lack of lecturer engagement affected students' motivation to learn and ultimately their satisfaction levels. The lack of F2F interactions also led to respondents citing challenges in engaging some lecturers and not receiving feedback in a timely manner.

(ii) Internet connectivity and technological challenges

Internet connectivity and technological challenges include issues with live streaming classes due to low bandwidth, difficulty in accessing specific programs or software, and challenges in using the Blackboard Learning Management System. One of the participants stated that '*E-learn* (was) *hard to use*' and another mentioned '*Basically, poor internet connectivity happens. Sometimes, the lectures weren't properly recorded on BBC (Blackboard Collaborate) causing the recordings to have parts that couldn't be viewed/heard clearly*'. In addition, as final examinations were moved online during the pandemic, some respondents expressed concerns about the stability of the platforms used, for instance, '*Final examination Lockdown Browser—I believe it's a good platform for exams but sometimes it crashes before the exam begins and creates panic (personally I panicked when it crashed, not sure about others)*'.

(iii) Lack of face-to-face laboratory classes during pandemic lockdown

The lack of F2F practical laboratory classes was a major concern. In many biological sciences subjects, laboratory classes represent an important experiential learning component. Not only does it allow the students to better relate their theoretical knowledge to real-life applications, but it also trains students to be skilful in conducting laboratory experiments (practical work skills) as well as data analysis and troubleshooting (cognitive skills). Although respondents appreciated the use of simulated data during online classes that enhanced their data analysis and report-writing skills, many were generally concerned that they did not have sufficient training in the practical work skills during the online laboratory classes. One stated '*Absence of lab classes and instead learn(ing) by theory not only impacts student's motivation but (also) the(ir) understanding*'.

(iv) Unique factors

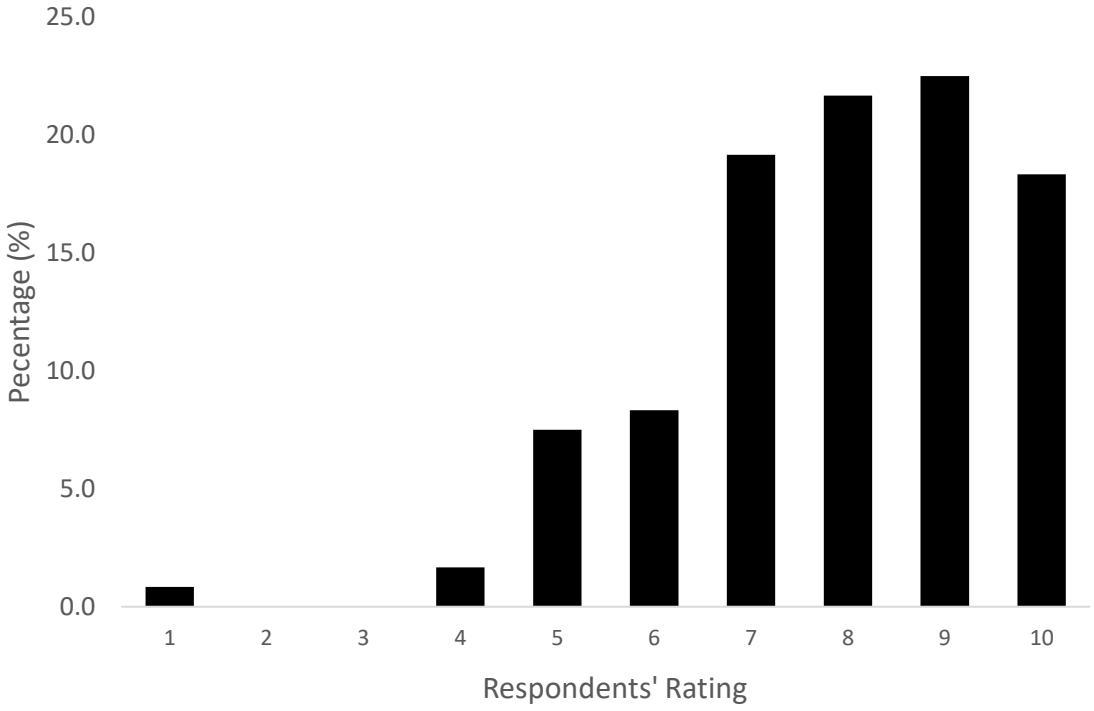
Numerous unique factors were mentioned as part of the challenges faced by the respondents. Some cited that their home environment was noisy which affected their ability to focus and learn. One of the respondents stated that '*Lack of attention span made focusing in class really hard in a small house with 7 people living together. Would really love to have F2F class again*.' Other factors that respondents noted were the timing of the lectures. Some international students commented that it was challenging for them to participate in early morning lectures due to the time difference in their home countries. For instance, one commented '*Some classes are just too early in the morning for me, hence, I would prefer coming to Malaysia and having them face-to-face'*. Some respondents noted that certain subjects were more rigid in their requirements for attendance to live lectures which were held early in the day; considering the time zone differences.

How Helpful Was the Department in Supporting the Students' Online Learning?

Respondents were asked to rate the technological infrastructure and academic support provided to them during the pandemic using a 10-point Likert scale, with '1' being not at all helpful and '10' being extremely helpful. The vast majority (81.7%) of the respondents rated the Department between 7 and 10. The mean score of respondents was 7.88 ± 1.69, while the mode score was 9 (Figure 3).

Figure 3

Percentage distribution of respondents' rating of the support provided by the academic department to facilitate their online learning



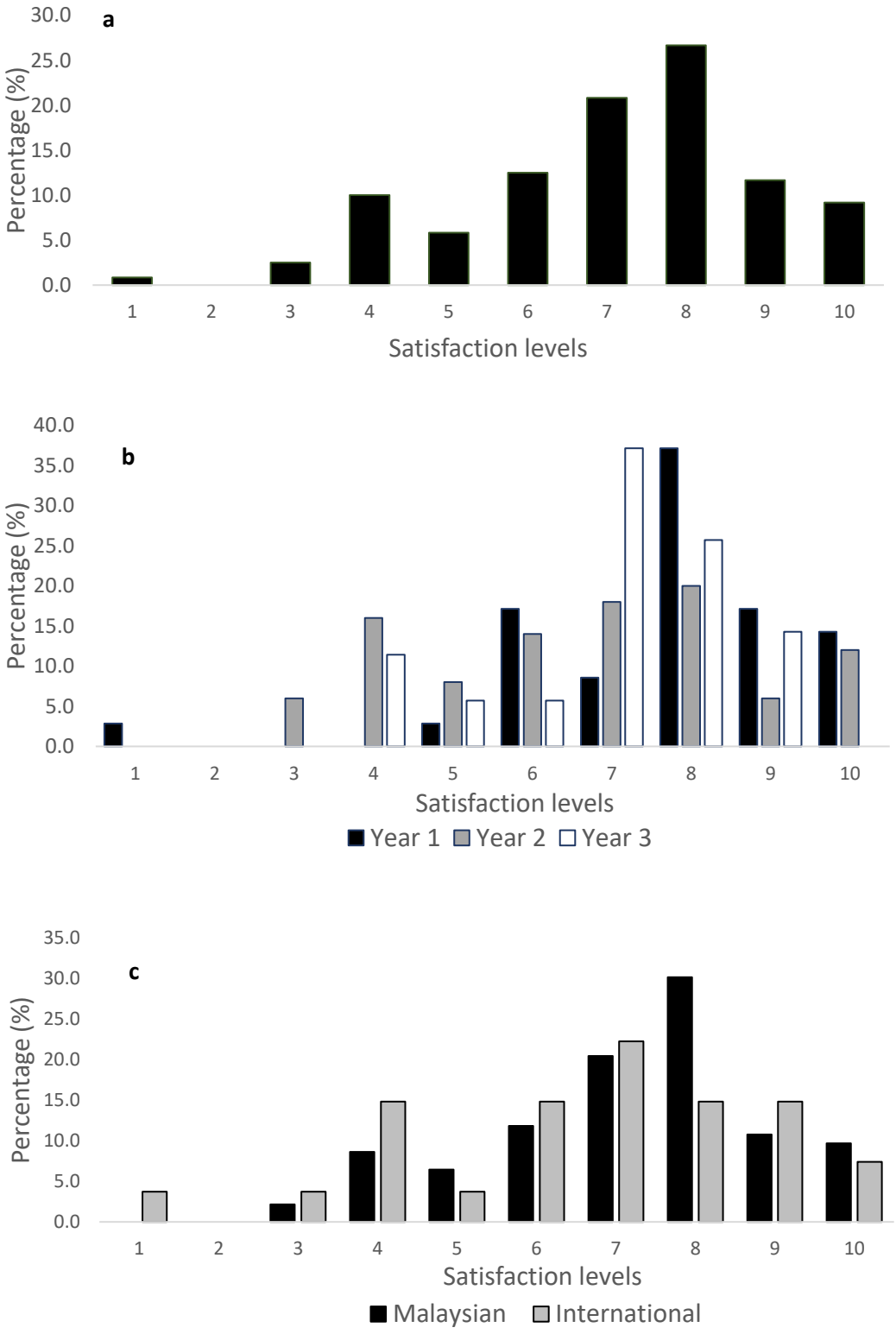
Note. Rating scale of 1–10, with 1 being 'not at all helpful' and 10 'extremely helpful'.

How Satisfied Were Students with Their Online Learning?

Respondents were then asked to rate their satisfaction levels of online learning using a 10-point Likert scale, with '1' being 'Not Satisfied' and '10' being 'Very Satisfied'. Respondents recorded a wide range of satisfaction levels, ranging from 1 to 10, with a mean score of 7.08 ± 1.88 and a mode score of 8 (Figure 4a). The Year 1 respondents were more satisfied (mean: 7.74 ± 1.79; mode: 8) as compared to Year 2 (mean: 6.66 ± 2.09, mode: 8) and Year 3 (mean: 7.03 ± 1.48; mode: 7) respondents (Fig. 4b). Malaysian respondents appeared to be more satisfied with their online learning (mean: 7.20 ± 1.76; mode: 8) than their international counterparts (mean: 6.63 ± 2.24; mode: 7).

Figure 4

Percentage distribution of respondents' satisfaction levels of online classes



Note. a) Total respondents; b) Stratified by year of study and c) Nationality
Rating scale of 1–10, with 1 being 'Not Satisfied' and 10 'Very Satisfied'

Various studies have been conducted to understand students' perspectives on the impact of the COVID-19 pandemic. It is recognised that the impact of COVID-19 pandemic on students is not limited to academic performance but also their social lives, financial situation and emotional health (Aristovnik et al., 2020; Elmer et al., 2020). The primary aim of this study was to obtain feedback from biological sciences undergraduates regarding their online learning experience in a private HEI in Malaysia. Aristovnik et al. (2020) analysed feedback collected from 30,384 students from 62 countries in Africa, Asia, Europe, the Americas and Oceania on their perception and satisfaction levels on distance learning during the pandemic. Generally, students were mostly satisfied with the support given by their respective universities. However, a lack of computer competency skills appeared to impact the overall online learning experiences (Aristovnik et al., 2020). A separate study conducted in Bangladesh also concurred that students' online learning experience was greatly affected by the lack of competency in using online platforms (Dutta & Smita, 2020). Apart from that, Internet connectivity was identified as one of the most common factors that impacted students' satisfaction in online learning in many other countries in the region (Muthuprasad et al., 2021), Indonesia (Amir et al., 2020), Thailand (Imsa-ard, 2020) and Bangladesh (Dutta & Smita, 2020). Similar to our observations, students found it challenging to stay focused while learning online (Amir et al., 2020; Imsa-ard, 2020). Apart from the challenges mentioned, the findings of a Thai study supported our observations that students generally felt that online T&L activities did not motivate them in their learning (Imsa-ard, 2020). A lack of F2F interactions and the feeling of isolation might be the underlying factors contributing to a lack of motivation in online learning. Although a large percentage (81%) of respondents disagreed that online learning supported the communication between instructors and students in a recent study (Imsa-ard, 2020), only 22.5% of respondents in this study claimed to have either always or often faced challenges in interacting with their lecturers during the pandemic.

The findings from this study highlight that the challenges faced by our students mirror the core issues faced by students in other parts of the world; albeit with some variations in percentage distribution. As part of the academic department's commitment to support and enhance students' learning experience, various initiatives have been implemented since the beginning of the COVID-19 pandemic. For example, two strategies were put in place to mitigate Internet connectivity issues. At university level, students were allowed

to use campus facilities and Internet access to attend online classes and study independently. At the department level, it was decided that all learning materials for students would be recorded (either pre-recorded or recorded live lectures). The availability of recorded learning material served not only those with Internet connectivity issues, but also students who lived in different time zones to Malaysia, allowing students to access the learning materials at their convenience. As a result of these measures, the department received positive feedback during the course-specific end-of-term surveys conducted in November 2020 (data not shown). Students remarked that recorded learning materials were helpful in times when they had poor Internet connectivity, but also served to improve their understanding of difficult concepts, as they could watch the videos multiple times. The use of a combination of synchronous (live sessions) and asynchronous approaches (pre-recorded classes, and/or recorded live sessions) received good feedback from our students (data not shown). The use of asynchronous videos can also be optimised to enhance students' engagement during online classes as evidence suggests that the use of asynchronous videos provides equal opportunities for all students, including introverted and slow-progressing individuals to engage and participate in online T&L activities (Lowenthal et al., 2020; Sandars et al., 2020).

Interestingly, our findings suggest that Year 1 students were generally more satisfied with their online learning experience (7.74 ± 1.79) compared to students from Years 2 and 3. This observation was in contrast to what was reported by Aristovnik et al. (2020). Our current Year 1 students include those who enrolled and started their university journeys with us since the beginning of the COVID-19 pandemic. It was thought that in comparison to Years 2 and 3 students who started their academic journey prior to COVID 19, the abrupt transition from F2F to online learning may have affected these students more. In addition, as the department adapted to online T&L, the staff have had the time and experience to resolve the various challenges that emerged during the earlier stages of the COVID-19 pandemic, leading to engaging online T&L activities and a relatively high overall students' satisfaction level in the following semesters when this research was conducted.

The data from this study indicate that students were generally satisfied with their online learning and thought highly of the support that the department has been providing during these unprecedented times, despite acknowledging that there were challenges to be overcome. Many of the students were

concerned about not being able to master practical skills as hands-on laboratory time was lost during the pandemic, despite virtual practical classes being carefully designed to ensure students acquired the essential cognitive skills such as troubleshooting and data analyses of simulated data. In response to this, the department has held a series of laboratory bootcamps to train students in diverse and essential laboratory practical skills, and plans to continue organising them regularly to provide students with sufficient hands-on laboratory skills while maintaining their safety and security (since the 1st of March 2021, the Government has allowed the return of students who require laboratory access back on campus). Alternative strategies such as the use of virtual practical classes have been reported to be engaging, and may be worth investing in (Chandrasekaran, 2020; Delgado et al., 2021).

Although this study provides valuable insights into how the department is supporting students in transitioning to a fully/partial online learning model, the sample size of this study is relatively small. The scope of the study may be limited but it informs the department on the experience of our current students and gaps that require attention and strategic intervention. It also provides a benchmark to assess the efficacy of future intervention strategies.

CONCLUSION

Despite the unprecedented challenges faced, a significant majority of respondents reported to be satisfied with their online classes and appreciates the efforts of the Department to support their learning during this ongoing pandemic. The feedback collected serves to inform the department on areas to channel new efforts into, in order to improve students' online T&L experience which in turn, will stimulate students' interest and motivation towards learning. The enhanced engagement between students and their classmates and lecturers will potentially further improve student satisfaction levels and the successful attainment of learning outcomes. This research highlights the need to further invest in capacity building of academics to learn either via formal workshops, or peer sharing of best practices the different online tools that could be used to better engage students during online T&L activities. Besides that, it highlights the need for institutions to adopt more flexible teaching approaches and timetabling to suit students with different learning abilities and needs, so that each student feels that they are equitably

supported in their learning journey. Undoubtedly, the COVID-19 pandemic has given an opportunity for the HEI to re-evaluate its T&L approaches. A positive shift in the mindset of stakeholders on the importance and benefits of online T&L will further support HEIs' role in providing relevant and quality education in the new normal.

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REFERENCES

Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: The challenges and opportunities. *Interactive Learning Environments*, 1–13. https://doi.org/10.1080/10494820.2020.1813180

Aguilera-Hermida, A. P. (2020). College students' use and acceptance of emergency online learning due to Covid-19. *International Journal of Educational Research Open, 1*, 100011. https://doi.org/10.1016/j.ijedro.2020.100011

Amir, L. R., Tanti, I., Maharani, D. A., Wimardhani, Y. S., Julia, V., Sulijaya, B., & Puspitawati, R. (2020). Student perspective of classroom and distance learning during COVID-19 pandemic in the undergraduate dental study program Universitas Indonesia. *BMC medical education, 20*(1), 1-8. https://doi.org/10.1186/s12909-020-02312-0

Apandi, A. M., & Raman, A. (2020). Factors affecting successful implementation of blended learning at higher education. *International Journal of Instruction, Technology, and Social Sciences, 1*(1), 13–23.

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability, 12*(20), 8438. https://doi.org/10.3390/su12208438

Boettcher, J. V., & Conrad, R.-M. (2016). *The online teaching survival guide: Simple and practical pedagogical tips*. John Wiley & Sons.

Chandrasekaran, A. R. (2020). Transitioning undergraduate research from wet lab to the virtual in the wake of a pandemic. *Biochemistry and Molecular Biology Education, 48*(5), 436–438. https://doi.org/10.1002/bmb.21386

Delgado, T., Bhark, S. J., & Donahue, J. (2021). Pandemic Teaching: Creating and teaching cell biology labs online during COVID-19. *Biochemistry and Molecular Biology Education, 49*(1), 32–37. https://doi.org/10.1002/bmb.21482

Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. *Journal of Educational Technology Systems, 49*(1), 5–22. https://doi.org/10.1177/0047239520934018

Dutta, S., & Smita, M. K. (2020). The impact of COVID-19 pandemic on tertiary education in Bangladesh: Students' perspectives. *Open Journal of Social Sciences, 8*(09), 53.

Elmer, T., Mepham, K., & Stadtfeld, C. (2020). Students under lockdown: Comparisons of students' social networks and mental health before and during the COVID-19 crisis in Switzerland. *PloS one, 15*(7), e0236337. https://doi.org/10.4236/jss.2020.89004

Imsa-ard, P. (2020). Thai university students' perceptions towards the abrupt transition to 'forced'online learning in the COVID-19 situation. *Journal of Education Khon Kaen University, 43*(3), 30–44.

Lowenthal, P., Borup, J., West, R., & Archambault, L. (2020). Thinking beyond Zoom: Using asynchronous video to maintain connection and engagement during the COVID-19 pandemic. *Journal of Technology and Teacher Education, 28*(2), 383–391.

Martin, F., Polly, D., Jokiaho, A., & May, B. (2017). Global standards for enhancing quality in online learning. *Quarterly Review of Distance Education, 18*(2), 1–102.

Muthuprasad, T., Aiswarya, S., Aditya, K., & Jha, G. K. (2021). Students' perception and preference for online education in India during COVID-19 pandemic. *Social Sciences & Humanities Open, 3*(1), 100101. https://doi.org/10.1016/j.ssaho.2020.100101

Sandars, J., Correia, R., Dankbaar, M., de Jong, P., Goh, P. S., Hege, I.,Masters, K., Oh, S., Patel, R. Premkumar, K. (2020). Twelve tips for rapidly migrating to online learning during the COVID-19 pandemic. *MedEdPublish, 9*. https://doi.org/10.15694/mep.2020.000082.1

Scull, J., Phillips, M., Sharma, U., & Garnier, K. (2020). Innovations in teacher education at the time of COVID19: An Australian perspective. *Journal of Education for Teaching, 46*(4), 497–506. https://doi.org/10.1080/02607476.2020.1802701

EVALUATING THE PERCEIVED EFFECTIVENESS OF ONLINE LEARNING AMONG BIOLOGICAL SCIENCES UNDERGRADUATES DURING THE COVID-19 PANDEMIC

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ABSTRACT

Background Online learning has been at the forefront of how higher education institutions (HEIs) have coped with COVID-19-associated disruptions. The online learning environment varies significantly from that of a traditional classroom and relies heavily on technology.

Aim This study assessed the perceived effectiveness of the online learning experience of biological sciences undergraduate students at a private HEI in Malaysia during the on-going pandemic.

Methods A questionnaire was administered to assess the perception of these undergraduates on the effectiveness of online learning. The survey consisted of questions regarding demographics, rating of online learning effectiveness, identification of preferred delivery mode, and providing suggestions for continuous improvement. Statistical data analysis was carried out using Microsoft Excel, using one-way ANOVA, two-way ANOVA and Welch's *t*-test.

Findings The majority of respondents agreed that online learning allowed flexible learning and 42.9% of respondents enjoyed online learning from home during the pandemic. However, 45.5% of respondents found that poor

internet connectivity affected their online learning experience, while 68.8% found it challenging to study at home during the pandemic. Most respondents preferred hybrid learning over face-to-face learning. Significant associations were observed between perceived effectiveness of online learning and Internet connectivity, flexible learning hours, and the ability to focus at home.

Conclusion There is a high level of acceptance towards online learning and, as the pandemic continues to shape our new normal, online learning is no longer a matter of choice. This study provides insights for the development of strategies to improve the quality of education for a new generation of learners in biological sciences.

Keywords Online learning, biological sciences, flexibility, perceived effectiveness

INTRODUCTION

The COVID-19 pandemic has forced many higher education institutions (HEIs) to either postpone semesters or suspend on-campus activities. These measures have caused a great deal of inconvenience (e.g. social-psychological well-being) to many students and educators (UNESCO, 2020). On the other hand, this pandemic has also forced HEIs to replace traditional classroom/face-to-face (F2F) lecture-based teaching approaches and to accelerate education innovations—particularly with regard to online learning. Online learning is a virtual learning ecosystem that is supported by electronic hardware (computers, Internet) and software either online (synchronous) or offline (asynchronous) (Aljawarneh, 2020; Garrison & Anderson, 2003; Gros & García-Peñalvo, 2016). During this COVID-19 pandemic, most tertiary institutions have either adopted or switched to online teaching using Blackboard, Microsoft Teams, Zoom, or other online platforms to support their teaching and learning (T&L) activities.

The online learning environment varies significantly from that of the traditional classroom setting when it comes to student motivation, satisfaction, and interaction (Bignoux & Sund, 2018). The effectiveness of

online learning is largely influenced by good pedagogical practices (for example fostering relationship with students, engagement, providing timely feedback and clear instructions) and setting clear learning objectives and expectations for the students (Bailey & Card, 2009; Sun & Chen, 2016). One study reported that there were no significant differences in student satisfaction between online learning and F2F (Driscoll et al., 2012), but emphasised that online learning can be as effective as F2F only if it is designed appropriately (Driscoll et al., 2012; Sun & Chen, 2016).

This study aimed to assess the effectiveness of the online learning experience of undergraduates who had enrolled in biological sciences programmes offered by a private HEI in Malaysia during the on-going pandemic. Understanding the driving factor(s) that contribute to effective online learning from the perspective of students can provide insights into how academic departments can continuously improve the current curriculum design and delivery, as well as enhance students' learning experiences in a post-COVID-19 world.

MATERIALS AND METHODS

Study Design

An anonymous, self-administered questionnaire was disseminated between February and March 2021 to undergraduate students of the Department of Biological Sciences at a private HEI in Malaysia to assess their perception towards the effectiveness of online learning during the Movement Control Order (MCO) that has been in place since March 2020. The recruitment of respondents was done via convenience sampling, wherein the survey form was shared on the Blackboard Learning Management System. Participation was completely voluntary; no compensation was provided.

In the first section of the survey, respondents' demographic information such as age, year of study as of February 2021, and nationality (Malaysian or International) were collected. In the second section, respondents were asked to rate their satisfaction levels of their online learning experience during the MCO period using a 10-point Likert scale. Next, using a five-point Likert scale (strongly disagree to strongly agree), respondents were asked the following

questions: (1) whether online learning had provided flexible learning hours, (2) whether they enjoyed learning from home during the pandemic, (3) whether poor Internet connectivity affected their online learning and (4) whether they found it challenging to stay focused while studying at home during the pandemic. In the third section, respondents were asked to choose a preferred mode of delivery (F2F, online, or hybrid) in the event it was safe to return to campus. Lastly, respondents were asked to provide suggestions on how the Department could support their learning experience in the upcoming semesters.

Data Analysis

Data analyses were performed using Microsoft Excel. Descriptive statistics including frequency, mean (M) and standard deviation (SD) were conducted to describe the demographic characteristics. To determine the factors that may influence respondents' perceptions on the effectiveness of online learning during the pandemic, four categorical variables (year of study, flexible learning hours, poor internet connectivity and ability to stay focused while studying at home) were identified and four separate one-way ANOVA tests were carried out. A two-way ANOVA test was performed to analyse the relationship between flexible learning hours and their preferred mode of delivery, while a Welch's *t*-test was used to analyse the differences in the perceived effectiveness of online learning ratings between different groups of respondents who were stratified based on their preferred modes of delivery. A p value of $< .05$ was used to determine significant associations in all the statistical tests that were carried out in this study.

RESULTS

Respondent's Profile

A total of 112 respondents completed the online survey, of whom 86 were Malaysians and 26 were international students (76.8% and 23.2%, respectively). The response rate was 57.7% of the total active undergraduate students in the Department. The respondents' age ranged from 18 to 25 years ($M = 21.1$, $SD = 1.5$). Year 2 students ($N = 45$, 40.2%) formed the majority

of the respondents, followed by Year 3 (*N* = 35, 31.3%) and Year 1 (*N* = 32, 28.6%).

Perception of Online Learning Experience and the Associated Challenges

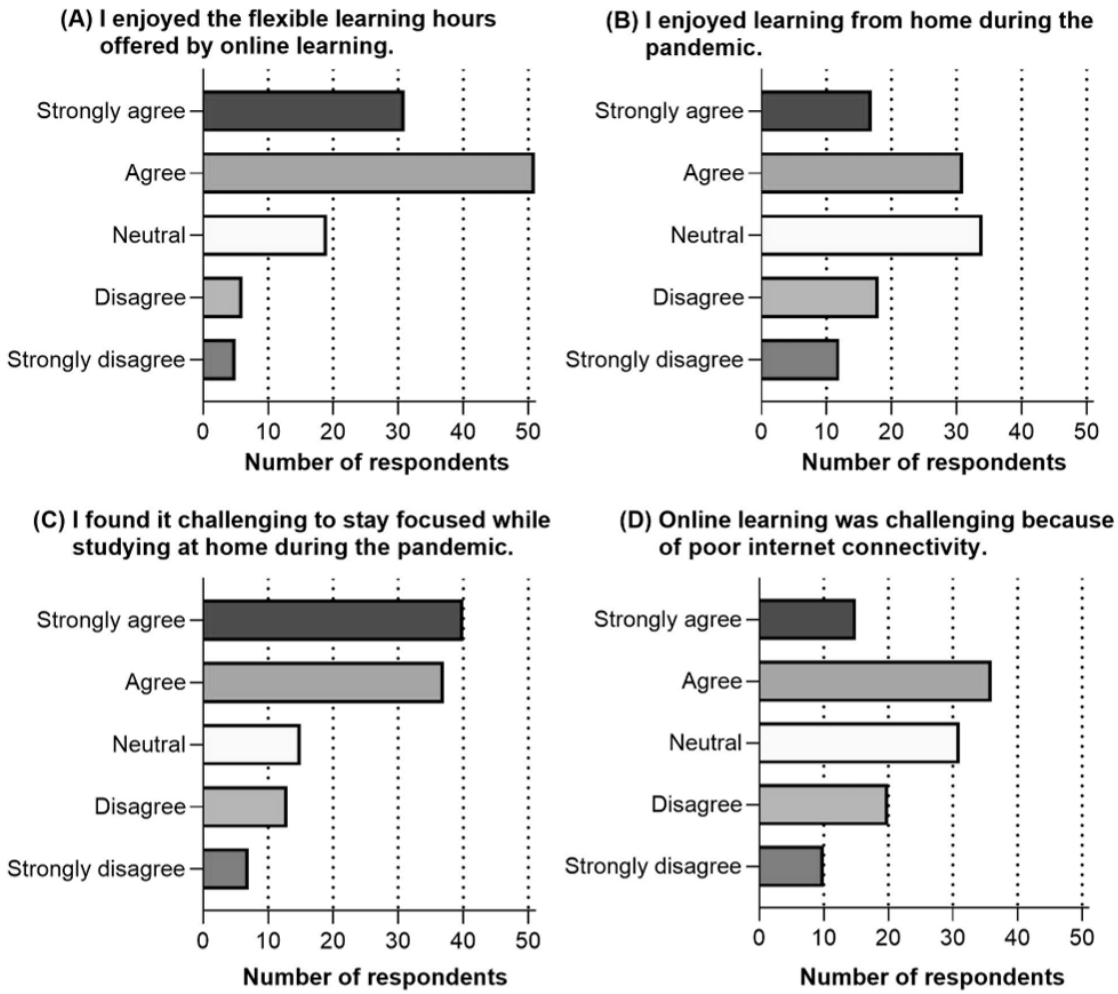
About 73.2% (*N* = 82) of the respondents agreed or strongly agreed that online learning allowed flexible learning hours, whereas 9.8% either disagreed or strongly disagreed (*N* = 11) (Figure 1A). Interestingly, 42.9% (*N* = 48) enjoyed online learning from home during the pandemic, as compared to 26.8% (*N* = 30) who did not enjoy this learning environment (Figure 1B). Nevertheless, a large proportion of respondents found it challenging to study at home during the pandemic (*N* = 77, 68.8%; Fig 1C) with 45.5% (*N* = 51) found that poor internet connectivity affected their online learning experience (Figure 1D).

Preferred Mode of Learning Post-COVID-19

Next, we assessed the respondents' preferred mode of learning by asking them to choose between F2F, online or hybrid (combination of F2F and online, regardless of practical, tutorial and lecture) when it was safe to return to campus. In totality, 55.4% (*N* = 62) preferred hybrid learning, while 42.9% (*N* = 48) of the respondents preferred the F2F mode. Less than 2% (*N* = 2) opted for 100% online learning (Figure 2A). Years 1 and 2 respondents appeared to prefer hybrid learning (57.1% and 60%, respectively) over F2F learning. In contrast, Year 3 respondents preferred F2F learning mode (*N* = 16, 50%) over hybrid mode (*N* = 15, 46.9%) (Figure 2B). Note that no Year 1 respondents chose the fully online mode option.

Figure 1

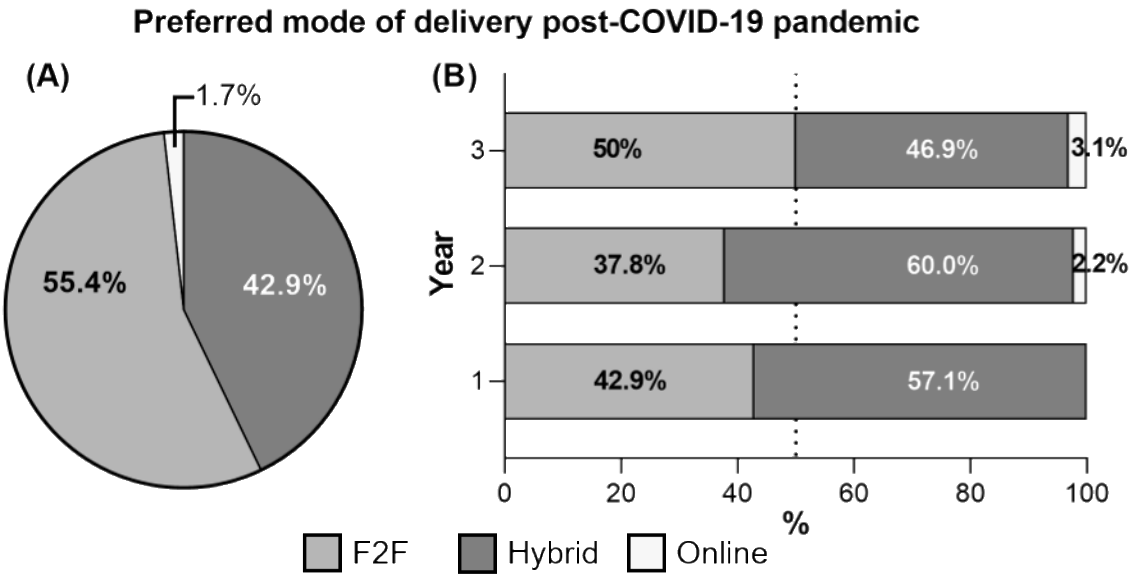
Respondents' perception towards online learning with regards to how they rated their appreciation



Note. (A) the flexible learning hours offered by online learning and (B) learning from home, as well as C) their ability to stay focused while studying at home and (D) the adverse impact of their online learning due to Internet connectivity issues.

Figure 2

Preferred mode of delivery post-COVID-19 pandemic



Note. (A) by all respondents; and (B) stratified by year of study. The year of study was determined based on the respondent's intake as of February 2021.

Association Between Various Factors and the Perceived Effectiveness of Online Learning

We, then, determined if there were any associations between how respondents perceived the effectiveness of their online learning (rated on a numerical scale of 1–10) with characteristics such as their year of study, their preference for flexible studying hours, the quality of Internet connectivity, and their ability to focus while studying at home.

Data from Figure 1 and Figure 2 suggest that online learning appeared to be favourable to many respondents. As such, factors such as the appreciation of flexible learning hours, year of study and Internet connectivity may contribute to the respondents' choice of preferred delivery mode and perception of online learning effectiveness. Hence, the potential association with these factors were assessed statistically.

(i) Perceived effectiveness of online learning and year of study, appreciation for flexible learning hours, internet connectivity and ability to focus while studying at home

There was no significant association between the perceived effectiveness of online learning and the respondents' year of study ($p = .195$) (Figure 3A). Based on one-way ANOVA, there was at least one group with a significantly different mean than the other groups ($p < .00001$). This is most likely the group that enjoys flexible learning hours, with a perceived effectiveness of online learning mean score of 6.37 (Figure 3B). There was also significant association between internet connectivity and the perceived effectiveness of online learning ($p < .05$) (Figure 3C). The heatmap demonstrates that respondents agreed that poor internet connectivity had a negative impact on the perceived effectiveness of online learning, with a mean score of 5.94. Lastly, the ability to focus while studying at home was significantly associated with the perceived effectiveness of online learning ($p < .05$) (Figure 3D). The mean perceived effectiveness of online learning score was 6.43, which was higher when compared to the mean score for poor Internet connectivity and flexible learning hours.

(ii) Preferred mode of delivery and flexible learning hours

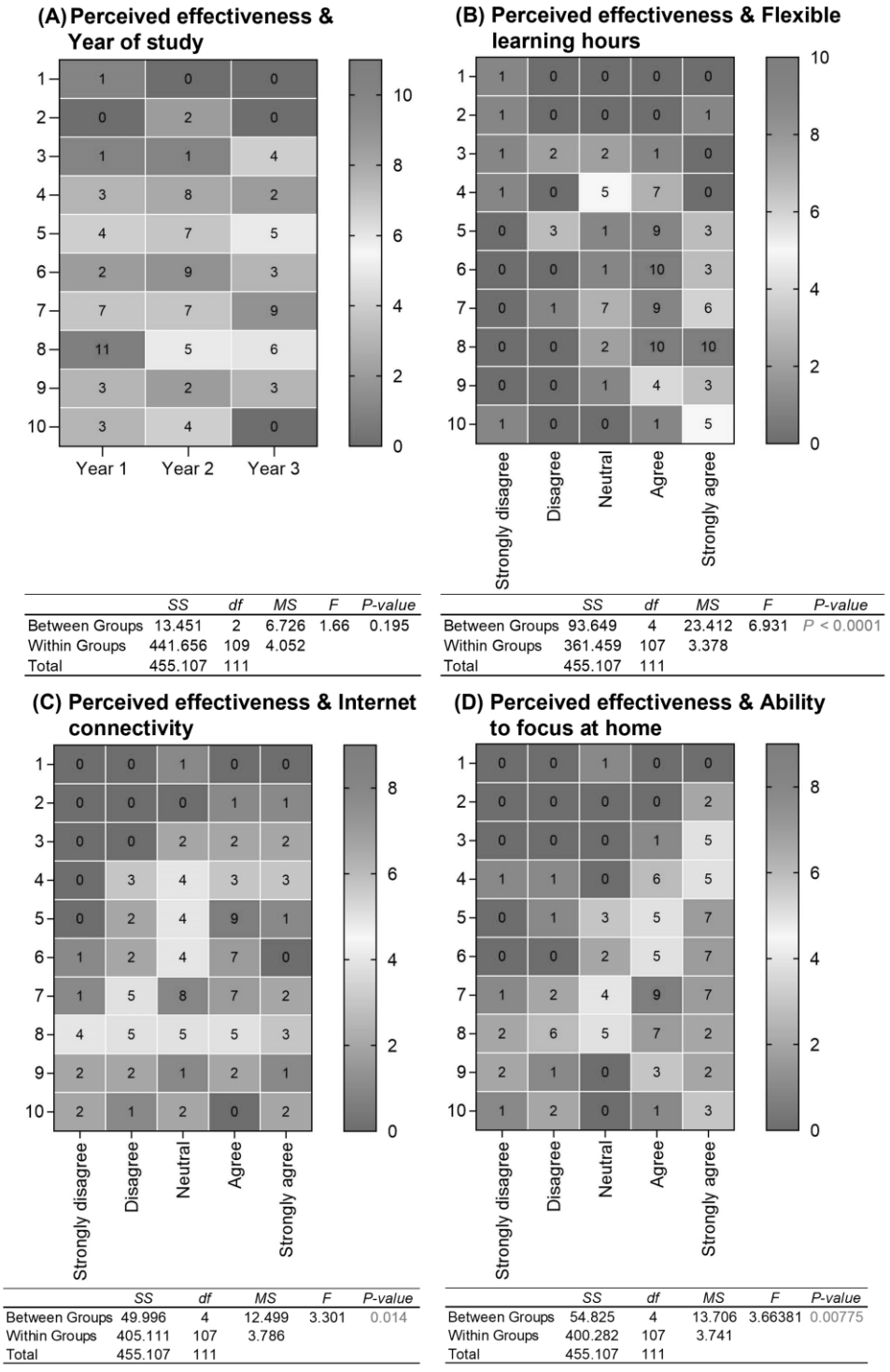
Data of respondents who preferred 100% online delivery was excluded in the subsequent analysis because of the low number of respondents who chose this option. Based on two-way ANOVA test, there were no significant differences in the appreciation for flexible learning hours between those who preferred 100% F2F and those who preferred the hybrid mode of delivery (Figure 4). The choice of preferred mode of learning post-COVID-19 was not associated with the appreciation for flexible learning hours.

(iii) Preferred mode of delivery and the effectiveness of online learning

To test if respondents who preferred hybrid learning reported higher levels of perceived effectiveness of online learning as compared to those who preferred 100% F2F, a Welch *t*-test of two samples with unequal variances was performed. A significant difference was identified in the perceived effectiveness of online learning between these two groups of respondents (Table 1). Respondents who chose hybrid learning as their preferred mode of T&L post-COVID-19 pandemic appear to perceive their online learning experience as more effective as compared to those who chose the 100% F2F T&L delivery mode.

Figure 3

Association between perceived effectiveness of online learning



	SS	df	MS	F	P-value
Between Groups	13.451	2	6.726	1.66	0.195
Within Groups	441.656	109	4.052		
Total	455.107	111			

	SS	df	MS	F	P-value
Between Groups	93.649	4	23.412	6.931	$P < 0.0001$
Within Groups	361.459	107	3.378		
Total	455.107	111			

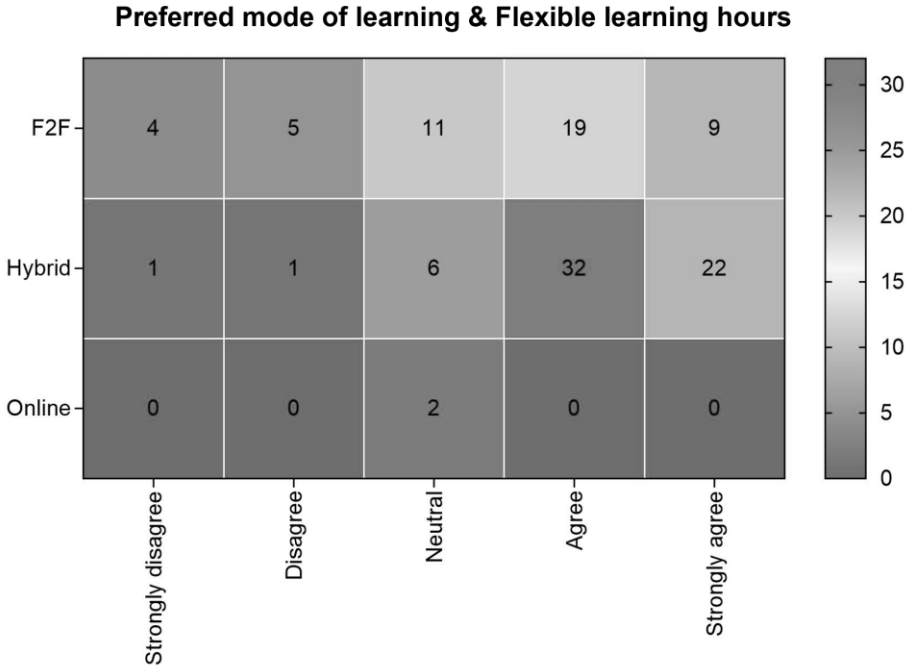
	SS	df	MS	F	P-value
Between Groups	49.996	4	12.499	3.301	0.014
Within Groups	405.111	107	3.786		
Total	455.107	111			

	SS	df	MS	F	P-value
Between Groups	54.825	4	13.706	3.66381	0.00775
Within Groups	400.282	107	3.741		
Total	455.107	111			

Note. (A) year of study; (B) appreciation for flexible learning hours; (C) internet connectivity; (D) ability to stay focused while studying at home. The values in each box represents the number of responders. The y-axis represents the effectiveness score for online learning using the numerical 10-point Likert scale. The heatmap legend is shown on the right. A p value of $< .05$ derived from a one-way ANOVA test indicates a significant difference between the mean perceived effectiveness of online learning of the various stratified groups.

Figure 4

Association between preferred mode of learning and appreciation for flexible learning hours, analysed using two-way ANOVA



	SS	*df*	*MS*	*F*	*P-value*
Rows	19.6	1	19.6	0.450	0.539
Columns	746	4	186.5	4.278	0.094
Total	940	9			

Note. Hybrid learning is defined by the choice of online learning for one or two types of classes (i.e. lecture, tutorial and/or practical)

Table 1 *The t-test analysis comparing the mean score of perceived effectiveness of online learning between respondents who choose 100% F2F and those who chose hybrid learning post-COVID-19*

	F2F	Hybrid
Mean "effectiveness" Score	5.813	6.823
Variance	5.049	3.034
Observations	48	62
Df	86	
t Stat	-2.573	
P (T<=t) two-tail	0.012	
t Critical two-tail	1.988	

DISCUSSION

The COVID-19 pandemic has transformed the landscape of our education ecosystem. World-wide concerns regarding disruptions to students' academic progression and the resulting psychosocial and mental health effects continue to rise (Aristovnik et al., 2020). The primary purpose of this study was to examine the perceived effectiveness of online learning among biological sciences undergraduates in a private HEI in Malaysia during this ongoing pandemic.

In this study, the majority of the respondents preferred the hybrid mode of delivery as an effective way of learning (Figure 2 and Table 1) when it was safe to return to campus. These findings are epitomised by a respondent's comment "To allow the students to have the choice to choose if they want to have a face-to-face classes and practical ones". These findings also highlight the continued need for F2F sessions (for example, practical laboratory sessions and wet-lab experiment-based research activities) that foster both cognitive and practical work skills attributes. The findings also cast a spotlight on the need for flexibility that enables students to choose the best mode of delivery to suit their own study pace without compromising on the successful attainment of learning outcomes. This flexibility was not offered in the past before the COVID-19 pandemic and students had no choice but to come to campus for their learning activities. While F2F sessions offer opportunities for social interactions and support as well as allowing students to have access to on-campus facilities, the downside of F2F sessions include students may have trouble approaching the educators with questions (they are either shy or affected by their peers), commuting challenges, restricted learning hours and environment. In this new system, live online classes are typically recorded, and these recordings are made available to students for their revision. These recordings provide the additional flexibility to allow students to revisit the videos and to learn at their own pace (Figure 3B). The findings from this study is consistent with that of previous studies that highlighted flexibility as one of the key advantages of online learning (Chizmar & Walbert, 1999; Petrides, 2002; Schrum, 2002). However, it should be noted that significant differences in learning preference (F2F or online) have been found among students enrolled in different degrees; mostly attributed to the nature of the degree and the availability of hybrid options (Fortune et al., 2011).

One of the advantages of online learning is to allow students to have synchronous and asynchronous learning experiences. Students can be anywhere and still interact with their educators and other students (Singh & Thurman, 2019). One would expect that students prefer to study from home, as it is within their comfort zone. Surprisingly, while most respondents like the idea of learning from home, they also found it challenging to stay focused (Figures 1B and C). The challenge may stem from intermittent or continual disruption by family members, cohabiting friend(s) or poor Internet connectivity as a result of many people occupying the same Internet bandwidth in the same household. This may also explain why a significant proportion of the respondents agreed that poor internet connectivity posed a challenge to their online learning (Figure 1D and 3C). Evidently, access to robust Internet connectivity and affordable e-devices are essential towards ensuring online learning success.

Interestingly, the year of study did not affect the perceived effectiveness of online learning, which implies that there is a relatively high level of acceptance for online learning among the respondents (Figure 3A). One would expect Year 3 respondents who would have been most accustomed to the F2F mode, to show "resistance" towards online learning because of the sudden switch to a different learning mode and the risk it might pose in negatively impacting their learning experience and grades. Nevertheless, the respondents did express the desire for more social interactions. Numerous studies have established a strong correlation between social interactions and effective online learning (Brindley et al., 2009; Bryant & Bates, 2015; Cox & Cox, 2008). Social interactions refer to student-educator, student-student and student-content interactions. These interaction networks strengthen student's ability, opportunity, and motivation to excel in an online learning environment (Kehrwald, 2008; Sher, 2009). Respondents of this survey highlighted the importance of these interactions. Some suggestions include (1) "*I would suggest that all the lecturers communicate well with all of the students*" (student-educator); (2) "*For group work, I'd suggest the lecturers to highly encourage students to frequently discuss on the assignment progress. Just reminding this repeatedly is very helpful to instil proactivity among students*" (student-educator); (3) "*Give special attention to international students who are unable to attend physical practical classes*" (student-educator); (4) "*Please try to provide clearer instructions to help make our lives slightly smoother with all the assignments that we have*" (student-content); (5) "*Lecturers can include online quizzes like Kahoot to make the classes more interesting (helps students to engage as well)*"

(student-content). The proportion of respondents (<2%) who preferred 100% online learning mode if given a choice when it is safe to return to campus emphasises the importance placed on in-person human interactions and access to specialised physical T&L equipment and spaces by biological sciences undergraduates who participated in this study. The high proportion of respondents who chose hybrid learning indicates that moving forward, education providers may need to reimagine their educational delivery to support the heterogeneous needs and expectations of a new generation of biological sciences undergraduates.

Future studies should also investigate the relationship between perceived effectiveness and other objective measures to provide a more comprehensive landscape of online learning efficacy in the new normal.

CONCLUSION

Despite facing unprecedented challenges, there is a relatively high level of online learning acceptance among biological sciences undergraduates in this study. The importance of student-educator interactions and access to laboratory facilities were consistently highlighted by the respondents in this study. This study confirms the general consensus that in this HEI, very few students prefer online-only learning, but are almost evenly split between hybrid and F2F learning; further emphasising the need to adopt a flexibility teaching and delivery in the post-COVID-19 world. It is evident that online learning is no longer an option, but a necessity. An effective return to a post-COVID-19 normal world may require a radical re-think on what "normal" should be, based on this evidence of student preferences. There is a need to ensure that online learning is delivered efficiently and effectively to guarantee that future biological science professionals not only successfully attain key competency skills and knowledge but are also primed to be the solutions of the many grand challenges humanity will face in the future. Hence, HEIs and educators alike, must equip themselves with the necessary competencies to adapt and realign their approach in providing relevant and quality education in this new and evolving reality.

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REFERENCES

Aljawarneh, S. A. (2020). Reviewing and exploring innovative ubiquitous learning tools in higher education. *Journal of Computing in Higher Education*, *32*(1), 57–73. https://doi.org/10.1007/s12528-019-09207-0

Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 Pandemic on Life of Higher Education Students: A Global Perspective. *Sustainability*, *12*(20), 8438. https://www.mdpi.com/2071-1050/12/20/8438

Bailey, C. J., & Card, K. A. (2009). Effective pedagogical practices for online teaching: Perception of experienced instructors. *The Internet and Higher Education*, *12*(3), 152–155. https://doi.org/https://doi.org/10.1016/j.iheduc.2009.08.002

Bignoux, S., & Sund, K. J. (2018). Tutoring executives online: What drives perceived quality? *Behaviour & Information Technology*, *37*(7), 703–713. https://doi.org/10.1080/0144929X.2018.1474254

Brindley, J., Blaschke, L. M., & Walti, C. (2009). Creating effective collaborative learning groups in an online environment. *The International Review of Research in Open and Distributed Learning*, *10*(3). https://doi.org/10.19173/irrodl.v10i3.675

Bryant, J., & Bates, A. J. (2015). Creating a constructivist online instructional environment. *TechTrends*, *59*(2), 17-22. https://doi.org/10.1007/s11528-015-0834-1

Chizmar, J. F., & Walbert, M. S. (1999). Web-based learning environments guided by principles of good teaching practice. *The Journal of Economic Education*, *30*(3), 248–259. https://doi.org/10.1080/00220489909595985

Cox, B., & Cox, B. (2008). Developing interpersonal and group dynamics through asynchronous threaded discussions: The use of discussion board in collaborative learning. *Education 3–13*, *128*, 553–565.

Driscoll, A., Jicha, K., Hunt, A. N., Tichavsky, L., & Thompson, G. (2012). Can online courses deliver in-class results?:A comparison of student performance and satisfaction in an online versus a face-to-face introductory sociology course. *Teaching Sociology*, *40*(4), 312–331. https://doi.org/10.1177/0092055x12446624

Fortune, M. F., Spielman, M., & Pangelinan, D. T. (2011). Students' perceptions of online or face-to-face learning and social media in hospitality, recreation and tourism. https://jolt.merlot.org/vol7no1/fortune_0311.pdf

Garrison, D. R., & Anderson, T. (2003). *E-learning in the 21st century: A framework for research and practice*. RoutledgeFalmer. https://doi.org/10.4324/9780203838761

Gros, B., & García-Peñalvo, F. J. (2016). Future trends in the design strategies and technological affordances of e-learning. In M. J. Spector, B. B. Lockee, & M. D. Childress (Eds.), *Learning, design, and technology: An international compendium of theory, research, practice, and policy* (pp. 1–23). Springer International Publishing. https://doi.org/10.1007/978-3-319-17727-4_67-1

Kehrwald, B. (2008). Understanding social presence in text-based online learning environments. *Distance Education*, *29*(1), 89–106. https://doi.org/10.1080/01587910802004860

Petrides, L. A. (2002). Web-based technologies for distributed (or distance) learning: Creating learning-centered educational experiences in the higher education classroom. *International Journal of Instructional Media*, *29*(1), 69–77.

Schrum, L. (2002). Oh, what wonders you will see: Distance education past, present, and future. *Learning and leading with technology*, *30*, 20.

Sher, A. (2009). Assessing the relationship of student-instructor and student-student interaction to student learning and satisfaction in web-based online learning environment. *Journal of Interactive Online Learning*, *8*, 102–120. http://www.ncolr.org/jiol/issues/pdf/8.2.1.pdf

Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988–2018). *American Journal of Distance Education*, *33*(4), 289–306. https://doi.org/10.1080/08923647.2019.1663082

Sun, A., & Chen, X. (2016). Online education and its effective practice: A research review. http://www.informingscience.org/Publications/3502

UNESCO. (2020). *Education: From disruption to recovery*. https://en.unesco.org/covid19/educationresponse

AN OVERVIEW OF ENGINEERING PROGRAMME OUTCOME ASSESSMENT QUALITY

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ABSTRACT

Background Engineering degree programmes in Malaysia are accredited by the Engineering Accreditation Council, Board of Engineers Malaysia (BEM). BEM is a signatory of the Washington Accord, an element in the International Engineering Alliance for engineering quality education and practice.

Aim This paper looks at the continual improvement to achieve a truly wholesome attainment of engineering programme outcomes (PO) by reviewing current practices, and offer new perspectives of the approach.

Methods This is a case study of engineering programmes in Malaysia.

Conclusion Most assessments currently focus on the cognitive PO but lacks depth on the assertive PO. In 2007, the IEA had observed that BEM assessment is process biased but neglects the graduate outcomes. It is proposed that more instruments and rubrics be targeted in the attainment assessments to reflect the wholesome graduate and programme outcomes.

Keywords Accreditation, programme outcomes, assessment instruments, attainment

INTRODUCTION

Engineering degree programmes in Malaysia are accredited by the Engineering Accreditation Council (EAC) of the Board of Engineers Malaysia (BEM) under the Malaysian Qualifications Agency Act (2007). This allows for the streamlining of all engineering programmes quality across the country.

The BEM has also joined the International Engineering Alliance (IEA), the governing body for Washington, Sydney and Dublin Accords, which provides common accreditation standards for engineering and technology programmes worldwide. Member countries enjoy the recognition of each other's engineering and technology degrees across jurisdictions. As such, BEM accreditation criteria are based on the IEA accreditation guidelines for engineering (Washington Accord [WA]), engineering technology (Sydney Accord), and technician education (Dublin Accord). This is embodied in the EAC Standards 2020 and Engineering Technology Accreditation Council (ETAC) Standards 2020.

This paper will be discussing the assessment quality of the accreditation criteria and process for engineering programmes only based on EAC Standards 2020 and WA based on the author's own work and experience.

ACCREDITATION CRITERIA

The IEA accreditation document is based on its Graduate Attributes and Professional Competencies document (International Engineering Alliance, 2013). Pertinent excerpts are taken below:

> The fundamental purpose of engineering education is to build a knowledge base and attributes to enable the graduate to continue learning and to proceed to formative development that will develop the competencies required for independent practice. (pp. 1–2)

> Graduate attributes form a set of individually assessable outcomes that are the components indicative of the graduate's potential to acquire competence to practise at the appropriate level. The graduate attributes are exemplars of the attributes expected of graduate from an accredited programme. Graduate attributes are clear, succinct statements of the expected capability, qualified if necessary by a range indication appropriate to the type of programme. (pp. 2)

The two key points here are outcome-based approach adopted by the IEA/WA and building knowledge base and attributes. The approach is not purely cognitive in nature. In a visit to Malaysia in 2017 where 2 institutions and 7 programmes were audited, IEA questioned the BEM process focus of its accreditation and not putting more effort on student graduate outcomes (Omar, 2019).

The EAC Standards 2020 adopted these and develop an outcome-based education approach through the emphasis on programme objectives (PEO) and programme outcomes (PO) (Engineering Accreditation Council, 2020). The PO are almost similar to the IEA Graduate Attributes (GA).

ACCREDITATION PROCESS

The objectives of EAC accreditation can be summarised as follows (Omar, 2019):

(1) To ensure that graduates of the accredited engineering education programmes satisfy the minimum academic and practical requirements for registration as engineer with BEM.
(2) To ensure that continual quality improvement (CQI) is being practised by institutions of higher learning (IHLs), and may also serve as a tool for benchmarking.
(3) To allow international mobility of graduates.

In order to meet the BEM requirements, programmes must embrace the outcome-based education (OBE) to meet the attainment of the PO. Teaching and learning methodologies must meet the OBE approach.

It must be noted that the focus of EAC accreditation, which meets the BEM requirements that institutions must satisfy, is four-pronged: (1) A programme that runs OBE, (2) engineering education content and level, (3) CQI, and (4) quality management system in place (Omar, 2019). These raise the importance of ensuring that graduates possess the graduate attributes expected from PO.

THE PROGRAMME OUTCOME

The PO in EAC Standard 2020 is given in Table 1. It is the adaptation of IEA GA 2013.

Table 1 *Programme outcomes*

	Category	Programme Outcomes (IEA 2013; EAC 2020)
1	Engineering knowledge	Apply the knowledge of mathematics, natural science, engineering fundamentals and an engineering specialisation, as specified in WK1 to WK4, to the solution of complex engineering problems.
2	Problem analysis	Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using the first principle of mathematics, natural sciences and engineering sciences (WK1 to WK4).
3	Design or development of solutions	Design solutions for complex engineering problems and design systems, components or processes that meet specific needs with appropriate consideration for public health and safety and cultural, societal, and environmental considerations (WK5).
4	Investigation	Investigate complex engineering problems using research-based knowledge (WK8) and research methods, including design of experiments, analysis and interpretation of data and synthesis of information, for valid conclusions.
5	Modern tool usage	Create, select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations (WK6).

6	Engineers and society	Reason through contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems (WK7).
7	Environmental and sustainability	Understand and evaluate the sustainability and impact of professional engineering work in the solutions of complex engineering problems in societal and environmental contexts (WK7).
8	Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice (WK7).
9	Individual and teamwork	Function effectively as an individual and as a member or a leader in diverse teams and in multi-disciplinary settings.
10	Communication	Communicate effectively in complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
11	Project management and finance	Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and a leader in a team, to manage projects in multidisciplinary environments.
12	Life-long learning	Recognise the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

The WK1-WK8 are the knowledge profiles expected to be developed in the curriculum as given Table 2.

Table 2 *Knowledge profile*

No.	Knowledge Profile
WK1	A systematic, theory-based understanding of the natural sciences applicable to the discipline.
WK2	Conceptually based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline.
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4	Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.
WK5	Knowledge that supports engineering design in a practice area.
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7	Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability.
WK8	Engagement with selected knowledge in the research literature.

These 12 outcomes aim to develop the attributes of an engineer that has the fundamental knowledge required to perform his/her engineering work and also able to function as a member of an organisation and society. These PO are in line with MQA 2.0 Learning Outcomes (LO) of nurturing a balanced

graduate. It is notable that these PO set in engineering accreditation came much earlier to MQA LO. To determine the knowledge level acquired, outcomes 1-5 will be assessed. These assessments are always through the traditional tests, final exams and projects. They are cognitive assessments. The depth and breadth of the engineering knowledge will be the factors assessed.

Outcomes 6-12 should develop the acquired attributes to work within the organisation and society. Awareness to sustainability and ethics for example, should be embedded in the curriculum structure. So too the ability to work in a team, communicate and continual professional development skills. These skills could be trained during their study, and thereafter, could be further enhanced during the employment. What is important is that the graduates are situationally aware of these skills or traits when they enter the employment phase which will be advantageous to them and their employers alike. The question remains on where and how these skills can be developed and assessed beyond the cognitive aspect. More importantly, how can the affective outcome aspect of training and assessment be maximised.

ASSESSMENT METHODS

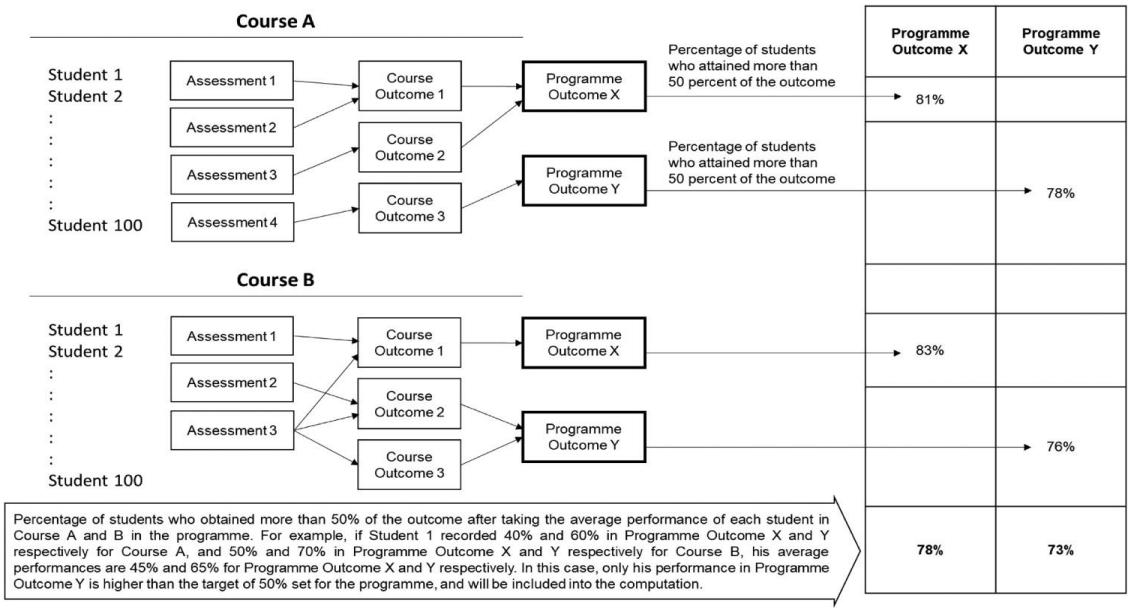
Realising that the graduate attributes is a wholesome development of the graduate, how can we then effectively assess them, especially the non-cognitive outcomes? Therein lies the dichotomy for the academic assessor. The traditional approach to teaching engineering is to make sure that the graduates have a strong hold on the engineering principles. Grades are solely based on knowledge and ability to solve engineering problems. Indeed, the curricula also focus solely in providing such courses.

With the OBE assessment adopted by EAC, programme assessments and the curriculum must reflect the differences in teaching and learning activities towards a more experiential learning approach. The various forms of experiential learning can be active learning, problem-based learning, flip classroom, and others. The importance of co-curriculum activities as instruments of assessment should be considered, requiring them to be designed with rubrics mapped to the relevant PO.

Several assessment methods have been used by Malaysian engineering programmes. The two widely used are accumulative assessment of all students and courses in the curricula and culminating assessment, where selected courses represent the development of the students. In the former method, all assessments, be it coursework or examinations, are taken as the metrics to calculate the attainment of the outcomes by every student in every course. The programme outcomes will be averaged from those. In the latter, a selected number of courses that are deemed enabling and culminating of selected students will be assessed and averaged for programme outcomes. These are mostly, if not all, targeted to the cognitive assessment of courses. An example is shown in Figure 1. These methods, while not detrimental in themselves, do not equitably assess the attributes that are affective in nature. They will indicate attainment of engineering knowledge as outcomes which do not meet the intent of the IEA GA of a wholesome engineer (IEA, 2013).

Figure 1

PO assessment through student assessments mapped to course learning outcomes and PO (Liew et. al., 2020)



QUALITY OF ASSESSMENT

The quality of PO assessment depends on the broadness of instruments and correctness of the rubrics. Current general practice by programme providers, however, indicated the resulting outcomes, although may fairly assess the cognitive PO attainment (PO1–PO5), cannot effectively assess the other seven PO. A study by Liew et.al. (2020) indicated that the majority of PO assessments in institutions visited between 2014–2018 did not meet the intended PO. The seven PO (PO6–PO12) cannot be correctly assessed because there is no "course" or "activity" that can be used to map to these PO (Ethics (PO8), for example). How and from what would one effectively assess the attainment of the outcome within the curriculum structure? This begs a serious re-evaluation of the assessment instruments if we are to harness the value of OBE.

One approach taken by EAC for PO assessment is to answer these three questions; where, how and what (Omar, 2019). To ensure that the complete PO are assessed, the mapping to the curriculum must be broadened beyond the courses and include identified activities. There must be a review of the parts of the curriculum and co-curriculum that effectively, if not wholly, assess all the 12 PO. We can begin to identify courses and activities within the curriculum and co-curriculum which can be constructively aligned to the outcomes and their assessment tools. The rubrics and framework for assessment must be outlined in detail to include the what, the when, and the how of where they are to be assessed. These hopefully can and should track students/cohort's development over the four years.

In terms of how each PO is assessed, there should an explanation of the assessment mechanisms. This could be quantitative and/or qualitative. They could then be in the aspects of formative, summative, enabling and culminating courses, including extra and co-curricular. It could be by cohorts or year. In any case, the right choices of instruments would be key to assessing graduate outcomes with respect to PO. It will then be able to discern distinctively between cognitive and affective domains for a fairer attainment level of the said PO.

The question of what satisfactory attainment is needs to be addressed by explaining the meaning of "attainment" and the standard set by the institution—What would be considered as "attained"? Examples of attainment by cohorts, students? What are the corrective actions that should be taken if the level of attainment is not satisfactory?

The question on what is meant by the satisfactory attainment must be well articulated by the institutions so that the assessments have a point to be directed. Therefore, the attainment rubrics must be laid out without much ambiguity. It then follows with the mitigating action plans to improve attainment discrepancies.

CONCLUSION

In this paper, we have given suggestions on the continual improvement to achieve a truly wholesome attainment of engineering PO by reviewing current practices and to offer new perspectives of the approach. Assessing the attainment of real outcomes either for engineering graduates or programmes must be investigated with more specific yet broader instruments within and outside the curriculum. The objective is to ensure that graduate outcomes will be focused on more, not just the knowledge part. Development of new constructive alignments across the mapped instruments and tools will be essential to achieve the desired course and programme outcomes towards satisfying the programme objectives and the intent of the IEA Graduate attributes.

REFERENCES

Engineering Accreditation Council. (2020). *Engineering programme accreditation standard 2020*. http://www.eac.org.my/web/document/EAC%20Standard%202020_approved%20BEM19April2020%20upload%2015June2020.pdf

International Engineering Alliance. (2013). Graduates attributes and professional competencies, ver. 3. *International Engineering Alliance.* https://www.ieagreements.org/documents#214

Liew, C.P., Puteh, M., Mohammad, S., Omar, A.A. & Kiew, P.L. (2020). Review of engineering programme outcome assessment models. *European Journal of Engineering Education*. https://doi.org/10.1080/03043797.2020.1852533

Malaysian Qualifications Agency Act. (2007). *Laws of Malaysia Act 679*. https://www.mqa.gov.my/pv4/document/akta/Act%20%20MQA%20679%20english.pdf

Omar, A.A. (2019). *EAC new panel of evaluators training* [Unpublished manuscript]. Accreditation Department, Board of Engineers Malaysia.

ROLES OF LEADERSHIP AND NON-ACADEMIC STAFF IN PROVIDING QUALITY HIGHER EDUCATION: A REVIEW PAPER

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ABSTRACT

Background The United Nations Sustainable Development Goal (SDG) 4 is Quality Education, which aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. An educated human capital is clearly a stepping stone to achieving several other SDGs, including decent work and economic growth, no poverty and reduced inequalities among countries. To this end, higher education institutions (HEIs) play a crucial role in providing quality education, which must be supported by both academic and non-academic staff.

Aim This review paper aims to provide awareness of the role and importance of non-academic staff in higher education, an issue which currently has not received much research attention. This paper also aims to highlight two key factors, namely leadership and job satisfaction, which play a vital role in improving organisational outcomes, especially in reducing turnover intention. Quality human capital will in turn enhance the quality of education provided.

Methods This is a review paper of existing body of knowledge on the scope covered in this paper.

Findings The literature clearly shows that non-academic or professional staff play a crucial role in HEIs and warrant more research attention due to their critical role in HEIs and differing job nature from that of academic staff.

Conclusion Talent retention among administrative staff warrants more attention, as the operations of HEIs depend heavily on administrative staff. Without efficient operations, institutions will not be able to provide high-quality education to the community. The reasons driving administrative staff turnover intention can be addressed through sound leadership and strategic actions taken by the organisation to retain administrative staff.

Keywords Leadership, non-academic staff, higher education

INTRODUCTION

According to Collier and Dollar (2002, p. 2) education is the "main engine of poverty reduction" which breaks the vicious cycle of poverty. Through education, in particular, higher education, the human capital moves from an unskilled to a skilled level, enabling increase in productivity, command for higher wages, and significant increase in the country's overall standard of living and competitiveness. Higher education institutions (HEIs) are a "repository for scholarship and knowledge" (Lu et al., 2017, p. 638) which has the ultimate goal of elevating a person's capacity to earn income and enabling them to give back to society (Lu et al., 2017).

In this era of globalisation, HEIs are at the forefront of fulfilling increasing societal demands, and professional support staff or non-academic staff in HEIs play an essential role in realising these demands (Ryttberg & Geschwind, 2017). The cornerstone of an HEI is a robust administrative system, which will determine the success of the institution's societal impact in delivering quality teaching and research (Maassen & Olsen, 2007).

Effective leadership styles and high employee job satisfaction improve organisational outcomes, which are often hindered by high employee turnover intention. On this basis, leadership style and job satisfaction are recognised in

existing studies as being among the most powerful influences on employee turnover decisions (Buchanan, 2006; Lambert et al., 2001; Noureen & Abbas, 2017; Sakiru et al., 2013; Tett & Meyer, 1993; Van Dick et al., 2004). This recognition is attributed to the fact that leaders, by virtue of their role, have a strong influence on employees' decision to remain in or leave the organisation. Khalid et al. (2016) discovered that effective leadership has a strong positive influence on employee retention. Although several factors affect employees' decision to stay in or leave their jobs, leadership style has been known to have a significant effect on their decisions (Alatawi, 2017).

Several theories have posited that workers who dislike their jobs will shun them by resigning (permanent measure) or by exhibiting behaviours like being absent from or coming late to work (temporary measure). The key motivation for these withdrawal behaviours is job satisfaction. This suggests that a high level of job satisfaction is negatively related to employee turnover intention (Spector, 1997). Hence, job satisfaction is considered one of the most accurate predictors of employee turnover intention (Cotton & Tuttle, 1986; Lambert et al., 2001; Meyer et al., 1993; Noureen & Abbas, 2017; Smith & Shields, 2013; Spector, 1997; Van Dick et al., 2004).

It is noted that high employee turnover has negative impacts on an organisation due to additional hiring, selection, and training costs. It also causes disruptions to work, resulting in negative impacts on organisational productivity and performance. Hence, keeping employee turnover in check should be on the priority list of any organisation (Alatawi, 2017). Only a small portion of actual turnover costs are monetary, with only 15%–30% of the overall costs of turnover being direct costs (e.g. recruitment, advertising, and training). The remaining 70%–85% that exist and are typically not captured in companies' balance sheets are hidden costs, including lowered productivity, knowledge loss, and demotivation among remaining employees (Racz, 2000). It is evident that although turnover can never be completely eliminated, it is a crucial factor that organisations should aim to minimise, particularly among employees with excellent performance (Robbins & Coulter, 2012). Similarly, in the higher education sector whereby non-academic staff are crucial to the university's operations, high employee turnover will have a significant negative impact on the university's financial costs.

LITERATURE REVIEW

The Malaysian Scenario

Throughout the past few decades, the higher education system in Malaysia has achieved significant progress in gaining global recognition for several institutions of higher learning and in rising as an international student hub. The Malaysian Government is committed to investing in and spurring higher education to attain greater heights through the Malaysia Education Blueprint 2015–2025 (Higher Education) or the MEB (HE). The 10-year strategy spells out the nation's aspirations to create a higher education system that is world class, to produce skilled workforce, and ultimately to enable Malaysia to become a high-income nation (*Malaysia Education Blueprint 2015-2025 (Higher Education),* 2013).

The realisation of the Malaysian Government's aspirations in the MEB (HE) 2015–2025 requires not only academics, but non-academic staff as well. According to the blueprint, an excellent higher learning institution community, ranging from institutional leaders and academics to academic support staff, results in high-quality higher learning institutions which form the higher education system. To achieve this aspiration, higher learning institutions must be capable of attracting, developing, and retaining excellent talent through a systematic mechanism for talent recruitment and development. This is especially crucial for universities, which are at the highest level of higher learning institution. Emphasis on research outcomes from universities is thus expected, along with the offering of courses at undergraduate and postgraduate levels.

Leadership in Higher Education Institutions

On the whole, little research attention has been given to leadership in institutions of higher education (Bass, 1990), and Malaysia is no exception (Lo et al., 2010). According to Durie and Beshir (2016), leadership development in higher education remains an under-investigated research area. This is in spite of the fact that leaders in HEIs face more complex situations than leaders in other public and private sectors; leaders in higher education are expected to fulfil their responsibilities to a wide range of stakeholders including students, staff, the government, and the public. In addition, Dopson et al. (2016) found

that there are few empirical studies on leadership development and its effectiveness, especially among universities. One of the distinguishing features of HEIs is that employees are classified into two categories: (1) academic staff, whose core responsibilities include managing academic affairs such as research and teaching; and (2) non-academic staff, whose core responsibilities include providing support for research and teaching activities (Küskü, 2003).

Leaders in HEIs who hold senior management positions are responsible for leading their institutions through the complexity of the ever-changing, global 21st-century contexts. Leaders are tasked with identifying innovative practices and strategies to ensure their institutions stay abreast of the latest developments in the education industry and are able to maintain their competitive edge among students and other stakeholders (Ng'ambi & Bozalek, 2013). According to van Ameijde et al. (2009), HEIs are expected to deal with a complex operating environment where they have to manage market pressures while upholding academic quality. Issues, including affordability, accountability, and relevance to the evolving economy, are among the key societal pressures faced by the leadership of HEIs (Lu et al., 2017).

According to Lu et al. (2017, p. 641) the key challenge faced by HEI leaders is balancing "the demands of constantly increasing administrative and reporting requirements with the advancement of scholarship and knowledge ... the two worlds of 'academe' and 'business'". Higher education institution leaders have to deal with international, national, and regional issues in a competitive education industry. In addition, the literature reveals that effective leadership in higher education is characterised by the following features: academic credibility and experience, and people skills including communication skills (Lu et al., 2017).

Importance of Non-Academic Staff in Higher Education Institutions

According to Baltaru (2018), non-academic staff play a crucial role in helping universities improve their performance. Examples of their roles include professional development of staff and students, academic support for students, societal engagement, and research impact. These aspects are vital in view of mounting pressures and expectations from both governments and global markets. In particular, the study by Baltaru (2018) found that universities which improved their non-academic staff-to-students ratio resulted in

increased numbers of student degree completions over shorter and longer periods.

Earlier studies have also reinforced the importance of non-academic or administrative staff, who are often overlooked. In higher education, studies on administrative staff's job satisfaction are sparse as the primary focus of job satisfaction research has been on academic staff (Smerek & Peterson, 2007). According to Henkin and Persson (1992), non-academic staff have an important role in the operational system of a university, and both academic and non-academic staff should be given equal recognition. Non-academic staff are key components of the university, who are responsible for the daily business operations (Smerek & Peterson, 2007). According to Liebmann (1986), non-academic staff outnumbered academic staff in the United States, and they could be deemed largely responsible for the successful day-to-day operations of every institution of higher learning.

The study by Henkin and Persson (1992) also found that university governance boards were typically dominated by the faculties. Their findings revealed that non-academic staff representation should be present to ensure equal distribution of power between the academic and administrative staff. This will ensure fair allocation of resources and opportunities for both groups of staff who are vital to the functioning of the university.

The limited research on non-academic staff may be attributed to their relatively recent appearance, which started in the 19th century. Throughout the history of higher education, academic staff who tutored students served the role as administrators as well. However, the growth in the higher education sector in the mid-19th century required organisational restructuring, which gave rise to the existence of non-academic staff to focus on the administrative duties of running the university (Liebmann, 1986). The roles of administrative staff have since expanded to cover wider scopes, including quality assurance, teaching and research support, financial and infrastructure management, and strategic planning. Hence, attracting and retaining competent administrative staff are crucial to HEIs' performance (Jung & Shin, 2015).

Overall, studies in the area of human resource management, namely leadership and job satisfaction among employees of HEIs in Malaysia, in particular universities, have typically been conducted only among academic staff

(Santhapparaj & Alam, 2005; Sirat et al., 2009; Wan Ahmad & Abdurahman, 2015). This may be due to the fact that university performance is rarely associated with the roles of non-academic staff. This is further aggravated by the fact that non-academic staff may not be recognised as part of the academic community (Henkin & Persson, 1992). The existing global literature has typically focused on top-level academic management (Baltaru, 2018). Coupled with the recent existence of non-academic staff roles in higher education, it can be expected that there is limited research in the areas of leadership, job satisfaction, and turnover intention among non-academic staff in Malaysia.

Job Satisfaction in Higher Education Institutions

According to Küskü (2003), there has been increasing research attention given to employee satisfaction in higher education since the early 1990s. This is attributed to the fact that HEIs are labour intensive, in which their effectiveness is heavily dependent on both administrative and academic staff (Johnsrud, 2002). Moreover, the current competitive market in the education field calls for HEIs to focus on strategies to maintain employee satisfaction in order to retain employees and help the organisation build competitive advantage (Siriattakul et al., 2019). This need is further supported by the fact that higher education plays a unique role in society. Demand for highly skilled, socially engaged people is both increasing and changing, resulting in a gap that can be filled by HEIs. Monitoring job satisfaction is extremely crucial to the continuing growth of educational systems around the world. The success and failure of an institution can be measured by the level of job satisfaction among its employees, as satisfaction has a great effect on the performance of employees, which in turn reflects positively or negatively on the quality of the institution's services (Szromek & Wolniak, 2020). Hence, employee satisfaction in HEIs is of paramount importance. An increase in employees' satisfaction level will correspond with an increase in the quality level of HEIs. Küskü (2003) also noted that the majority of studies among HEI employees have been conducted in the West, with few studies done in developing or underdeveloped countries. In addition, much research has been focused on academic staff, with considerably less attention given to administrative or non-academic staff (Johnsrud, 2002). In many countries, authors have done research on job satisfaction from the academic staff's perspective (Szromek & Wolniak, 2020). Studies on administrative staff are warranted, as Küskü (2003) found significant differences between the levels of satisfaction of academic

and administrative employees. This is due to the differences in job nature and expectations of the two groups. For instance, academic staff's job satisfaction is deeply connected with their teaching results, which reflect their teaching quality. On the other hand, for administrative staff, leadership style has the strongest influence on job satisfaction (Songcog & Guhao, 2020). In a study on academic staff, particularly professors, job satisfaction and turnover may be driven more strongly by factors related to the desire to pursue individual and institutional reputation in research (Hofmann & Strobel, 2020). This is not applicable to administrative staff. Moreover, administrative staff's job satisfaction has a strong influence on HEIs' effectiveness and performance. Their work supports the primary missions of the institution (Johnsrud, 2002). Governance and performance management of HEIs increasingly rely on data to monitor administrative structures and processes, as well as performance, in research and teaching (Hofmann & Strobel, 2020). Such monitoring roles call for administrative staff.

Hence, attracting and retaining competent administrative staff, keeping them motivated and rewarding them accordingly are of paramount importance (Jung & Shin, 2015). According to Jung and Shin (2015), leadership has a significant relationship with job satisfaction of university staff. Use of overt control by supervisors over task performance and low self-reliance reduce employees' satisfaction with the job. On the other hand, leaders who communicate with staff and set clear expectations, give staff recognition for their work, and provide a reasonable level of work autonomy and self-development opportunities have a positive effect on job satisfaction (Johnsrud, 2002; Jung & Shin, 2015). University leaders are recommended to fulfil the intrinsic needs of their subordinates and promote creativity and self-learning among them (Jung & Shin, 2015). Job satisfaction has a direct effect on employee morale, which then affects their turnover intention (Johnsrud, 2002).

Turnover in Higher Education Institutions

An employee is estimated to change jobs seven times throughout their career. Like any other organisation, high voluntary turnover rates in higher education have several negative impacts on both the organisation and the remaining employees. It has cost some universities up to 68 million dollars annually (Jo, 2008). The is attributed to HEIs allowing high turnover among non-academic

and academic staff to become a norm within the industry, often blaming the problem on poor economic situations that lead to downsizing or budget cuts. As a result, staffing shortage coupled with increasing work demands lead to burnout or employees leaving (Figueroa, 2015). According to a study by Jo (2008) among university administrators, turnover rate among women in HEIs is higher than that of men. Among the reasons cited are challenges of balancing work life and family, not feeling valued, disrespected, belittled, along with no career progression and lack of flexible working arrangements. The reasons are both monetary and non-monetary, suggesting that institutions need to create both financial incentives and recognition awards for outstanding employee performance. According to Küskü (2003), especially in developing countries where economic satisfaction level may be low with respect to the job completed, improvements in non-economic factors are important in increasing job satisfaction, which will boost productivity while reducing turnover intention.

According to Figueroa (2015), longitudinal studies found that low retention among administrative staff remains a challenge for institutions. The key reasons for this phenomenon are low staff engagement, low organisational commitment, little sense of value, inadequate career progression opportunities, insufficient staff development, and low pay.

CONCLUSION

Through this review, it is evident that talent retention among administrative staff warrants more attention, as the operations of HEIs depend heavily on them. Without efficient operations, the institutions will not be able to provide high-quality education to the community. The reasons driving administrative staff turnover intention can be addressed through sound leadership and strategic actions taken by the organisation to retain administrative staff. In summary, further research among non-academic staff in universities is warranted to facilitate talent retention of these employees who are fundamental to the successful operation of the university.

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REFERENCES

Alatawi, M. (2017). Can transformational managers control turnover intention? *SA Journal of Human Resource Management*, *15*. https://doi.org/10.4102/sajhrm.v15i0.873

Baltaru, R.-D. (2018). Do non-academic professionals enhance universities' performance? Reputation vs. organisation. *Studies in Higher Education*, *44*(7), 1183–1196. https://doi.org/10.1080/03075079.2017.1421156

Bass, B. M. (1990). From transactional to transformational leadership: Learning to share the vision. *Organizational Dynamics*, *18*(3), 19–31. http://ezproxy.lib.swin.edu.au/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=heh&AN=9607211357&site=ehost-live&scope=site

Buchanan, K. (2006, September 4). Job performance and satisfaction. *Ezine @rticles*. http://ezinearticles.com/?Job-Performance-and-Satisfaction&id=290072

Collier, P., & Dollar, D. (2002). *Globalization, growth, and poverty: Building an Inclusive world economy*. O. U. Press.

Cotton, J. L., & Tuttle, J. M. (1986). Employee turnover: A meta-analysis and review with implications for research. *The Academy of Management Review*, *11*(1), 55–70. https://doi.org/10.2307/258331

Dopson, S., Ferlie, E., McGivern, G., Fischer, M., Ledger, J., Behrens, S., & Wilson, S. (2016). *The impact of leadership and leadership development in higher education: A review of the literature and evidence*. Leadership Foundation for Higher Education

Durie, A. D., & Beshir, E. S. (2016). Leadership effectiveness in higher education institutions: The IPA approach. *Arabian Journal of Business and Management Review*, *6*(5), 1–4. https://doi.org/10.4172/2223-5833.1000243

Figueroa, O. (2015). The influences impacting staff turnover in higher education. *Journal of Management and Sustainability*, *5*(4), 86. https://doi.org/10.5539/jms.v5n4p86

Henkin, A. B., & Persson, D. (1992). Faculty as gatekeepers: Non-academic staff participation in university governance. *Journal of Educational Administration*, *30*(2). https://doi.org/10.1108/09578239210014487

Hofmann, Y. E., & Strobel, M. (2020). Transparency goes a long way: Information transparency and its effect on job satisfaction and turnover intentions of the professoriate. *Zeitschrift für Betriebswirtschaft*, *90*(5-6), 713–732. https://doi.org/10.1007/s11573-020-00984-0

Jo, V. H. (2008). Voluntary turnover and women administrators in higher education. *Higher Education*, *56*(5), 565–582. https://doi.org/10.1007/s10734-008-9111-y

Johnsrud, L. K. (2002). Measuring the quality of faculty and administrative worklife: Implications for college and university campuses. *Research in Higher Education*, *43*(3), 379–395. https://doi.org/10.1023/a:1014845218989

Jung, J., & Shin, J. C. (2015). Administrative staff members' job competency and their job satisfaction in a Korean research university. *Studies in Higher Education*, *40*(5), 881–901. https://doi.org/10.1080/03075079.2013.865161

Khalid, N., Pahi, M. H., & Ahmed, U. (2016). Loosing your best talent: Can leadership retain employees? The dilemma of the banking sector of Hyderabad Sindh, Pakistan: A mediation investigation. *International Review of Management and Marketing*, *6*(3), 608–616.

Küskü, F. (2003). Employee satisfaction in higher education: The case of academic and administrative staff in Turkey. *Career Development International, 8*(7). https://doi.org/10.1108/13620430310505304

Lambert, E. G., Lynne Hogan, N., & Barton, S. M. (2001). The impact of job satisfaction on turnover intent: A test of a structural measurement model using a national sample of workers. *The Social Science Journal*, *38*(2), 233–250. https://doi.org/10.1016/S0362-3319(01)00110-0

Liebmann, J. D. (1986). *Non-academic employees in higher education: A historical overview* [Paper presentation]. Annual Forum of the Association for Institutional Research, Orlando, FL, United States.

Lo, M.-C., Ramayah, T., & Run, E. C. d. (2010). Does transformational leadership style foster commitment to change? The case of higher education in Malaysia. *Procedia - Social and Behavioral Sciences*, *2*(2), 5384–5388. https://doi.org/10.1016/j.sbspro.2010.03.877

Lu, J., Laux, C., & Antony, J. (2017). Lean Six Sigma leadership in higher education institutions. *International Journal of Productivity and Performance Management*, *66*(5), 638–650. https://doi.org/10.1108/IJPPM-09-2016-0195

Maassen, P. E., & Olsen, J. P. E. (2007). *University Dynamics and European Integration*. Springer Netherlands.

Malaysia Education Blueprint 2015–2025 (Higher Education). (2013). Kementerian Pendidikan Malaysia.

Meyer, J. P., Allen, N. J., & Smith, C. A. (1993). Commitment to organizations and occupations: Extension and test of a three-component conceptualization. *Journal of Applied Psychology*, *78*(4), 538–551. http://ezproxy.lib.swin.edu.au/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=12359338&site=ehost-live&scope=site

Ng'ambi, D., & Bozalek, V. (2013). Leveraging informal leadership in higher education institutions: A case of diffusion of emerging technologies in a southern context. *British Journal of Educational Technology*, *44*(6), 940–950. https://doi.org/10.1111/bjet.12108

Noureen, R., & Abbas, M. (2017). Can employee turnover intentions be averted? Evaluation of role of job satisfaction on the relationship of leader member exchange dimensions and employee turnover intentions. *Journal of Engineering and Applied Sciences*, *12*(8), 2238–2247. https://doi.org/10.36478/jeasci.2017.2238.2247

Racz, S. (2000). Finding the right talent through sourcing and recruiting. *Strategic Finance*, *82*(6), 38.

Robbins, S. P., & Coulter, M. (2012). *Management*. Pearson.

Ryttberg, M., & Geschwind, L. (2017). Professional support staff at higher education institutions in Sweden: Roles and success factors for the job. *Tertiary Education and Management*, *23*(4), 334–346. https://doi.org/10.1080/13583883.2017.1322631

Sakiru, O. K., Othman, J., Silong, A. D., Silva, J. L., & Kareem, S. D. (2013). Review of leadership theories and organizational performances. *International Business Management*, *7*(1), 50–54. https://doi.org/10.3923/ibm.2013.50.54

Santhapparaj, A. S., & Alam, S. S. (2005). Job satisfaction among academic staff in private universities in Malaysia. *Journal of Social Sciences*, *1*(2), 72–76. https://doi.org/10.3844/jssp.2005.72.76

Sirat, Z., Kipli, N. A., Singh, K., Augustine, E. C., Goh, K., & Jusoff, K. (2009). The satisfaction level of Universiti Teknologi Mara Sarawak's staff towards university environment. *Canadian Social Science*, *5*(3), 24–33. https://doi.org/10.3968/j.css.1923669720090503.003

Siriattakul, P., Jermsittiparsert, K., & Abdurrahman, A. (2019). A broader perspective of job satisfaction in higher education institutes of Indonesia. *International Journal of Psychosocial Rehabilitation*, *23*(4), 719–733. https://doi.org/10.37200/ijpr/v23i4/pr190405

Smerek, R. E., & Peterson, M. (2007). Examining Herzberg's theory: Improving job satisfaction among non-academic employees at a university. *Research in Higher Education*, *48*(2), 229–250. https://doi.org/10.1007/s11162-006-9042-3

Smith, D. B., & Shields, J. (2013). Factors related to social service workers' job satisfaction: Revisiting Herzberg's motivation to work. *Administration in Social Work*, *37*(2), 189–198. https://doi.org/10.1080/03643107.2012.673217

Songcog, J. M., & Guhao, E. S., Jr. (2020). A structural equation model on job satisfaction among non-teaching personnel in private higher education institution in Region XII, Philippines. *Review of Integrative Business and Economics Research*, *9*, 480–537. http://ezproxy.lib.swin.edu.au/login?url=https://search.proquest.com/docview/2367740645?accountid=14205 http://librarysearch.swinburne.edu.au/primo_library/libweb/action/openurl?genre=article&issn=24146722&isbn=&title=Review+of+Integrative+Business+and+Economics+Research&volume=9&issue=&date=2020&atitle=A+Structural+Equation+Model+on+Job+Satisfaction+among+Non-Teaching+Personnel+in+Private+Higher+Education+Institution+in+Region+XII%2C+Philippines&spage=480&pid=&vid=sut_alma_services_page&institution=SUT-ALMA&url_ctx_val=&url_ctx_fmt=null&isServicesPage=true

Spector, P. E. (1997). *Job satisfaction: Application, assessment, causes, and consequences*. SAGE Publications, Inc.

Szromek, A. R., & Wolniak, R. (2020). Job satisfaction and problems among academic staff in higher education. *Sustainability*, *12*(12), 4865. https://doi.org/http://dx.doi.org/10.3390/su12124865

Tett, R. P., & Meyer, J. P. (1993). Job satisfaction, organizational commitment, turnover intention, and turnover: Path analyses based on meta-analytic findings. *Personnel Psychology*, *46*(2), 259–293. https://doi.org/10.1111/j.1744-6570.1993.tb00874.x

van Ameijde, J. D. J., Nelson, P. C., Billsberry, J., & van Meurs, N. (2009). Improving leadership in higher education institutions: A distributed perspective. *Higher Education*, *58*(6), 763. https://doi.org/10.1007/s10734-009-9224-y

Van Dick, R., Christ, O., Stellmacher, J., Wagner, U., Ahlswede, O., Grubba, C., Hauptmeier, M., Höhfeld, C., Moltzen, K., & Tissington, P. A. (2004). Should I stay or should I go? Explaining turnover intentions with organizational identification and job satisfaction. *British Journal of Management*, *15*(4), 351–360. https://doi.org/10.1111/j.1467-8551.2004.00424.x

Wan Ahmad, W. I., & Abdurahman, S. M. (2015). Job satisfaction among academic staff of Universiti Utara Malaysia: A work environment perspective. *Mediterranean Journal of Social Sciences*, *6*(3). https://doi.org/10.5901/mjss.2015.v6n3s2p251

DEVELOPING WORKPLACE SOFT SKILLS IN STUDENTS OF THE AMERICAN DEGREE TRANSFER PROGRAM

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ABSTRACT

Background A pertinent soft skill plays an important role in achieving a successful career. However, to achieve this, a remarkable soft skill on communication and presentation has to be empowered by the students at the tertiary level. The American Degree Transfer Program (ADTP) in Sunway University offers a degree programme in various fields with a unique holistic approach specially tailored for students.

Aim This study intends to identify areas and types of skills, especially in communication and presentation, to help develop students' soft skill.

Methods Data collection was done by comparing assessment results of students from several semesters.

Findings The ADTP offers up to 133 different subjects for students to take from Year 1 to Year 3 of their degree programmes. Two subjects selected for this study were called Public Speaking and US History to 1877. Both subjects analysed the mean scores for various types of assignment which includes speech and presentation.

Conclusion Students have the freedom and flexibility to choose subjects while enhancing their soft skills in preparation to meet the working world. Different assessment methods carried out in Public Speaking and US History to 1877

using different styles of speech and presentation skills benefit the students in building their personal skills. This paper suggests that Sunway's ADTP helps students develop various soft skills that prepare them in fulfilling employability expectation.

Keywords Assessment, workplace soft skills, presentation

INTRODUCTION

The National Graduate Employability Blueprint (2012–2017) indicated that even though Malaysia has a sufficient supply of graduates with technical skills, the demand for these graduates remains a problem due to a lack of soft skills and competencies issues (Ministry of Higher Education Malaysia, 2012). Malaysian employers believe that most local graduates have the technical and subject competencies from their degrees, but still lack a broader range of soft skills and attributes such as communication skills, interpersonal skills, information and communication technology (ICT) skills, teamwork, desire to learn, and ability to take initiative (Malaysian Employers Federation, 2016).

Job vacancies in Malaysia have been increasing but only parts of these jobs are fulfilled. This is due to low employability skills among graduates, particularly degree students from local higher education institutions (Nooriah & Zakiah, 2017). Higher education institutions can help improve the employability skills among their students through effective teaching delivery, curriculum, and assessments (Abd Majid et al., 2020).

The assessment method in the Malaysian education system is more focused on examination. This type of assessment only tests the individual's academic abilities and performance. Therefore, local graduates are afraid and shy to express themselves, and they are nervous about presentations in the workplace. The teaching delivery and assessment in higher education institutions should encourage communication and expression of ideas or opinions, teamwork, and creativity. Developed countries such as the United States, Australia, and the United Kingdom are already focusing on assessment-based learning experiences to help students improve their competencies and skills. They offer a wide variety of subjects for their students. The assessment

methods are also diversified from projects, class presentations, assignments, case studies, in-class tests or quizzes, group discussions, practical sessions, group work, etc. To ensure that our students are both academically knowledgeable and competent in skills and ability, the higher education institutions must be willing to change and upgrade their programme content and assessment methods.

This research aims to identify how selected subjects and assessment methods implemented in the American Degree Transfer Program (ADTP) helps students with the development of workplace soft skills and competencies. The ADTP offers a wide range of subjects. Most of the subjects are 70% focused on assessments. The programme also uses multiple methods to assess the learning outcomes and competencies of the students. The students are given the flexibility to choose subjects from different areas, which in turn exposes the students to different learning strategies and competencies.

MATERIALS AND METHODS

The first focus of this research is to look at how the broad ranges of subjects offered in the ADTP can expose the students to different types of workplace soft skills. The second focus is to measure how the assessment methods used in selected subjects in the ADTP contribute to workplace soft skills.

The skills and competencies in the job market are constantly changing based on the demand of employers and changes in the economy. Table 1 lists the soft skills that are in demand among Malaysian employers in 2019 and 2020 (Sani, 2019; Marr, 2019).

Table 1 *Type of skills/competencies*

Type of Skills/Competencies	
• Communication Skills	• Adaptability and Flexibility
• Creativity	• Leadership Skills
• Analytical Skills	• Teamwork
• Problem Solving Skills	• Cultural Intelligence and Diversity
• Data Literacy	• Emotional Intelligence
• Technological Skills /Digital Skills	• Time Management
• Critical Thinking	

The research aims to look at the variety of subjects and assessment methods used in the American curriculum that contributes towards the development of workplace soft skills in students. The effectiveness of workplace soft skills can be measured based on the overall students' achievement in each assessment. This research will focus on two subjects that are currently being offered in the ADTP. The subjects are selected based on some of the soft skills that are in demand in the current job market.

COMM1013 Public Speaking and Presentation Skills
This subject introduces students to underlying oral communication skills and techniques, including the fundamentals and principles of public speaking preparation and presentation. This subject will focus on presenting public speeches in professional and public settings. Students will also practise preparing, presenting, and evaluating speeches as well as other forms of oral presentations such as informative, persuasive, occasional speeches.

HIST 1023 US History to 1877
This subject introduces students to a broad overview of US history, from the earliest settlements to the Reconstruction. This subject helps students analyse the significant ideological, economic, and social developments leading to the establishment of the United States of America as a sovereign nation. At the end of the course, students will be able to apply the social, political, and economic issues that led to the Civil War as well as the effects of the war on the United States of America. Students will also demonstrate an understanding of the historical, social, and cultural development of the people as well as institutions of the United States of America.

RESULTS

The ADTP offer up to 133 different subjects for students to take from Year 1 to Year 3 of their degree programmes. The subjects offered range from communication, business, engineering, history, political science, psychology, mathematics, sciences, statistics, art, design, and more. Most of the subjects consist of 70% coursework and 30% final exam while some subjects are assessed based on 100% coursework. Table 2 summarises the selected subjects

(with the breakdown of only the coursework) offered in the ADTP related to some of the workplace soft skills.

Table 2 *The Subjects offered in the American Degree Transfer Program*

Communication • ADVS 1013 Principles of Advertising (70%) • COMM 1023 Introduction to Human Communication (70%) • COMM 2033 Mass Media and Society (70%) • JRNS 1013 Introduction to Journalism (70%) • COMM 1013 Public Speaking and Presentation Skills (100%)
Creativity • MUSC 1033 American Popular Music (70%) • THEA 1013 Introduction to Theatre (70%) • ARTD 1024 Drawing Techniques and Process (100%) • ARTD 1034 History of Art and Design (100%) • ARTD 1044 Intro to Computer Graphics (100%)
Digital • CSCI1013 Introduction to Computer Application (100%) • CSCI 2014 Information Technology for Business (70%)
Data Literacy • STAT 2014 Introduction to Statistics with SPSS Lab (70%) • STAT 2024 Statistics for Engineering with SPSS Lab (70%) • STAT 2034 Probability and Statistics (70%)
Cultural Intelligence and Diversity • HIST 1023 US History to 1877 (70%) • HIST 1033 US History since 1877 (70%) • HIST 3013 Intellectual History of the Modern West (70%) • MAND 1014 Mandarin I (70%) • POLS 2014 International Relations (70%) • POLS 2023 American Government and Politics (70%) • POLS 3013 Pacific Asia Today (70%) • POLS 3024 American Foreign Policy (70%) • RELS 1013 Survey of World Religions (70%) • RELS 3014 World Mythology (70%) • SOCY1013 Principles of Sociology (70%)

The ADTP is part of the American degree education that promotes a holistic education where students take their major subjects along with other subjects for their degree. Also, most American universities require students to take a selected number of subjects from the general education category, which covers a wide range of subjects. Some universities also require the students to be equipped with core skills such as writing, communication, numeracy, and

digital skills. From the diversity of subjects, students not only gain additional knowledge but also develop competencies in workplace soft skills such as communications skills, creativity, digital skills, data literacy, and cultural intelligence and diversity. These skills and competencies are useful for achieving their degree as well as in the future workplace.

Public Speaking and Presentation Skills

This subject covers five types of assessment:

(i) Impromptu speech

An impromptu speech is given when the speaker has little or no preparation time. It could be the sharing of knowledge or opinion. It is purely based on a variety of topics that the student wants to share with the audience. If the speech is opinion-based, then the students are required to state the opinion, the reason behind the opinion, and a conclusion.

Students will be able to learn the following:

- Develop and advance clear and cognizant arguments.
- Build confidence to communicate and generate quick and logical ideas.
- Become good listeners for valuable comments and recommendations.

(ii) Occasional speech

A special occasion speech is designed to engage the audience's emotion on a particular event. Occasional speech conveys an unmistakable message and is accompanied by an extraordinary way of presenting the message. The events in which such a speech is delivered include weddings, tributes, eulogies, etc. The main idea of occasional speech is to stir emotions of the listeners.

Students will be able to learn the following:

- Meet and engage with people in meaningful conversations.
- Expand social and business networks.

(iii) Informative speech

An informative speech is about sharing one's knowledge and educating the audience. The main goal would be outlining a speech to provide enlightenment on a specific topic, hence remember better a topic among the audience. An informative speech explains a variety of fields.

Students will be able to learn the following:

- Practise and gain experience in researching, writing, organising, and speaking.
- Discover and present information clearly while tailoring the speech for a specific group.

(iv) Persuasive speech

The goal of a persuasive speech is to convince the audience with his/her point of view. The success of a persuasive speech is measured by the willingness of the audience to follow or agree with a point made by the speaker.

Students will be able to learn the following:

- Fine-tune verbal and non-verbal skills.
- Develop leadership skills.
- Become a thought leader.

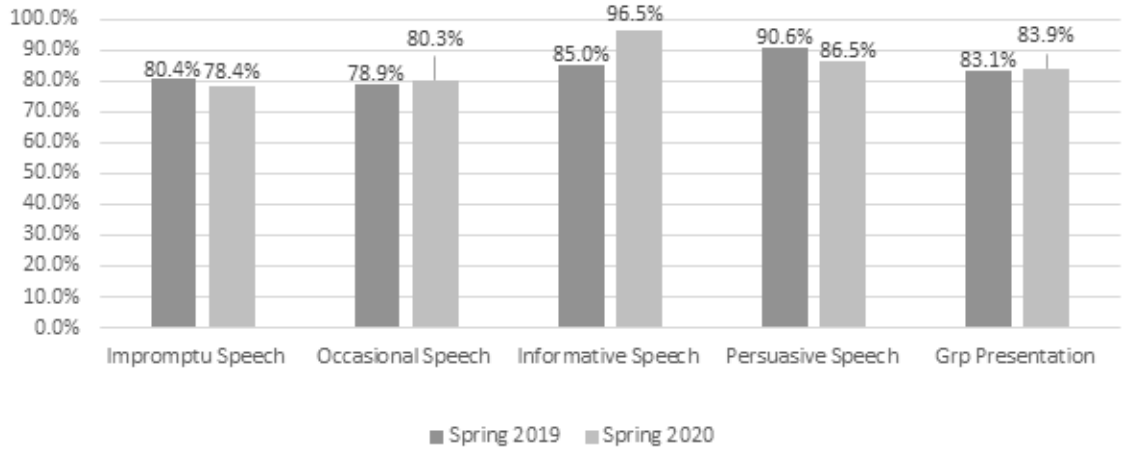
(v) Group presentation skills

Group presentation skills investigate the coordination of group members in outlining the speech, and practising organisational and teamwork skills.

Students will be able to learn the following:

- Give employees a sense of belonging.
- Manage and execute large and complex projects with members whose skills best fit.
- Exercise teamwork skills with shared experience and knowledge.
- Generate and share ideas.

Figure 1 *Public speaking*



Note. Assessment scores for Public Speaking among students in Spring 2019 and Spring 2020 semesters.

The overall results suggest that the assessment scores for Informative Speech and Persuasive Speech are high above 80% for both Spring semesters. There is also a rise in assessment scores for Informative Speech in Spring 2020. The students have achieved good presentation skills especially using presentation aids such as a recorded PowerPoint presentation for both Persuasive Speech and Informative Speech. In both semesters, the assessment for Impromptu Speech is below 80%. Students have regardless developed skills to make clear, cognisant arguments given the brief preparation time for Impromptu Speech. Coming from a rigid textbook-based education system since primary school; students have less or no exposure in sharing or standing on a standpoint, hence their unpreparedness for the assessment which has low or no rise in the percentage of achievements. The same result has been obtained for Occasional Speech. Despite being the most exciting and freeing form of presentation, where the presentation is mostly to enhance networking opportunities and meet people, the assessment for both Spring semesters has obtained below 80% whereby most students obtained 75% out of the 100% total marks. The assessment for Persuasive Speech was better in Spring 2019 than Spring 2020 due to the exercise being done in face-to-face classes; it was easier to perform a persuasive presentation to a live audience than a virtual one, as done in the Spring 2020 semester. Lastly, for Group Presentation, there is no significant rise in the percentage in both semesters despite strong emphasis on coordination and teamwork for this assessment. Students may lack time management skills due to the tight schedule and organisational skills

in managing seven to eight people in a group project. Overall, in both semesters, Informative Speech marks the highest score among students not only because it was a group work, but also because students were excited about sharing new knowledge which, in turn, would attract the audience's attention and curiosity.

US History to 1877
This subject covers two types of assessment:

(i) Discussion presentation
Students will apply the social, political, and economic issues that led to the Civil War as well as the effects of the war on the United States of America by creating questions and answers in Microsoft PowerPoint slides. This assignment also prepares students to be more familiar with the chapters and subtopics.

Students will be able to learn the following:

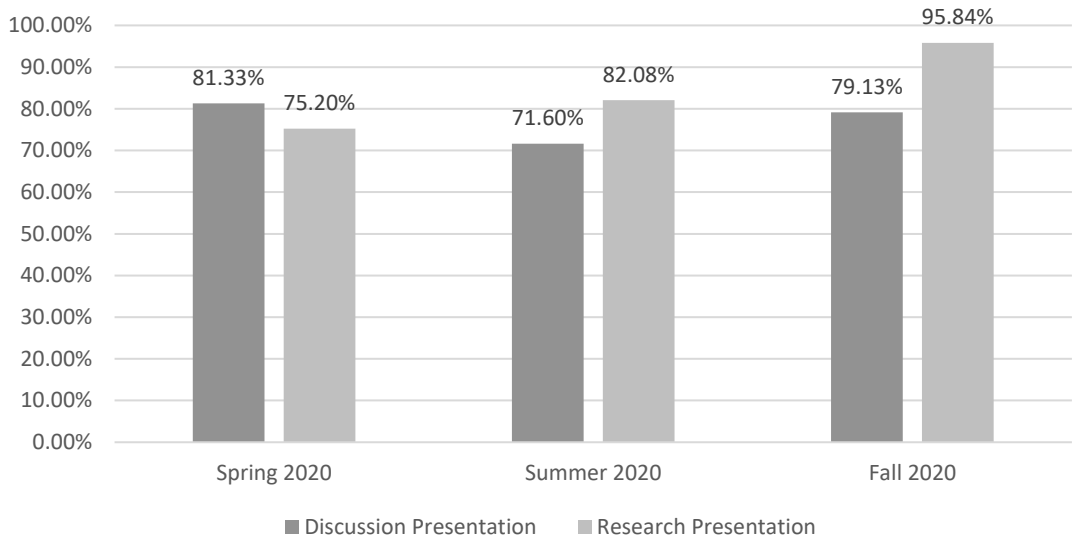
- Practise critical thinking skills by applying what they have learnt to create questions and answers.
- Gain emotional intelligence by their ability to use the joys and pains of history to create questions that empathise with others and are socially sensitive.

(ii) Research presentation
Students will demonstrate an understanding of the historical, social, and cultural development of the people as well as institutions of the United States of America by carrying out a US historical research of their choice (before the year 1877) and present their findings in Microsoft PowerPoint slides.

Students will be able to learn the following:

- Become adaptable and flexible.
- Demonstrate cultural intelligence and diversity.

Figure 2 *US History to 1877*



Note. Assessment scores for Discussion Presentation and Research Presentation in the US History to 1877 subject.

The above graph shows the average assessment results for two US History to 1877 assessments—Discussion Presentation and Research Presentation—for the recent three semesters of Spring, Summer, and Fall 2020.

Based on the various assessment methods implemented in this subject, student has consistently achieved above the 70% competency for both assessments over the three semesters in 2020.

For the Discussion Presentation, among the three semesters, there was a slight drop of percentage competence for the June 2020 semester. This is due to the semester being a short one (7 weeks, as opposed to the usual 14 weeks) and the first semester to be fully online.

For the Research Presentation, among the three semesters, there was an increase in competence of achievement where there was an improvement as each semester progressed.

DISCUSSION

The ADTP is a holistic education, which allows students to choose their subjects and take additional subjects that can help them in various areas such as communication, creativity, data literacy, digital skills, cultural intelligence, and diversity. The students are also taught to work with deadlines as most of the subjects have 70% of continual assessment. In some subjects, students are taught to work in groups for brainstorming activities, discussion, and presentation as part of the assessments.

Public Speaking exposed the students to many communication skills that prepare them for the working world. Through presentations conducted in class, public speaking not only can encourage students to speak and engage with the audience, but also teach them to present, convince, and develop their self-esteem. Having a supportive environment for the presenters will help them approach the audience confidently. Being well prepared in convincing a point or idea would be beneficial, as proper research has been done to support each point.

The students have achieved good communication and presentation skills by instilling reflection on what students have learnt and how their opinions may have strengthened or transposed during the presentation. Through various assessments, students are taught to look beyond their own notions and recognise and adapt to other viewpoints. This would be beneficial for young graduates while seeking job opportunities. Having said that, exposure to various public speaking assessment is an essential skill for all graduates. As the education system during students' formative years is exam-oriented, it may not be easy to inculcate presentation and speech skills in students during their tertiary education. However, the assessment of various speech skills has shown the development of soft skills that are much needed to prepare them for the working world.

To reflect on the importance of the development of the student's soft skills, the various assessments on the earlier charts have indicated the priorities of employable candidates. These findings are also in line with Andrews and Higson's (2008) study on graduates' and employers' expectations on graduate candidate's employability in the United Kingdom and mainland Europe. In their findings, implement-based work and soft skill-based work are important in nurturing graduate employability prospects. Pierce (2019) concluded that

employers expect their new employees to possess problem-solving, critical thinking and communication skills, as well as teamwork expertise. Rizwan et al. (2018) reported that problem-solving, critical thinking, teamwork and soft skill in communication are essential for entry-level engineers. In light of an investigation of occupation promotions, Bee and Hie (2015) likewise reasoned that correspondence, collaboration, and the capacity to work autonomously were the most sought-after delicate abilities.

The HIST 1023 Discussion Presentation assessment gets students to practise the workplace soft skill of critical thinking by applying what they have learnt in history class (readings, case studies, discussions, and videos) to create questions and answers into Microsoft PowerPoint slides with a photograph related to each slide. Students will learn to understand the joys and pains of history (the story of winners and losers in history) to create questions that empathise with others and are socially sensitive.

The second assessment is the Research Presentation, which provides students with an opportunity to use their ICT skill. Students are also given the flexibility to decide how they want to present their research in the Microsoft PowerPoint format. Students furthermore get to learn and practise different types of presentation styles rather than writing a history essay. Massingham and Herrington's (2006) study reported that the most influential factors of student attitudes are the teaching processes used in class; for example, constructivist instead of transmissive, with constructivist learning being that students learn through active engagement while constructing knowledge. In other words, students apply what they have learnt.

Another skill that history students acquire by doing this historical research presentation is cultural intelligence and diversity. The US is a country that has a multitude diversity of people (Feiner, 2020). By making students research a topic of their choice on US history and then presenting their findings, students will not only develop adaptability and flexibility skills but also cultural intelligence and diversity awareness since they will learn beyond the required textbooks and additional readings. Making the students use Microsoft PowerPoint slides in both the Discussion Presentation and Research Presentation allows them to be creative in expressing their ideas, opinions, and what they have learnt from their research. This also gives students the desire to learn since they are proficient with the Internet and encouraged to use ICT tools for both assessments.

CONCLUSION

The ADTP provides their students with the flexibility to choose their subjects and develop workplace softs skills while completing their degree. The students also learn to adapt to different teaching and assessment methods compared to what they have been exposed to in secondary school. The programme offers subjects on cultural diversity, communication, creativity, digital competencies, and knowledge in data literacy. This will certainly benefit the students in their personal skills development, studies, and workplace skills. The Public Speaking and Presentation Skills subject was very effective in giving the students the confidence to talk and present in front of an audience. The subject furthermore teaches students different types of presentation styles that can be used in their future career. Therefore, it is highly recommended that all university students take this subject in the first year of their degree. Public speaking and presentation are very important workplace skills that are needed by everyone. The US History subject exposes the students to cultural intelligence and diversity awareness, both relevant knowledge required in the globalised world. The students are also taught to use ICT skills to share what they have learnt more creatively. Students should be encouraged to take at least two cultural intelligence and diversity subjects as electives in their degree programme.

ACKNOWLEDGEMENTS

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REFERENCES

Abd Majid, M. Z., Hussin, M., Norman, M. H., & Kasavan, S. (2020). The employability skills among students of public higher education institution in Malaysia. *Geografia-Malaysian Journal of Society and Space, 16*(1). https://doi.org/10.17576/geo-2020-1601-04

Andrews, J., & Higson, H. (2008). Graduate employability, 'soft skills' versus 'hard' business knowledge: A European study. *Higher education in Europe, 33*(4), 411–422. https://doi.org/10.1080/03797720802522627

Bee, O. K., & Hie, T. S. (2015). Employers' emphasis on technical skills and soft skills in job advertisements. *The English Teacher, 44*(1), 1–11.

Feiner, L. (2020, November 7). Read Joe Biden's first speech as President Elect. *CNBC.* https://www.cnbc.com/2020/11/07/read-joe-biden-acceptance-speech-full-text.html

Marr, B. (2019, October 28). The 10+ most important job skills every company will be looking for in 2020. https://www.forbes.com/sites/bernardmarr/2019/10/28/the-10-most-important-job-skills-every-company-will-be-looking-for-in-2020/?sh=1b43304c67b6

Malaysian Employers Federation. (2016). *MEF salary survey for executives 2016*. Malaysian Employers Federation.

Massingham, P. & Herrington, T. (2006). Does attendance matter? An examination of student attitudes, participation, performance and attendance. *Journal of University Teaching & Learning Practice, 3(2).* http://ro.uow.edu.au/jutlp/vol3/iss2/3

Ministry of Education Malaysia (2015). *Malaysia education blueprint 2015–2025 (higher education)*. Ministry of Education Malaysia.

Nooriah, Y., & Zakiah, J. (2017). Development of graduates employability: The role of university and challenges. *Jurnal Personalia Pelajar*, 20,15–32.

Pierce, D. (2019). What employers want: Employers are looking to community colleges for help in teaching soft skills. *Community College Journal, 89*(3), 20–25.

Rizwan, A., Demirbas, A., Hafez, N. A., & Manzoor, U. (2018). Analysis of perception gap between employers and fresh engineering graduates about employability skills: A case study of Pakistan. *International Journal of Engineering Education, 34*(1), 248–255.

Sani, R. (2019, February 20). Demand for soft skills in the workplace. *New Straits Times.* https://www.nst.com.my/education/2019/02/461884/demand-soft-skills-workplace

CARBON FOOTPRINT STUDY ON ELECTRICITY CONSUMPTION OF SUNWAY UNIVERSITY DURING COVID-19 LOCKDOWN

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ABSTRACT

Background The COVID-19 global pandemic has triggered a significant transition in energy use and changes in electricity demand patterns in higher education institutions, leading to a future sustainable framework.

Aim This paper aims to identify the carbon footprint from electricity consumption during the COVID-19 lockdown of Sunway University and to highlight the concurrent initiatives taken by the university management in reducing electricity consumption during this pandemic.

Methods This work was performed by analysing secondary data of monthly electricity consumption bill from the years 2018, 2019, and 2020 obtained from Sunway University.

Findings Total carbon footprint recorded for the years 2018, 2019, and 2020 are 10,369 tCO_2eq, 10,005 tCO_2eq and 7,523 tCO_2, respectively. A reduction of 25% or 2,483 $MTCO_2eq$ was recorded from the total carbon footprint calculated for 2020 compared to 2019. There was an overall reduction in Sunway University campus' electricity consumption from 2018 to 2020 due to the pandemic and the concurrent university management's sustainable initiative.

Conclusion The COVID-19 pandemic has reduced electricity consumption, contributing to lower carbon footprint and exhibiting successful results by the university management in realising the green campus initiatives. This global pandemic could be a good plan of action for university management's policymaking towards a greener campus.

Keywords COVID-19, electricity consumption, carbon footprint, sustainable initiatives

INTRODUCTION

At the start of 2020, the COVID-19 pandemic shocked the whole world as the coronavirus began spreading widely, forcing for a shutdown implementation in many economic sectors to contain the virus. The lockdown helped keep people away from directly contacting each other. Manufacturing, industrial, service, and educational sectors were forced to shut down temporarily until the pandemic is under control (Edomah & Ndulue, 2020). Huge socio-economical activities globally came to a still, impacting the lives of thousands of individuals—economically and emotionally. Higher education institutions were indirectly forced to move from an on-campus mode of teaching to an off-campus one as all university campuses were forced to be closed (Favale et al., 2020), via the implementation of online delivery method of teaching to students.

However, this pandemic had helped many higher education institutions achieve their sustainability goals to reduce carbon footprint. Higher education is considered one of the major sectors that contributes to CO_2 emission from the daily activities of students and staff (Abdullah et al., 2019). According to Setyowati et al. (2019), electricity consumption records the highest contribution to carbon footprint on campus as it is an essential need to provide students with basic facilities such as lighting and air-conditioning, lab equipment, and charging pots for electronic gadgets. However, as the lockdown was implemented, with all on-campus activities at a halt, consumption of electricity reduced tremendously and brought down carbon footprint (Filimonau et al., 2021).

The Sunway University campus was closed to all students and staff from 18th March 2020 to 12th May 2020 due to the implementation of Malaysian Movement Control Order (MCO). Tentatively the campus was opened with minimal on-campus activities, following the Standard Operation Procedures (SOPs) provided by the Ministry of Education. During this duration, the consumption of electricity has decreased due to the reduced number of Sunway campus dwellers and various sustainable initiatives taken by the management. In this study, the carbon footprint was calculated from electricity consumption for the years 2018, 2019, and 2020 of Sunway University. This study's result reflects the effect of the pandemic and the success of a sustainable framework pathway and quality assurance initiated by the university management.

MATERIALS AND METHODS

Electricity consumption was the major contributor to the campus' carbon footprint and the total CO_2 emission was calculated using a calculating tool which estimates the CO_2 emission as metric ton of carbon dioxide equivalent ($MTCO_2eq$) (Nor Izana et al., 2017). Carbon footprint from electricity usage was estimated by using Equation (1) as indicated below:

$$\mathbf{CO_2 = Amt \ x \ E_{EF}} \quad \text{(Equation 1)}$$

where

CO_2 = the CO_2 equivalent in metric ton ($MTCO2eq$)
Amt = Average Monthly Electricity usage
EEF = Electricity Emission Factor

Equation 1 is computed using the secondary data on the monthly electricity bill from the Sunway University campus, comprising the North and South Buildings and the University Building, collected from the Facilities Department for the years 2018, 2019, and 2020. The E_{EF} value is taken as 0.672 $MTCO_2eq$ per MW/hr based on work by Nor Izana et al. (2017).

RESULTS

Figure 1 shows the total electricity consumption calculated for all three buildings at the Sunway University campus from 2018 to 2020, illustrating an overall reduction of total electricity consumption. However, the University Building indicated an increase of 372,375 kWh in year 2019 compared to the previous year, as many new programmes commenced with an increase in student intake. In addition, there were continual upgrade and renovation work in the University Building throughout 2019. Electricity consumption for the North and South Buildings recorded a reduction of 22% (730,452 kWh) and 17% (230,539 kWh) between 2019 and 2020, respectively. As for the University Building, a reduction of 27% (2,728,413 kWh) was recorded compared to 2019 and 2020. The impact of lockdown during the COVID-19 pandemic had reduced on-campus activities which indirectly reduced electricity consumption, as observed in Figure 1. Reduction in electricity consumption by 19% and 17% was reported at Bournemouth University and University of Northampton, the United Kingdom, respectively when the campuses were under total lockdown (Filimonau et al., 2021).

Figure 1

Total electrical consumption by campus building for 2018, 2019, and 2020

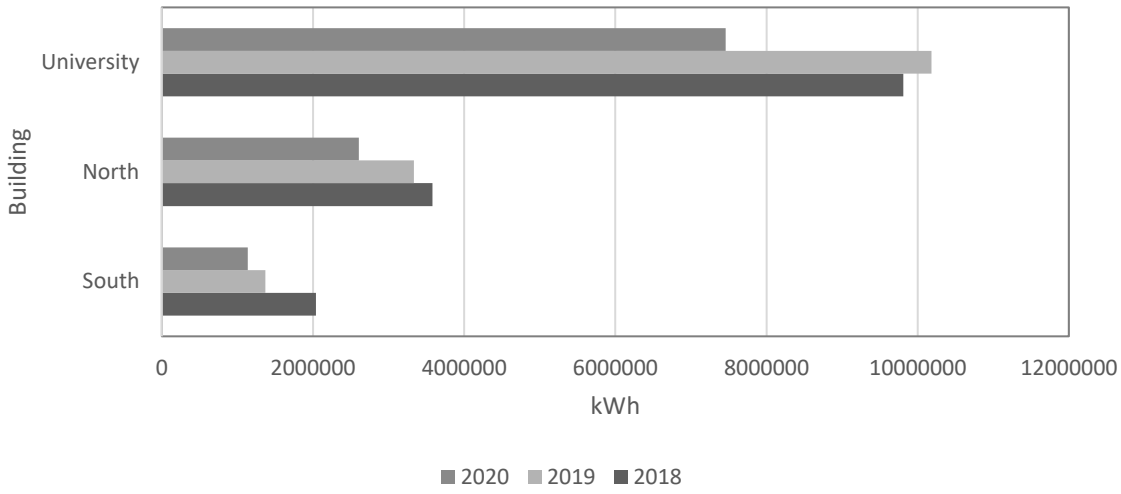

Figure 2 illustrates the monthly electricity consumption for the Sunway University campus in 2020 where a clear downward trend in electricity consumption could be observed from March to May. In April, the campus was shut down and the electricity consumption was recorded as the lowest compared to other months. A minimal amount of electricity consumption amounting 379,553 kWh for the University Building was observed as this minimal amount of electricity was required to maintain the university campuses. Minimal lighting and air-conditioning were required especially by the Security and Maintenance departments as staff were on duty during the lockdown period and for electrical equipment's in the science research laboratories. In August 2020, there is a surge of the consumption amounting 412,656 kWh and 158,390 kWh for the North and South Buildings respectively, as students enrolled in International Foundation programmes could return to campus for practical sessions, hybrid classes, and even final exams while adhering to strict SOPs.

A similar trend is observed in many universities across the globe as on-campus activities were limited due to the pandemic. According to Nweye and Nagy (2020), in University of Texas, the United States, a large drop of electricity consumption is observed as the university shifted to full online teaching during lockdown. Moreover, Pang et al. (2020) claimed that during campus closure due to COVID-19 from 31st March to 31st July 2020 at University of Alabama, the total electricity consumption decreased by nearly 41% compared to the previous year.

Figure 2

Monthly electrical consumption by campus building for 2020

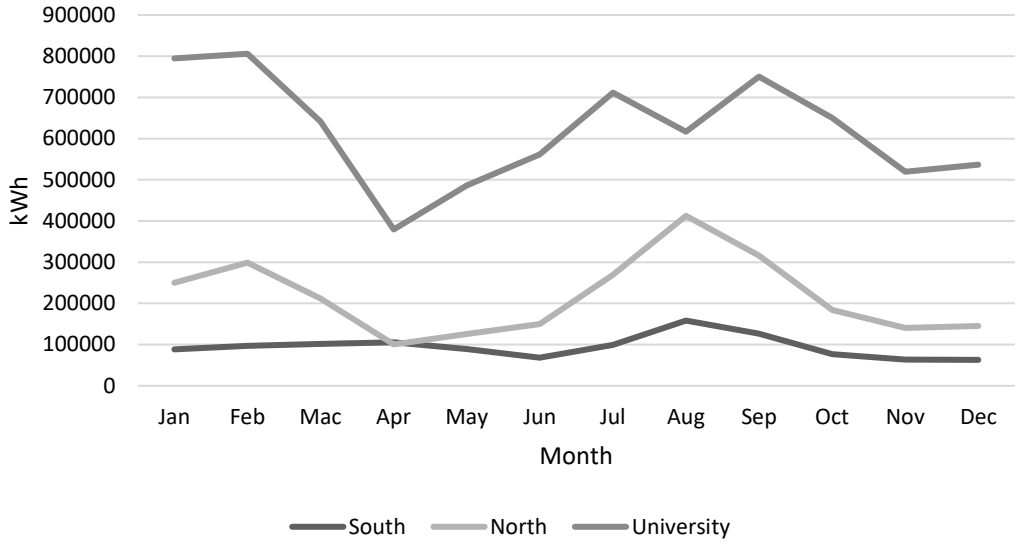

Table 2 shows the total carbon footprint calculated from the Sunway University campus' electricity consumption for 2018, 2019 and 2020. There was a reduction of 3.5%, amounting to 364 $MTCO_2$ equivalent of carbon footprint from electricity consumption, between 2018 and 2019. This was due to the installation of solar panels on the roof of the college building and the energy generated was compensated with the purchased electricity for the South Building. Apart from that, various energy-saving initiatives were carried out throughout the Sunway University campus as part of the sustainable initiatives. In 2020, carbon footprint was further reduced by 25% amounting to 2,483 $MTCO_2$ equivalent of carbon footprint compared to the previous year due to the management's initiatives on top of the lockdown.

Table 2 *Carbon footprint from electricity consumption for 2018, 2019, and 2020*

Year	Carbon Footprint ($MtCO_2$/MWh)
2018	10,369
2019	10,005
2020	7,523

DISCUSSION

During the lockdown period due to the COVID-19 pandemic, with the shutdown of university campuses, an evident reduction in electricity consumption could be observed as all on-campus teaching and learning activities were done online remotely at home. While the campus was allowed to be re-opened, teachers and students adopted online or hybrid teaching and learning methods, adhering to the Ministry of Education's strict SOPs with limited direct contact among students and staff on campus.

Various efforts were taken by the university management to wisely use electricity consumption during the lockdown, even though staff and students returned to campus. Staff were to request, in advance, for the air-conditioning system to be turned on when they were on campus, as unutilised venue lights, electrical appliances, and air conditions were turned off throughout the lockdown period. This is one of the efforts by the Sunway University management towards inculcating positive impact towards a green campus.

Many higher education institutions adopt sustainable practices in their day-to-day operations to educate their communities (Sippel et al., 2018). As an approach towards attaining a worldwide recognition of a green campus status, the Sunway University management adopts greener initiatives as a quality assurance framework, especially with electricity consumption control.

The national lockdown from 18th March 2020 positively reduced carbon footprint at the university campus by 25%. However, Edomah and Ndulue (2020) claimed that a forced lockdown due to the COVID-19 global pandemic can lead to a momentary transition in energy use and changes in electricity demand patterns. Even though this reduction is momentarily impacting behavioural shift in energy usage on campus, this research can lead to future sustainable framework pathways and quality assurance that the university management can further scrutinise.

CONCLUSION

As a safety measure during the COVID-19 pandemic, the world issued lockdowns which forced universities to close their campuses and conduct all activities online. In this paper, carbon footprint from electricity consumption was calculated from 2018, 2019 and 2020 at Sunway University. The results reveal a reduction of 25% on carbon footprint in 2020 compared to 2019.

The pandemic has reduced electricity consumption at Sunway University due to the forced lockdown and the green initiatives taken by the university, which were ongoing concurrently. Hence, this would be a recommended platform to leverage by the university management to develop a quality assurance framework towards building a greener campus especially in controlling electricity consumption that contributes to carbon footprint.

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REFERENCES

Abdullah, S., Mansor, A. A., Ahmed, A. N., Napi, N. N. L. M., & Ismail, M. (2019). Carbon footprint assessment for academic institution: A UI greenmetric approach. *International Journal of Scientific and Technology Research*, *8*(11), 1752–1755. http://www.ijstr.org/final-print/nov2019/Carbon-Footprint-Assessment-For-Academic-Institution-A-Ui-Greenmetric-Approach.pdf

Edomah, N., & Ndulue, G. (2020). Energy transition in a lockdown: An analysis of the impact of COVID-19 on changes in electricity demand in Lagos Nigeria. *Global Transitions*, *2*, 127–137. https://doi.org/10.1016/j.glt.2020.07.002

Favale, T., Soro, F., Trevisan, M., Drago, I., & Mellia, M. (2020). Campus traffic and e-learning during COVID-19 pandemic. *ArXiv*, *176*(April).

Filimonau, V., Archer, D., Bellamy, L., Smith, N., & Wintrip, R. (2021). The carbon footprint of a UK university during the COVID-19 lockdown. *Science of the Total Environment*, *756*. https://doi.org/10.1016/j.scitotenv.2020.143964

Nor Izana, M. S., Wan Noor Anira, H. W. A., Norizan, M. A., & Siti Rasidah, M. S. (2017). Carbon footprint assessment at UITM Seri Iskandar Campus, Malaysia. *Malaysian Journal of Sustainable Environment*, *2*, 59–72. https://ir.uitm.edu.my/id/eprint/29791/1/29791.pdf

Nweye, K., & Nagy, Z. (2020). Impact of COVID-19 on academic campus energy use. *BuildSys 2020, Proceedings of the 7th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, 322–323. https://doi.org/10.1145/3408308.3431123

Pang, Z., Feng, F., & O'Neill, Z. (2020). Investigation of the impacts of COVID-19 on the electricity consumption of a university dormitory using weather normalization. *ArXiv*, (March 2020).

Setyowati, D. L., Hardati, P., Astuti, T. M. P., & Amin, M. (2019). Awareness of electrical energy as realization a conservation in Universitas Negeri Semarang Campus. *IOP Conference Series: Earth and Environmental Science*, *256*(1). https://doi.org/10.1088/1755-1315/256/1/012046

Sippel, M., Meyer, D., & Scholliers, N. (2018). What about greenhouse gas emissions from students? An analysis of lifestyle and carbon footprints at the University of Applied Science in and carbon footprints at the University of Applied Science in Konstanz, Germany. *Carbon Management*, *9*(2), 201–211. https://doi.org/10.1080/17583004.2018.1440851

STUDENT FEEDBACK ON RAPID ADAPTATION OF ONLINE DELIVERY LEARNING DURING THE COVID-19 PANDEMIC: LEARNING POINTS TOWARDS BETTER FUTURE PRACTICE

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ABSTRACT

Background The sudden need for a fully online teaching mode at the onset of the COVID-19 pandemic saw higher education institutions (HEIs) scramble to adapt their curricula and delivery methods. Novel solutions were quickly generated and implemented, potentially impacting, among other things, the quality of student experience. Reflections from student feedback on the rapid transition to virtual learning platforms resulted in the identification of key areas for improvements in academic practice in the era of online teaching and learning.

Aim Based on student feedback throughout two semesters of teaching at a private university in 2020 during the COVID-19-associated Movement Control Order, this paper reports learning points from the adaptations that were carried out during the initial and later phases of transition to guide continual improvement.

Methods Qualitative and quantitative data from the feedback survey of more than 450 respondents in each semester across three academic departments were analysed. Measures included overall learning experience, quality of teaching and learning, as well as communication. Quantitative analyses

included word clouds and descriptive statistics based on the five-point Likert scale measures. Qualitative results were derived from simple thematic coding.

Findings Results revealed that the majority of students had positive experiences from the quick adaptation to online delivery, coupled with regular communication from the academic departments. Main concerns for students included the lack of face-to-face interactions and active connections between students.

Conclusion This study suggests that the preferred practices for better student experiences during the rapid transition to online curriculum delivery include regular communication sessions, options for face-to-face interactions (when permissible), and improved connections between peers.

Keywords Online teaching, student experience, higher education, quality assurance

INTRODUCTION

Positive student experience is a significant factor for the sustainability of private higher education institutions (HEIs). As such, regular feedback helps academic and administrative management teams foster better engagement strategies with students to improve their learning experiences (Ramísio et al., 2019). Such efforts were intensified with the onset of the COVID-19 pandemic that has thrown the world into crisis. Many events and activities were disrupted, causing worldwide distress among various communities. In the world of academia, HEIs were plunged into a situation where traditional forms of teaching and learning had to adapt almost instantly to a fully online mode. This adaptation involved more than just switching education delivery mechanisms into virtual platforms. The adaptation also involved a lot of re-organising of the curriculum as well as coordination between instructors and students via regular communication of updated information to inform problem-solving and decision-making in very fluid circumstances (Murphy, 2020).

Given the lack of precedence of how such a change can be mitigated, HEIs had to develop novel solutions to address the need for rapid adoption of

online delivery and student engagement methods. It is now a year into the pandemic and more reviews of methodologies or approaches to online adaptation of the curricula are beginning to provide greater insights into adaptation efficacy. This paper presents an example of how a school within a private university adapted to a fully online delivery of teaching and learning at the onset of the COVID-19 pandemic-associated Movement Control Order (MCO) and discusses how student feedback helped inform decision making by the school leadership to enhance student experiences throughout the year.

Sudden rapid changes such as responding to a pandemic crisis can contribute significantly to personal distress. The sense of disruption in personal routines can throw individuals into deep feelings of uncertainty, confusion, helplessness, hopelessness, and despair. These feelings, coupled with actual public health risks of the COVID-19 virus and the loss of economic activities, as well as long-term isolation from social connections due to national lockdowns have created significant amounts of anxiety. Educational psychology research consistently show that anxiety negatively affects learning, and when prolonged, can lead to the demoralisation of students (Cargnelutti et al., 2017). To quell anxiety and distress in students and to address their educational needs, the school management quickly developed interventions designed to address these emerging crises.

As with any crisis, responses to danger and distress must be swift, by quickly putting mechanisms in place to ensure the safety and security of communities affected. Research on crisis management also shows that early intervention to stabilise crisis situations better facilitates recovery from any eventual consequences of distress caused by the crisis (Everly Jr et al., 2014). Part of this management involves staying connected with those directly affected by the crisis and to provide regular information and situational assessment. These can lead to a better sense of security and personal resilience (McCabe, et al., 2014). A key objective in crisis intervention is to empower relevant stakeholders through information-giving, compassionate engagement, and mobilising action steps in those who are affected by the crisis (Noullet et al., 2018). Delaying any intervention would lead to a lot of psychological distress and potential demoralisation as seen in many cases across HEIs worldwide (Oyedotun, 2020).

In the case presented here, academic heads of three departments of a school collaborated in deploying crisis intervention via regular town hall meetings with students and/or staff to provide weekly updates on developments in

curriculum adaptations, university advisories, government regulations/directives and to address individual student inquiries or concerns. This was carried out over two semesters, from April to July 2020 and then from August to December 2020. The first semester started after a two-week delay and involved a fully online curriculum delivery as the nation went under a Movement Control Order lockdown, while the second had a partially hybrid mode (i.e., dual mode of face-to-face and online) for a few weeks before reverting to being fully online halfway through the semester due to a second lockdown as a result of a new wave of infections.

To better understand the efficacy of the intervention strategies, surveys on students were collected each semester. The aims were to obtain (1) measures of overall student learning experience, (2) an understanding of factors contributing to their acceptance and satisfaction of online curriculum delivery, (3) types of problems faced by students in each semester, and (4) their feedback and suggestions for improvement.

Several studies prior to the COVID-19 pandemic revealed that online and blended learning showed promise although the findings on students' preferences when compared to face-to-face learning were mixed. These studies also discussed numerous contributing factors towards student satisfaction such as instructor competency of online instruction, user readiness, assessment diversity, facilitation of social interactions, course flexibility and learner circumstances. The current study provides some insights into how these factors play a role in student experience given the unique and unprecedented circumstances of the pandemic.

MATERIALS AND METHODS

Participants included students from three separate academic departments within the School of Science and Technology at Sunway University, namely the Departments of Biological Sciences, Computing and Information Systems, and Psychology. Two online surveys were carried out, with one in each semester. The first survey had 467 respondents and the second had 488, each representing approximately 25% of the student population. These surveys included both quantitative and qualitative questions. The quantitative results were analysed and summarised into trends and frequencies according to question categories. No demographic information was identified except for

programme of study. Unique variations that may exist between programmes of study are not discussed in this paper.

The qualitative results included thematic analysis of keywords from the students' responses by sentiment analysis of the comments as well as through text analytics. QDAP2in R was used to carry out the analysis. Comparative analyses were performed using three factors—Sentiment Score as well as Positive and Negative Words.

The items in the second survey were worded slightly differently from the first one, as the modes of delivery were different—the first semester being fully online and the second one partially hybrid before reverting to fully online. Questions were added to know if students chose face-to-face session or fully online, as well as their reasons for deciding so. The rationale for this was to determine if there was any impact due to the introduction of hybrid delivery. Both surveys were released around week 4 of each semester and results were compiled towards the end of week 7.

RESULTS

The results of this study are categorised into (1) student ratings of the mode of delivery for both semesters, (2) qualitative responses on student experience, and (3) reasons for students' choices of delivery mode.

Table 1 *Student ratings on teaching and learning quality for the April and August 2020 semesters*

Questions	Rating category	April (n = 467)		August (n = 488)	
		Total	%	Total	%
Overall learning experience	Satisfactory to Very Good	397	85.01	444	90.98
	Bad to Very Bad	70	14.99	44	9.02
Quality of teaching delivery	Satisfactory to Very Good	406	86.94	446	91.39
	Bad to Very Bad	61	13.06	42	8.61
Quality of teaching materials	Satisfactory to Very Good	429	91.86	465	95.29
	Bad to Very Bad	38	8.14	23	4.71

As presented in Table 1, the overall learning experience scores were largely positive for the April semester, with 85.01% of students rating satisfactory to very good scores. This rating increased to 90.98% in the August semester. Regarding teaching delivery, 86.94% of students gave ratings ranging from satisfactory for the April semester and this increased to 91.39% in the August semester. As for the quality of teaching materials, 91.86% students rated satisfactory and above for the July semester, while for the August semester, the numbers went up to 95.29%. As such, the overall experience for students improved in the second semester.

Table 2 *Sentiment analysis scores of the qualitative responses for the April and August 2020 semesters*

Questions	April		August	
	Positive	Negative	Positive	Negative
A. One thing you enjoy the most (N_{APR}=434, N_{AUG} = 437)	89.17 %	10.83 %	90.85 %	9.15 %
B. One thing that stops you from learning (N_{APR}=437, N_{AUG} = 433)	48.51 %	51.49 %	58.66 %	41.34 %
C. One good thing about online teaching (N_{APR}=415, N_{AUG} = 414)	93.73 %	6.27 %	95.17 %	4.83 %
D. Any other feedback (N_{APR}=375, N_{AUG} = 338)	65.07 %	34.93 %	69.82 %	30.18 %

For qualitative responses on student experiences, between 80.30% to 93.58% of students sampled for the April semester responded, while for the August semester, there were fewer—between 69.26% and 89.55%. Results of the sentiment analysis showed that between 48.51% and 93.73% students had positive impressions of the April semester, whereas in August the positive sentiments ranged from 58.66% to 95.17%. Negative sentiments about classes (Question C. in Table 2) dropped from 6.27% in the April semester to 4.83% in the August semester. Other questions also showed a drop of negative sentiments, which can be due to the students being generally happier or that they were able to accept and adapt to the online learning delivery better by the August semester. A significant component of positive feedback referred to the regularity of the academic and administrative management communication with the students. However, the students expressed dissatisfaction in the level

of communication between students as they felt isolated, especially in social referencing for both academic and interactional purposes.

A dual-mode and hybrid delivery option was made available for students early in the August semester. A total 65% of respondents indicated their preference for a hybrid option. The other 35% preferred to study fully online. This is consistent with the earlier qualitative results where more respondents reported a preference for face-to-face classes when available.

Text analytics were carried out to further understand the qualitative answers provided by the students in both semesters. Figure 1 shows the students highlighted time saving, online/recorded classes, and flexibility as what they enjoyed the most during the April semester. These factors become more evident (time, online, and recorded being top three keywords) in the August semester. This result indicated the acceptance and appreciation of the students for online and recorded delivery. As the August semester was a hybrid semester, some students also mentioned about face-to-face sessions and back to campus. This indicated that there are some students who appreciated the opportunity to return to face-to-face classes, even if for a brief period.

Figure 1

Word cloud for the question on the one thing that the students enjoyed the most in the April (top) and August (bottom) semesters

For the question on what stops them from learning, there was mixed feedback during the April semester with regard to connectivity related issues (high frequency keywords like the Internet, connection, online, communication). Distraction was also highlighted as an issue. The issues on distraction and online/connectivity continued to be highlighted during the August semester. Hence, one must be mindful of teaching and learning activities that rely on good Internet connections. Students with connectivity problems will likely miss out on their learning and social interactions. Distraction can be caused by a noisy home environment (e.g. siblings learning online in parallel, or the home being too comfortable). Educators need to be cognisant that one will not receive full attention from their students if distractions and disruptions occur frequently or continue to persist.

Figure 2

Word cloud for the question on the one thing that stops students from learning in the April (top) and August (bottom) semesters

To confirm some of the students' preferences and sentiments, a question was asked to know what students would want the school to continue doing. In Figure 3, it is evident that students liked having access to recorded materials. Also, it can be observed that students accepted online teaching and learning better than anticipated. One may attribute this to the MCO enforced by the government that limited external distraction factors but, on the other hand, the mentioning of online sessions showed that students appreciated online learning as an optimal option moving forward in ensuring their academic progression, given the uncertain nature of the circumstances.

Combining the outcomes of the sentiment and text analysis, it can be concluded that the students were generally positive and appreciative of the opportunity to continue learning during the ongoing pandemic via online delivery. The benefit of transitioning towards online delivery is the availability of recorded materials (originally prepared for students who were facing connectivity problems to view their lectures asynchronously). Students appreciated the possibility to review a course content through the recorded material at their own pace.

Figure 3

Word cloud for the question on the one good thing to continue from the April (left) and August (right) semesters

DISCUSSION

Based on the results above, the overall outcomes of the adaptation to a fully online curriculum delivery were generally perceived as positive in both the semesters surveyed. Suffice to say that the students did not have a choice given the circumstances that the university was forced to abide by the directives and guidelines by the authorities to migrate to online delivery. Nevertheless, positive feedback reflected successful transition to online delivery by the institution. Sentiment analyses supported this observation. Cooperation and support of the students also contributed to the success of this transition.

While online delivery led to a sense of flexibility and convenience in learning, the majority of respondents still preferred at least some access to traditional face-to-face learning activities. Despite the provision of online support for learning and increased facilities for online learning, there was still a powerful desire for some face-to-face learning. Students reported that the lack of face-to-face interactions increased the likelihood of miscommunication and the

sense of isolation, thereby causing feelings of demotivation and demoralisation.

As such, it is strongly suggested that online curriculum delivery must be accompanied with a conscious and concerted effort to foster interactions (synchronous and asynchronous) to facilitate the goals of teaching and learning. This is in line with the findings of Safsouf et al. (2020), that suggest that the perceived usefulness, assessment diversity, social interactions, and course flexibility play a role in impacting learner satisfaction. Current findings seem to echo Ghazal et al.'s (2018) suggestion that the critical success factors that influence students' experience and satisfaction in a blended learning setting are students' connection with their classmates as well the individual course characteristics.

CONCLUSION

This paper described a study that involved the surveying of student feedback regarding the rapid transition from face-to-face teaching and learning to a fully online one in light of the COVID-19 pandemic. Students who were surveyed reported generally positive attitude towards the adoption of online curriculum delivery. Students also indicated their preference for more regular opportunities to connect with their lecturers and academic leadership as well as between themselves. The improvement of student feedback from the April semester to the August semester reflect the success of the efforts to provide regular communication with students to address various issues that arose during this period and to foster active two-way engagement for better overall student experience. Real-time sharing of experiences between the leadership of various academic departments, including crisis management and best practice strategies provide a useful co-learning experience and confidence-building opportunity for academic leaders to cope with unprecedented circumstances. As such it is suggested that these learning points be considered in the future development of best practices in quality assurance as the academic world continues to adapt towards the realities of our still-evolving new normal in the face of the current pandemic and the real of threat of other pandemics and catastrophic disruptions in the near future.

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REFERENCES

Cargnelutti, E., Tomasetto, C., & Passolunghi, M. C. (2017). How is anxiety related to math performance in young students? A longitudinal study of Grade 2 to Grade 3 children. *Cognition and Emotion, 31(4)*, 755–764. https://doi.org/10.1080/02699931.2016.1147421

Everly Jr, G. S., McCabe, O. L., Semon, N. L., Thompson, C. B., & Links, J. M. (2014). The development of a model of psychological first aid for non–mental health trained public health personnel: The Johns Hopkins RAPID-PFA. *Journal of Public Health Management and Practice, 20,* S24–S29. https://doi.org/ 10.1097/PHH.0000000000000065

Ghazal, S., Al-Samarraie, H., & Aldowah, H. (2018). "I am still learning": Modeling LMS critical success factors for promoting students' experience and satisfaction in a blended learning environment. *IEEE Access, 6,* 77179–77201. https://doi.org/ 10.1109/ACCESS.2018.2879677

McCabe, O. L., Semon, N. L., Thompson, C. B., Lating, J. M., Everly Jr, G. S., Perry, C. J., Moore, S. S., Mosley, A. M., & Links, J. M. (2014). Building a national model of public mental health preparedness and community resilience: validation of a dual-intervention, systems-based approach. *Disaster Medicine and Public Health Preparedness, 8(6)*, 511–526. https://doi.org/10.1017/dmp.2014.119

Murphy, M. P. (2020). COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemporary Security Policy, 41(3*), 492–505. https://doi.org/10.1080/13523260.2020.1761749

Noullet, C., Lating, J.M., Kirkhart, M.W., Dewey, R. & Everly Jr., G.S. (2018). Effects of pastoral crisis intervention training on resilience and compassion fatigue in clergy. *Spirituality in Clinical Practice, 5*(1), 1–7. https://doi.org/10.1037/scp0000158

Oyedotun, T. D. (2020). Sudden change of pedagogy in education driven by COVID-19: Perspectives and evaluation from a developing country. *Research in Globalization*, *2*, 100029.

Ramísio, P. J., Pinto, L. M. C., Gouveia, N., Costa, H., & Arezes, D. (2019). Sustainability strategy in higher education institutions: Lessons learned from a nine-year case study. *Journal of Cleaner Production, 222*, 300–309.

Safsouf, Y., Mansouri, K., & Poirier, F. (2020). *Smart learning environment, measure online student satisfaction: A case study in the context of higher education in Morocco* [Paper presentation]. 2020 International Conference on Electrical and Information Technologies (ICEIT), 1–5. https://doi.org/ 10.1109/ICEIT48248.2020.9113189

TEACHING MULTIPLE SUBJECTS SIMULTANEOUSLY THROUGH ASSIGNMENTS

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ABSTRACT

Background Teaching methods are continually evolving due to practice and research by dedicated teachers. Assessments have to be well designed to facilitate learning. However, students may not appreciate the linkage between each of the individually assessed subject modules.

Aim This paper proposes the use of integrated assignments to simultaneously assess learning in one or more related subject modules, and to assist students in understanding the linkage between the different subject modules.

Methods In Sunway Diploma Studies Department (SDS), the lecturers create integrated assignments through a process that embraces the key decisions in Bearman et al.'s (2014) Assessment Design Decisions Framework.

Findings An example of an integrated assignment for an SDS business management diploma was discussed. In the integrated assignment, students are required to propose a business plan and apply student learning outcomes from five different subject modules.

Conclusion Integrated assignments facilitate student learning. Students are able to understand the linkage between individual subject modules while simultaneously learning the curriculum of each individual subject module, for more holistic understanding. In addition, integrated assignments help students optimise time and effort. There is scarce research on teaching one or more related subject modules simultaneously. This paper contributed knowledge

through presenting integrated assignment practice. Further research could be conducted to examine the effectiveness of student learning through integrated assignments.

Keywords Integrated, group, assignment, linkage, holistic

INTRODUCTION

Teaching methods are continually evolving due to practice and research by dedicated teachers. An important component of teaching is the design of assessments. Assessment is one of the most important components of learning and teaching (Biggs & Tang, 2011). Formative assessments are akin to "homework". Summative assessments are graded and awarded marks which contribute to the total coursework marks. Hence, the assessment strategy is an important part of curriculum design (Boud & Falchikov, 2006). Assessments come in many varieties including quizzes, written examinations, and coursework assignments. Coursework assignments are written assignments for students to show their understanding of lessons taught in the context of a workplace. Assessments have to be well designed to facilitate learning. Furthermore, students spend the majority of time and effort on passing assignments (Gibbs & Simpson 2004). From the students' perspective, what is assessed is what is actually being taught (Ramsden, 2003).

Currently, there is much ongoing research on the areas of improving the pedagogy of teaching delivery through improving assessments. For example, improving assessment tasks to stimulate learning (Carless, 2015); assessment for employability (Knight & Yorke, 2003); assessment strategies for motivating student learning (Sambell et al., 2013); and the effect of different assessment patterns on student learning (Jessop et al., 2014).

Study programmes often consist of separately assessed subject modules taught by specialist lecturers. The relationship between the individual subject modules and the overall programme may be confusing to students (Jessop et al., 2014). That is, students may not appreciate the linkage between each of the individually assessed subject modules.

One way to assist students in understanding the connection between the different subject modules is to create an integrated assignment that

simultaneously assesses one or more related subject modules. There is scarce research on teaching one or more related subject modules simultaneously. This paper will discuss the efforts of the Sunway Diploma Studies Department (SDS) in creating an integrated assignment for their students, in order to overcome the challenges to modular study programmes outlined above. The design process is described in the following section.

MATERIALS AND METHODS

In SDS, an integrated assignment is designed based on the programme learning outcomes. These outcomes guide the learning outcomes of the individual subject modules within the programme. An integrated assignment will simultaneously require student learning from more than one subject module. These subject modules are selected with the programme learning outcomes in mind. That is, the subject modules are selected from the same semester. This method is similar to Wiggins and McTighe's (1998) backward design, which is to design a curriculum based on the programme learning outcomes.

According to the Assessment Design Decisions Framework for supporting university educators' design of good assessments by Bearman et al. (2014), the decisions for designing good assessments include identifying the (1) purpose of the assessment; (2) context; (3) learning outcomes; (4) assessment tasks; (5) feedback processes; and (6) key interactions.

For the past two years, SDS lecturers have created integrated assignments by combining two or more subject modules. Their design process embraces the key decisions in Bearman et al.'s framework. Firstly, identifying the purpose of the assessment. The purpose of the SDS integrated assignment is to facilitate student learning and grading, by requiring students to demonstrate their learning outcomes from each of the several subject modules. By doing so, the students will instinctively appreciate the relationships between the subject modules.

Secondly, identifying the context of the assessment. The lecturers will select a context for the integrated assignment. For example, the assessment tasks may be set within an international franchise scenario. Hence, students will understand the complex linkage between the different subject modules taught

in the same semester. This understanding cannot be learnt by studying any individual subject module independently on its own.

Thirdly, identifying the learning outcomes of the assignment. The learning outcomes of the individual subject modules are separately listed in the integrated assignment. Students will understand the learning outcomes required in each section of the integrated assignment.

Fourthly, identifying the assessment tasks of the assignment. The specialist lecturers of each of the subject modules will have one or more meetings to create unique tasks that simultaneously demonstrate student learning outcomes for each of the separate subject modules; and show the interaction between the subject modules.

Fifthly, identifying the key interactions in the integrated assignment. The students are briefed on which section of the integrated assignment is to be supervised and marked by which lecturer. This is done by communicating the marking rubrics to the student from the start of the semester. The marking rubrics will show how the learning from the different subject modules fit into the different sections in the integrated assignment. In this way, students gain appreciation of the inter-relationship between the subject modules.

Finally, identifying the feedback processes to support student learning. The marking rubrics will also be the basis of the main feedback process to inform the student on their learning and possible mistakes. In addition, lecturers will discuss the graded assessment with students during tutorials.

In summary, the SDS integrated assignment is designed in this way to simultaneously assess students in two or more subject modules. The benefits of the integrated assignment assessment format are discussed in the following section.

RESULTS AND DISCUSSION

For the past two years, SDS lecturers created integrated assignments that simultaneously assess student learning on two or more subject modules. For instance, an integrated assignment could be where students are required to propose a business plan and apply student learning from five subject modules.

Firstly, students will use their knowledge from the subject module "Introduction to Business" to conceptualise the background, purpose, and staff allocation for their proposed business. Next, the students use their learning from the subject module "Principles of Management" to explain the operations management and control of their proposed business.

Subsequently, the students will be required to use concepts from the subject module "Principles of Marketing" to identify the target customers of the proposed business and the marketing strategies employed to engage the customers. Students then draw up a financial plan for the proposed business, applying their learning from the subject module "Introduction to Financial Accounting". Finally, the overall format and presentation of the integrated assignment report are guided by the students' understanding of the "Business English" subject module.

CONCLUSION

Learning can be facilitated with assessments that are relevant and well designed. One way to assist students to understand the linkage between the different subject modules is to create an integrated assignment that simultaneously assesses one or more related subject modules. This paper discussed the efforts of SDS lecturers in creating an integrated assignment for their students.

The main benefit of the SDS integrated assignment is holistic learning. That is, students can understand the complex linkage between the different subject modules taught in the semester, and how they fit in the context of the overall study programme. In the integrated assignment example cited, students will be better able to understand how the five subject modules complement each other in the preparation of a business plan.

Secondly, integrated assignments optimise student time and effort. Many business programmes require students to read as many as six subject modules in each semester. Each subject module will have one individual assignment and one group assignment as coursework assessment. This means students will have to complete six individual assignments and six group assignments in each semester. However, in SDS, the students need to submit six individual assignments and only one integrated group assignment. Therefore, the integrated assignment benefits students by optimising their time and effort. In

addition, students will be able to appreciate the intricate linkage between the subject modules.

In summary, the integrated assignments facilitate student learning. In the process, SDS helps students understand the linkage between individual subject modules while learning the curriculum of each individual subject module. In addition, integrated assignments help students optimise time and effort. There is scarce research on teaching one or more related subject modules simultaneously. This paper contributed knowledge through presenting integrated assignment practice. Further research could be conducted to examine the effectiveness of student learning through integrated assignments.

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REFERENCES

Bearman, M., Dawson, P., Molloy, E., Boud, D., Joughin, G., Bennett, S., & Hall, M. (2014). *Guide to the assessment design decisions framework*. http://www.assessmentdecisions.org/guide/

Biggs, J. B., & Tang, C. (2011). *Teaching for quality learning at university: What the student does* (4th ed.). Open University Press.

Boud, D., & Falchikov, N. (2006). Aligning assessment with long-term learning. *Assessment & Evaluation in Higher Education, 31*(4), 399–413. https://doi.org/10.1080/02602930600679050

Carless, D. (2015). Exploring learning-oriented assessment processes. *Higher Education, 69*(6), 963–976. https://doi.org/10.1007/s10734-014-9816-z

Gibbs, G., & Simpson, C. (2004). Conditions under which assessment supports students' learning. *Learning and Teaching in Higher Education*, *1*(1) 3–31. http://eprints.glos.ac.uk/id/eprint/3609

Jessop, T., El Hakim, Y. & Gibbs, G. (2014). The whole is greater than the sum of its parts: A large-scale study of students' learning in response to different programme

assessment patterns. *Assessment & Evaluation in Higher Education*, *39*(1),73–88. http://doi.org/10.1080/02602938.2013.792108

Knight, P. T., & Yorke, M. (2003). *Assessment learning and employability*. Open University Press.

Ramsden, P. (2003). *Learning to teach in higher education* (2nd ed.). Taylor & Francis.

Sambell, K., McDowell, L., & Montgomery, C. (2013). *Assessment for learning in higher education*. Routledge.

Wiggins, G., & McTighe, J. (1998). *Understanding by design*. Association for Supervision and Curriculum Development.

A REVIEW OF VIRTUAL TEACHING STRATEGIES FOR GEN Z LEARNERS

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ABSTRACT

Background As it is inevitable to move classrooms to the virtual world due to the ongoing COVID-19 pandemic, a greater emphasis is being placed on improving teaching approaches to engage students online.

Aim This paper aims to understand the characteristics of the Generation Z learners, and explore teaching strategies which are suitable and effective to them in the virtual classroom.

Methods An overview of the existing literature around the characteristics of Generation Z is provided with the need to adapt to the students' learning needs

Findings This paper proposes recommendations on possible online teaching deliveries which could cater to the current learners' needs for more effective learning outcomes.

Conclusion The generational theory which identifies different learning styles and preferences could be used as a reference for educators to develop more effective virtual teaching strategies.

Keywords Gen Z, virtual classroom, online teaching

INTRODUCTION

In order to reduce the transmission of COVID-19, in most countries, educational institutions had to suspend physical, in-person classes unexpectedly and move to the virtual space abruptly. The sudden switch from face-to-face classes to the virtual classroom has disrupted the usual teaching practices. While adapting to new pedagogical approaches online, which are very much different from offline practices, it is also important to understand the current generation's learning needs.

The Millennials, also known as Gen Y, are at least 25 years old in 2021 (Parker & Igielnik, 2020) and have graduated from tertiary education. The new cohort, the Generation Z (Gen Z), has entered the higher educational institutions. This group of learners have brought along very distinctive characteristics and learning preferences to the classroom. Thus, while educators are re-designing their pedagogy for online classes, it is important to understand the unique learning styles of Gen Z. This will help instructors develop a more interactive and efficacious online teaching approach which will result in more favourable learning outcomes.

BACKGROUND OF GEN Z

The generational theory developed in 1991 posits distinguishing different cohorts based on their birth year due to different sets of historical events that created a distinct gap among the generations (Parry & Urwin, 2011). Each generation has been associated with different characteristics that define them as a unique group.

Gen Z was born between 1996 and 2015 (Seemiller & Grace, 2017). They are currently between 6 and 25 years old. Succeeding from the Baby Boomers and Generations X and Y, this rising Gen Z has received vast attention from researchers in recent years. Gen Z has earned the nicknames "Digital Natives", "iGen" and "Screensters" (Rothman, 2016). These labels were given because they were born a year after the birth of World Wide Web. Unlike Gen Y who witnessed the emergence of the Internet, social media, and smart devices; Gen Z was brought up in a media-saturated world. Digital devices have been widely accessible to them since young and they spend a large part

of their lives using and interacting with laptops, tablets, smartphones, and other digital devices.

Unlike their parents, Gen Z reads news from social media rather than newspapers. People from this cohort have more virtual than in-person friends. They probably have no idea how a rotary dial telephone works nor the need to remember family members' phone numbers. In short, they cannot imagine life without digital devices and Internet connection. As this tech-savvy cohort grows up in an "always on" technological environment, recent research has shown a drastic change in their behaviours, attitudes, and lifestyles (Dimock, 2019).

Since most of the educational offerings these days have been shifted to online platforms due to the COVID-19 pandemic, with the integration of technology into the virtual learning spaces, educators need to adopt online teaching approaches which are aligned to Gen Z's learning needs. Given that this tech-savvy cohort has a different preference and expectation while learning in class, online teaching approaches which cater to their learning needs is necessary to achieve a more productive and effective learning outcome.

CHARACTERISTICS OF GEN Z

Short Attention Span

The use of fast-paced multimedia since young has marked a significant impact on the attention span of Gen Z. While Gen Y was reported to have a 12-second attention span, studies have indicated that Gen Z only has an eight-second attention span. People from Gen Z have been found to be unable to focus on and analyse complex information for an extended period of time (Rothman, 2016; Shatto & Erwin, 2016). Therefore, sitting in front of the laptop, and listening passively to an hour-long lecture in the virtual classroom is not effective for Gen Z learners. When there is no variety and digital tools that meet their learning preference, they quickly become bored (Seemiller & Grace, 2017).

Visual Learners

Since Gen Z is so immersed in Internet technology and smart devices, it is reported that the visual ability of their brain is more developed than their auditory system (Rothman, 2016). While Gen Y enjoys regular text messaging, Gen Z communicates through videos, images, animated GIFs and emojis. While Gen X refers to the user manual on how to set up a new laptop, Gen Z learns from YouTube. They find it hard to learn through reading a wordy textbook or listening to an audio lecture (Cameron & Pagnattaro, 2017).

Besides, platforms such as Instagram, as well as various photo and video sharing social media applications which have gained high popularity among Gen Z (Haenlein, 2020) has substantiated the fact that Gen Z people are more visual in predisposition. The use of fast-paced multimedia has impacted Gen Z learners significantly, which makes visual forms of learning more beneficial.

Influenced by Like-Minded People

Unlike the earlier generation, it is interesting to find that Gen Z pays attention to social media influencers more than celebrities (Francis & Hoefel, 2018). This finding is evident in the survey reported by Ernst and Young in 2016, which asserts that this cohort prefers genuine narratives and authentic content using "real people" rather than commercially produced content. They prefer listening to stories of their peers and obtaining information through YouTube (Schwieger & Ladwig 2018). Celebrities and public figures are often perceived as inauthentic, whilst opinions from their friends and like-minded influencers are more valuable and have a greater impact on them.

Self-Leaners

The Ernst and Young report (2016) further identified Gen Z as self-leaners. They are hyperconnected and very adept at learning things on their own using web-based research resources. This tech-savvy cohort has access to global information at their fingertips almost instantly and they enjoy learning from their digital devices. Educators are no longer a main source of information in their learning (Drozdova, & Shuyskaya, 2021).

Clip Thinker

However, due to the speed the Internet offers, Gen Z prioritises the speed at which they can find the right information, as opposed to actually knowing the right information (Schwieger & Ladwig, 2018). The skills of deep analysis and critical thinking are lacking among Gen Z (Rothman, 2016). This phenomenon is identified as "clip thinking". The clip thinking concept is not new, but it has been widely discussed with the current generation in recent Russian literature (Drozdova, & Shuyskaya, 2021; Melnyk et al., 2020; Vikhrova, 2017). Due to the speed and vastly fragmented multimedia available online, the young generation has developed clip thinking by making immediate, rash decisions without the analysis of a problematic case and its factors (Dautov et al., 2019).

Content Creators

Unlike Gen Y who re-shares content in social media, Gen Z enjoys creating content. In contrast to the older generation who are shy and lack the technology know-hows, Gen Z likes recording videos on product reviews or vacation experiences to share on social media platforms. According to the Institute for Emerging Issues (2012), Gen Z is a do-it-yourself generation. Instead of forwarding a seasonal greeting cards or video for example, they create or curate one themselves to share with their family and friends.

Instant Feedback and Gratification

Gen Z is used to constant connectivity 24 hours a day, and on-demand entertainment via connected digital devices anytime and anywhere. Besides, the waiting period between the moment of "I want/need" and the implementation of the desires have been greatly minimised (Vikhrova, 2017). Instead of going to the library and spending a few hours researching and reading books for information, Google presents the necessary details in minutes. For class assignments, Gen Z expects almost instant feedback on their performance. This tech-savvy cohort seems to have developed a general dislike of waiting for responses, as they expect instant information and feedback (Rothman, 2016)

RECOMMENDATIONS

Having identified the different learning needs and preferences of Gen Z learners, and given the constant advancement of technology, educators need to review and re-strategise their teaching approaches periodically.

Gen Z prefers bite-size information as they are unable to focus for an extended period of time. Therefore, educators are encouraged to split their one-hour virtual class recording into small sub-topics or mini-lessons. In addition, it is recommended that educators vary and change their mode of delivery from time-to-time in a class session. Giving an assortment of activities and different types of learning materials in the virtual classroom could parallel a "screen change" in the learner's digital devices. Furthermore, incorporating videos, online interactive games, and other visual teaching methods are reported to be more effective as opposed to passive teaching in one- or two-hour online classes (Gerschenson et al 2017).

There are numerous digital educational tools available which educators can use in the virtual classroom to create excitement and better engagement in class. Quizziz, Edpuzzle, Socrative, Padlet are some examples of digital educational tools which could be used. Social media applications like YouTube and Facebook can also be creatively integrated into Gen Z's education experience.

Having identified that most Gen Z learners are wired to hearing and seeing lesson content through digital devices, educators can consider video-based mini-lessons as opposed to wordy PowerPoint slides, lengthy lecture explanations, or written instructions. With the technology nowadays, mini videos can be created easily to deliver information by using online free-ware such as Biteable, Powtoon, or screen-capturing software with mobile phone cameras.

Since Gen Z learners have wide access to global resources, educators need to review their role in delivering and imparting knowledge. There is a need to shift from being knowledge providers to knowledge facilitators. Instead of PowerPoints presentations, classes should encourage open discussions, lively debates, and structured group work (Cilliers, 2017). Flipping the classroom to provide more engagement instead of the usual traditional lecture session might

be more appreciated and valued by Gen Z learners. To encourage greater participation, educators can consider the "breakout group" function in online class applications.

Knowing that the Gen Z cohort is better influenced by their peers and like-minded people, senior students can also be invited to share their lab experiences, assignment reminders, internship stories, etc. The message will be sent across Gen Z learners more effectively as opposed to dry explanations on textbook theories or reminders. A simple online freeware like Zoom or a laptop/phone camera is sufficient for a story or narrative to be shared.

Having identified that Gen Z has difficulty processing large and complex information, it is suggested that educators provide clear, step-by-step guidelines for online searching and reviewing of resources for class assignments. Since learners have access to vast global resources which can be overwhelming, segmented assignments can help students stay focused on getting the right information (Mohr & Mohr, 2017). Moreover, there should be diversity in the focus and type of tasks assigned. Questions have been raised about whether Gen Z should be limited to a single serious analytical publication or allowed to skim through a variety of sources to get a more "volumetric" information (Vikhrova, 2017). It has also been questioned whether educators should focus more on developing data analysis and fact-checking skills (Vikhrova, 2017). Educators are encouraged to focus on both.

While educators are trying to adapt to Gen Z's learning preferences, it is also important to help students develop the ability to focus for a longer period of time (Drozdova & Shuyskaya, 2021). Project-based learning through technology is an option which emphasises critical thinking and problem solving ("The face of Gen Z", 2012). Educators could continue project-based learning practices even in the virtual classroom. This is important to produce students with better analytical skills.

Gen Z prefers interactions more than communication with their educators and peers. While institutions are trying to manage their budgets by maximising resources, class size should be kept at an ideal number for effective interactions. It is challenging and time-consuming for educators to interact with students in large-enrolled seminars (Liu et al., 2019). Small class size

(=15) has also been recommended for learning that requires higher order thinking skills (Taft et al., 2019).

In addition, performing joint project-related tasks, discussing the results, voting and building ratings, together with close interactions with students in the virtual space are encouraged (Drozdova & Shuyskaya, 2021). On the issue of collaboration, educators should be less concerned about the limitations of virtual classes and the inability of meeting face-to-face for discussion during the pandemic. Gen Z knows how to connect well with others in the virtual world (Ozkan & Solmaz, 2015) and will therefore be comfortable with the shift to the e-learning mode.

Since Gen Z would appreciate the opportunity to co-create lessons, educators are encouraged to allow learners to contribute and collaborate in the virtual class. Educators can motivate their learners to use digital tools to collect information and work with peers to create presentations and later share ideas online (Morgan, 2020)._While this tech-savvy group has more technology know-hows than the educators (Cilliers, 2017), Gen Z students can be empowered to create bite-size learning materials which can be more effective than those created by educators. Active involvement of students in the production of content will better engage them in the learning process (Drozdova & Shuyskaya, 2021)

In addition, research has found that Gen Z prefers video-recording more than note-taking (Cilliers, 2017). It is recommended that instructors record their lessons for flexible and asynchronous learning in the virtual classroom. Besides catering to the learning preference of Gen Z learners, recordings offer more flexibility in terms of allowing learners to learn at their own pace and time.

CONCLUSIONS

Every generation is inherently diverse and complex. Most of today's educators generally come from generations which are more "book-oriented", whereas Gen Z is "screen-oriented" (Melnyk et al., 2020). It is challenging for educators to cater to unique learning needs of Gen Z students. The need to continually explore suitable digital educational tools to update teaching

pedagogy skills is time consuming and challenging. Moreover, it is common to find a feeling of displeasure by one generation towards the younger generations' diametrically opposed characteristics. Educators should avoid approaching generational differences with narrow-mindedness and a blame mentality. This would only foster dissatisfactions and conflicts instead of focusing on growth-oriented solutions (Schroth, 2019). Instead, it is important to have a more open-minded acceptance towards Gen Z students, and to understand their unique characteristics and distinct learning style in the virtual classroom. This will promote a more effective virtual teaching approach to effectively meet the desired learning outcome.

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REFERENCES

Cameron, E. A., & Pagnattaro, M. A. (2017). Beyond Millennials: Engaging Generation Z in business law classes. *Journal of Legal Studies Education*, 34(2), 317–324.

Cilliers, E. J. (2017). The challenge of teaching Generation Z. *PEOPLE: International Journal of Social Sciences*, *3*(1), 188–198.

Dautov, D., Korochentseva, A., & Al Hussini, M. K. M. (2019). Features of clip thinking and attention among representatives of Generations X and Generations Z. *SHS Web of Conferences, 70*, 06001. https://doi.org/10.1051/shsconf/20197006001

Dimock, M. (2019, January 17). Defining generations: Where Millennials end and Generation Z begins. *Pew Research Center*. https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/

Drozdova, E. A., & Shuyskaya, Y. V. (2021). Clip thinking and its influence the teaching methodology. *KnE Social Sciences*, 46–54.

Ernst & Young Report. (2016). From Innovation to Expectation: How M & E Leaders are Responding to Gen Z. http://www.ey.com/Publication/vwLUAssets/ey-media-entertainment-leaders-respond-togen-z/$FILE/ey-media-entertainmentleaders-respond-to-gen-z.pdf

Francis, T., & Hoefel, F. (2018). True Gen': Generation Z and its implications for companies. *McKinsey & Company*, *12*.

Gerschenson, M., Stearns, J., Dudoit, K., Fujihara, S., & Kennedy, A., (2017). Teaching Generation Z at the University of Hawai'i. *IICEHawaii 2017 Conference Proceedings, USA*.

Haenlein, M., Anadol, E., Farnsworth, T., Hugo, H., Hunichen, J., & Welte, D. (2020). Navigating the new era of influencer marketing: How to be successful on Instagram, TikTok, & Co. *California Management Review*, *63*(1), 5–25.

Liu, B., Xing, W., Wu, Y., Tian, Y., & Li, R. (2019). Students' interaction and perceptions in a large-enrolled blended seminar series course. *Turkish Online Journal of Educational Technology—TOJET*, *18*(3), 88–96.

Melnyk, Y. B., Yekhalov, V. V., & Sedinkin, V. A. (2020). The role and influence of "clip thinking" on the educational process in medical education. *Interdisciplinary Journal of Virtual Learning in Medical Sciences*, *1*, 61–64.

Morgan, H. (2020). Best practices for implementing remote learning during a pandemic. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, *93*(3), 135–141.

Mohr, K. A., & Mohr, E. S. (2017). Understanding Generation Z students to promote a contemporary learning environment. *Journal on Empowering Teaching Excellence*, *1*(1), 9.

Ozkan, M., & Solmaz, B. (2015). *The changing face of the employees: Generation Z and their perceptions of work (a study applied to university students)*. *Procedia Economics and Finance*, *26*, 476–483.

Parker, K., & Igielnik, R. (2020, May 14). On the cusp of adulthood and facing an uncertain future: What we know about Gen Z so far. *Pew Research Center*. https://www.pewresearch.org/social-trends/2020/05/14/on-the-cusp-of-adulthood-and-facing-an-uncertain-future-what-we-know-about-gen-z-so-far-2/

Parry, E., & Urwin, P. (2011). Generational differences in work values: A review of theory and evidence. *International Journal of Management Reviews*, *13*(1), 79–96.

Rothman, D., 2016, A tsunami of learners called Generation Z. *Public Safety Online Journal*, 1(1).

Schroth, H. (2019). Are you ready for Gen Z in the workplace? *California Management Review*, *61*(3), 5–18.

Schwieger, D., & Ladwig, C. (2018). Reaching and retaining the next generation: Adapting to the expectations of Gen Z in the classroom. *Information Systems Education Journal*, *16*(3), 45.

Seemiller, C., & Grace, M. (2017). Generation Z: Educating and engaging the next generation of students. *About Campus*, *22*(3), 21–26.

Shatto, B., & Erwin, K. (2016). Moving on from Millennials: Preparing for Generation Z. *Journal of Continuing Education in Nursing*, *47*(6), 253–254

Taft, S. H., Kesten, K., & El-Banna, M. M. (2019). One size does not fit all: Toward an evidence-based framework for determining online course enrollment sizes in higher education. *Online Learning*, *23*(3), 188–233.

The face of Gen Z. (2012) *Institute for Emerging Issues: NC State University*, *119*(9), 7767-7779. https://iei.ncsu.edu/wp-content/uploads/2013/01/ForumPaperFinal_2_2-41.pdf

Vikhrova, O. (2017). On some Generation Z teaching techniques and methods in higher education. *International Information Institute (Tokyo). Information*, *20*(9A), 6313–6324.

AFTERWORD

RETHINKING QUALITY ASSURANCE IN HIGHER EDUCATION AS ENTERPRISE

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ABSTRACT

Two decades into the 21st century, higher education institutions continue to navigate shifts in knowledge production for global economic reforms and future work that is rapidly evolving, address the implications of artificial intelligence and augmented reality, and develop pathways to improve access to education and promote lifelong learning. There is also the need to balance higher education as public good and as enterprise. Since late-2019, the onslaught of an unexpected global pandemic has brought online and remote teaching-learning and assessing from the side-lines to centre-stage. How are practitioners in Malaysian public and private education and quality assurance institutions responding in such times? What are effective and relevant approaches for the present and future in higher education? These questions framed the discourses at Malaysia's recent seminar on internal and external quality assurance. In this paper, I reflect upon the discourses at this seminar and draw some conclusions through a sociology of education lens. My analysis reveals three emerging themes with implications for higher education and quality assurance in Malaysia. This review highlights the need for more collaborative research between quality assurance agencies and universities to comprehend 21st century higher education and formulate contemporary quality assurance approaches for Malaysia and potentially the SEA region.

Keywords Higher education, quality assurance, reforms, Malaysia

BACKGROUND

Almost every year, since 2014, public and private higher education institutions in Malaysia and from the Southeast Asia (SEA) region gather to exchange knowledge and share experiences on higher education and quality assurance reforms that affect their academic practices and processes. Topics raised and discussed include events and experiences within programmes or institutions, between institutions as well as between the higher education systems of different SEA countries. I am referring to the Seminar on Internal-External Quality Assurance or SieQA which runs under the auspices of the Malaysian Higher Education Institutions Quality Assurance Network or MyQAN as it is more popularly known. Typically, SieQA is conducted by MyQAN in partnership with the Malaysian Qualifications Agency (MQA) along with a Malaysian higher education institution (public or private) that is selected each year as the event organiser.

It is not surprising that the discussions and presentations at SieQA 2021 are interesting and important extensions of the topics and issues discussed in past SieQA events. This is because education and curriculum practitioners continue to navigate the complex and multi-faceted challenges of higher education in the 21st century. These include the need for quality assurance frameworks and processes to address the Fourth Industrial Revolution or IR 4.0 (the theme for SieQA 2017) and align curriculum with UNESCO's sustainable development goals or SDGs (the theme in SieQA 2019). Additionally, SieQA 2021 discourses also highlight the challenges brought on by the onslaught of the COVID-19 global pandemic which forced higher education institutions (HEIs) to adapt and adopt new approaches at rapid speeds. For many Malaysian HEIs, teaching-learning and assessments had to migrate almost overnight onto online and off-campus modes so that essential aspects of higher education could continue in some form for necessary reasons. In addition to these challenges, higher education providers in Malaysia are also asked or told to come up with more flexible and enterprising approaches so that the state's agenda for widening access, promoting lifelong learning, building an educated and skilled workforce, and growing Malaysia's higher education provisions for domestic and international markets can be realised (Malaysia 2011).

With these contexts as background, the focus of SieQA 2021 was to look at how public and private HEIs in Malaysia embed a quality assurance culture in higher education as response to 21st century and enterprise considerations. Such emphases bring up questions about what and how quality assurance becomes the conditions, practices, and norms for contemporary forms of higher education and why. For example, are flexible education programmes a fad or a sustainable curriculum? What are new ways of teaching, learning, and assessing and how are they deemed valid, reliable, and recognised methods? As such, SieQA 2021 proceedings were categorised and delivered along four tracks which were: (a) flexible education ecosystems towards 21st century, (b) efficient and effective delivery systems with integrity, (c) sustainable curriculum, and (d) international reference. Some of the discourses along these tracks involved local case studies, experiments and/or review of trial projects for delivering and assuring quality of higher education programmes in Malaysian HEIs. Their findings and outcomes offer valuable information for understanding higher education in Malaysia in contemporary times.

ANALYSIS AND SYNTHESIS

In approaching this afterword, as a summative review and analysis of the Seminar's proceedings for common themes and emergent thoughts, it is important that I explain the analytical approach. As outlined earlier, the overarching question for SieQA 2021 is about what and how quality assurance culture is embedded in Malaysia's higher education as enterprise. I offer my reflections and conclusions through a sociology of education lens based on the following conceptual understandings of 'higher education enterprise' and 'quality assurance culture'.

First, let us examine the notion of 'higher education enterprise'. In contemporary globalising times, higher education institutions are required to work on many things at the same time. Academic staff in established universities, and emergent ones as well, engage in research to varying degrees for purposes of generating and disseminating knowledge. They are also involved in academic governance matters and aspects of institutional development including growing student numbers. Institutional administration and operations come along with management decision making to ensure sustainability of the institution and its programmes and services. Studies show that various forms of academic work and governance in universities across the

world are being contested by economic and market forces and competition for students and funding that cause universities to develop management or corporate structures and executive decision-making strategies that make contemporary universities an 'academic enterprise' (Lee, 2004; Marginson & Considine, 2000; Tan, 2002). In Malaysia, public HEIs lean towards enterprise approaches as academics design and offer programmes that follow what the markets want in contrast to their personal or institutional research strengths and interests. Similarly, enterprise characteristics and culture develop in HEIs when they become corporate entities or where their ownership or equity structure involve foreign or private interest (Buchbinder & Newson 1990; Horn, 2011; Ziguras, 2005).

In terms of quality assurance culture, one can trace the approaches and efforts of assuring higher education quality in Malaysia to the late 1990s when the higher education sector was liberalised and private HEIs were established alongside public ones (Lee, 1999; Lee, 2000; Lee, 2004). Further to the liberalisation of Malaysia's higher education (Malaysia, 1996), legislations were put in place to regulate and monitor the operations of private HEIs offering their own programmes or collaborative programmes with foreign partner institutions (Lee, 2004; Tan, 2002). About a decade later, the Malaysian Quality Agency (MQA) Act and Qualifications Framework (MQF) were established (Malaysia, 2007). These began to shape academic processes and standards and determine how HEIs in Malaysia develop and deliver academic programmes. Over time, quality assurance 'consciousness' and 'conscience' find their way into HEIs' processes, practices, and norms. Research shows higher education governance requirements enculture in Malaysian HEIs and their academic activities quality practices and processes for determining admission requirements, measuring graduate outcomes, and collaborating with foreign institutions (Lee, 2004; Mok, 2011; Wan et al., 2017).

To understand 'enterprise' and 'quality assurance' as culture is to accept them as social constructs. The same comprehension leads to acknowledging higher education curriculum as 'social institution' because it represents the national and/or global cultures that contribute to it along with the knowledge, values, and practices of academics, policy makers, and regulators involved (Young, 2008). These conceptual understandings are important for fixing the analytical method for this review. There are a few theoretical frameworks in education for analysing the outcomes and synthesising the conclusions of SieQA 2021. However, for us to address the Seminar's main question about what and how

quality assurance culture is embedded in Malaysia's higher education, I would contrast two approaches; the traditional (technical, objective) against the contemporary (sociological, subjective) methods. Briefly, the traditional approach reviews technical, factual, and measurable aspects of education while the contemporary approach examines social, contextual, and political aspects (Muller & Gamble, 2010; Pinar, 2003; Young, 2008; Young & Muller, 2010). To appreciate what and how quality assurance culture is embedded in Malaysia's higher education as enterprise involves delving into the contexts, purposes, and belief systems of stakeholders involved (Muller & Gamble, 2010; Young, 2008). As such, I use the sociology of education approach to understand Malaysia's current contexts, realities, and aspirations in higher education and ways for quality assurance to evolve as response to local and global challenges.

REVIEW OF PROCEEDINGS

The two-day SieQA 2021 brought together more than 400 participants mainly from institutions of higher learning and quality assurance in Malaysia but also some from Myanmar, Philippines, Thailand, and Vietnam. The first day of the Seminar offered parallel workshop sessions along the four tracks outlined earlier. On the second day, keynotes were delivered by the Vice Chancellor of Sunway University, a private university in Malaysia, on embedding and evolving higher education quality assurance culture for a changing world (Wilkinson, 2021) and by the Chairperson of the MQA Council who spoke on the importance of new quality elements for measuring higher education in present and post COVID-19 times (Ismail, 2021). A dialogue on global quality assurance issues was also held on the second day with speakers who are experienced in SEA and European higher education contexts and quality assurance perspectives. I summarise the deliberations and outcomes from the discourses of both days under the categories of: (a) education ecosystems, (b) delivery systems, and (c) sustainability and international reference.

Education Ecosystems

The need for flexibility in contemporary higher education systems was emphasised and acknowledged throughout the Seminar. The accreditation of prior experiential learning or APEL (Liew, 2021) along with micro-credential

programmes (Alias, 2021) are viewed as effective means for opening up access to higher education and promoting continuous or lifelong learning in Malaysia. Presenters and participants discussed the challenges and dilemmas associated with presently unclear and laborious processes for determining the 'extent of accreditable learning' for purposes of admissions (APEL A), credit transfer (APEL C), or award of academic qualification (APEL Q). Nonetheless, the majority agreed that these are constructive ways for developing a lifelong learning ecosystem that would support the country towards becoming a developed nation. Several papers under the 'education ecosystems' category covered the challenges and opportunities inherent in teaching in teams (Sim & Ng, 2021) and teaching multiple subjects simultaneously (Choy & Lim, 2021) as well as researching and assessing students' digital and data literacy skills for career readiness (Nadarajah et al., 2021). Findings suggest that more planning and support are needed to develop capacities for teaching multiple subjects and in teams and that these approaches should be pursued as they contribute towards students' holistic, inter-disciplinary, and multi-disciplinary learning.

Delivery Systems

The 'what' and 'who' for in contemporary approaches for academic delivery and assessments were interestingly covered at the Seminar. The advent of the internet and digital technologies is making the not-so-new distance learning model of yesterday more relevant and attractive today as online distance learning (ODL). However, ODL practitioners grapple with questions on how much synchronous versus asynchronous and/or which types of 'blended learning' approaches are best for higher education students in Malaysia (Khalid, 2021). Similarly, the use of alternative assessment methods that seek to determine what students can or cannot do rather than what they know or

do not know ought to be considered (Abu Bakar, 2021). However, adopting alternative assessment methods also means accepting open-book and take-home tests as valid and reliable means of determining students' formative and continuous achievements. Are our quality assurance criteria and frameworks in Malaysia ready for this?

Papers presented under 'delivery systems' also covered social and ethical constructs such as academic integrity in online examinations (How et al., 2021)

and conducting research (Chau et al., 2021), and organisational integrity in institutional practices (Mat Som & Abdul Rajak, 2021). Ismail (2021) argues that the issue of academic integrity would not arise when higher education is able to address the 'intangible' aspects of students' holistic development such as implementing value-based education to develop noble qualities in people.

Sustainability and International Recognition

Following the above account, I think the track on 'sustainable curriculum' was particularly pivotal to this Seminar's objectives because the notion of sustainability suggests that all requisite aspects of education, curriculum and quality assurance work together in balanced and/or harmonious ways. The concepts of 'fluid' and 'dynamic' curriculum that encompass life skills, emotional well-being, and sense of inclusiveness were presented and discussed as elements for education sustainability (Thian, 2021). Juxtaposed against this discourse was the topic on 'convergent' curriculum and education as preparation for IR 4.0 with convergence being associated with inter-, multi-, and trans-disciplinary teaching and learning (Wan Jaafar, 2021). Curriculum reform along these lines for higher education in Malaysia will require changes at many levels of knowledge building and institutional rethinking, and therefore, should be reviewed and calibrated carefully for contexts, relevance, and benefits.

Under 'sustainability and international recognition', participants discussed student mobility programmes where matching local and foreign parties' expertise and expectations remain a challenge and quality assurance gaps in international collaboration remain due to dissimilar quality assurance 'language' in philosophies, standards, measures and practices of parties involved (Abdullah, 2021). Other papers for 'sustainability' touched on commonly studied topics such as leadership (Gan, 2021) and holistic student development (Nadarajah et al. 2021; Sockanathan et al., 2021). Nonetheless, their observations and findings on students' experience and success in Malaysian HEIs during a global pandemic of unprecedented scale are noteworthy and contribute towards helping academics improvise and adapt teaching-learning approaches in moments of crisis.

The Seminar's proceedings show the COVID-19 pandemic to affect higher education and quality assurance practices in Malaysia in novel ways. Almost

all discourses and papers touch on the direct and/or indirect effects of the pandemic that have added to Malaysia's existing challenges in higher education. At the same time, papers by Tong et al. (2021), Yaacob et al. (2021), Sim and Dewika (2021), and Choy et al. (2021) illustrate how positive opportunities and outcomes emerge under present pandemic conditions when academics overcome challenges in adopting technology and digital tools for teaching and supervising students, when students are supportive of their lecturers' struggles and receptive to change, and where institutional support and timely management decision making contribute towards academic continuity and success. Accordingly, one should view 'crises as opportunities' (Ismail, 2021). For example, the overnight shift from traditional face-to-face to online and remote teaching-learning and assessments, such that the latter is no longer 'optional' but 'necessary', is likely to advance Malaysia's higher education in significant ways in a world that is rapidly globalising and technologizing. The review of this Seminar's proceedings highlights three common and emergent themes as explained in the next section.

Common and Emergent Themes

The SieQA 2021 proceedings affirm that higher education delivery in the 21st century is changing rapidly and the COVID-19 pandemic has accelerated its rate of change. The requirement for social distancing and working off-campus evidenced that online teaching-learning and remote campus access can function adequately well for most teaching-learning purposes. Although there are limitations encountered with online and remote delivery, the proceedings of this Seminar indicate that with better planning, resourcing, and support systems in place online delivery can be developed and enhanced to be more engaging and effective. Regardless of whether lecturers and students engage with hybrid or dual mode teaching-learning or if their sessions are synchronous or asynchronous, the fact remains that students today are digital natives and they are fast becoming digital nomads and expect to learn as such. Hence, educational institutions have to not only respond in ways that will allow students to have 'open' and 'online' access to learning, but they also have to make learning available on a 'whenever required' or 'on-demand' basis. These scenarios contribute to the first, and fairly obvious, emergent theme I draw for higher education delivery which is a 'triple-O' – open, online, and on-demand.

The second thematic thrust relates to local and global social trends, economic reforms, technological advancements, and therefore, knowledge building practices for the 21st century. Traditionally, academic pursuits follow individual's in-depth knowledge and research interests and institutions of higher learning are organised as units or departments with single subject expertise. However, the world and its problems are not neatly organised and compartmentalised. The critical thinking and problem-solving skills we want to hone in students require multi-disciplinary and inter-disciplinary knowledge and thinking skills. The internet-of-things, artificial intelligence and augmented reality disrupt many aspects of life and have replaced various roles of academics and HEIs. This Seminar's keynote speakers stressed the necessity and timeliness for Malaysian HEIs to embrace multi-disciplinary and inter-disciplinary approaches, to cross disciplines of studies and share knowledge, so that their work and outputs can be abreast with global changes and remain relevant and applicable (Ismail, 2021; Wilkinson, 2021). Hence, another emergent theme is that of moving towards building multi-disciplinary knowledge and skills or, simply put, the need for academics to 'integrate or disintegrate'.

Finally, the common 'note' detected throughout the Seminar was the one on reforms in the 'what' and 'how' we measure or consider as quality in Malaysian higher education. To advance APEL and micro-credentials, we need to change mindsets and shift our current ways of measuring the attainment of knowledge and qualifications. Wilkinson (2021) argues that the complexities in education systems, virtualisation of resources, and evolving stakeholders' needs have made the measuring of technical aspects of curriculum and mapping single subject knowledge to predicted learning outcomes somewhat the 'inhibitors' to critical reforms in Malaysia's higher education. A new or 'third generation' quality assurance approach that recognises multi-disciplinary efforts and commends research and innovation that feed into new knowledge building is envisioned. At the same time, Ismail (2021) moots a shift towards measuring the 'intangible' elements in higher education such as shared purposes and meanings for institutions and the development of social responsibility, citizenship and international mindedness in students. Proposals to make higher education curriculum more flexible and fluid also require us to focus on intangible elements like people's emotional wellbeing and mental strength and their sense of inclusivity and sustainability. With this, I infer an emergent need to identify and include new quality elements and measures for social and cultural relevance in Malaysia's higher education.

CONCLUSION

The need for people and systems to change in order for change to happen is not new theory. Historically, pandemics have forced people to break away with the past and imagine their world anew (Peters & Besley, 2020). The current COVID-19 crisis in Malaysia and across the world present opportunities for us to evaluate and embrace some, if not all, of the reforms discussed at SieQA 2021. Therefore, the next step is not about asking 'whether to change or not to change' but rather 'what to change'. I hope that the organisers and participants remain connected as communities of higher education and quality assurance practitioners. I urge that some of the approaches proposed and discussed be put to trial in different universities and colleges and their results be brought back to the next SieQA for further deliberation and validation.

However, a possible obstacle to taking forward the ideas and models discussed may be the presence of gaps or the need for more information. Many presenters at SieQA 2021 acknowledged the limitations of their research and/or the uniqueness of their problems that may not allow the findings to be generalisable. The clarion call is for more research, particularly collaborative research, between quality assurance and higher education practitioners in Malaysia as well as between scholars, quality agencies, and universities across the SEA region. Key reasons for in-depth understanding of contemporary higher education issues have been discussed, and the time for establishing relevant changes may be now.

In wrapping up the reflections and conclusions on SieQA 2021, it would be amiss of me to not commend the work of workshop and paper presenters and the engagement of participants that have contributed to the breadth and depth of the discourses held. Also, the outcomes of this Seminar would not be what they are without the advice of MyQAN and MQA that have guided the scope, objectives, and topics of the Seminar. It is noteworthy that academics, curriculum and policy writers, and others in higher education continue their work of building, exchanging, and disseminating knowledge despite pandemic restrictions. These are the intangible qualities of educators and education for generations to uphold.

REFERENCES

Abdullah, H. S. V. (2021). *Global quality assurance framework* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Abu Bakar, A. (2021). *Alternative assessment* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Alias, A. K. (2021). *Micro-credentials* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Buchbinder, H., & Newson, J. (1990). Corporate-university linkages in Canada: Transforming a public institution. High Educ 20, 355–379. https://doi.org/10.1007/BF00136218

Chau, D. M., Chai, L. C., & Veerakumarasivam, A. (2021). *Embedding research integrity to ensure quality of higher education in Malaysia* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Choy, T. Y., & Lim, A. B. (2021). *Teaching multiple subjects simultaneously through assignments* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Choy, T. Y., Diana, G. M. J., Lim, T. H., & Nurul Aini, K. Y. (2021). *Internship during COVID-19* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Gan, E. (2021). *Roles of leadership and non-academic staff in providing quality higher education: A review paper* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Horn, M. B. (2011*). Beyond good and evil: Understanding the role of for-profits in education through the theories of disruptive innovation*. Special Report I, American Enterprise Institute**:** 1-15. https://eric.ed.gov/?id=ED521781

How, P. L., Lee, S. L., Ng, K. H., Sathissan, R., Shereen, K., & Wong, S. L. (2021). *Maintaining academic integrity in the conduct of online examinations: A case study at Sunway College Johor Bahru* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Ismail, A. (2021). *New quality elements in higher education post COVID-19* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Khalid, F. (2021). *Synchronous versus asynchronous online distance learning* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Lee, M. N. N. (1999). Private higher education in Malaysia. School of Educational Studies. Monograph Series No: 2/1999. Pulau Pinang: University of Science Malaysia.

Lee, M. N. N. (2000). The impacts of globalization on education in Malaysia. In N. P. Stromquist & K. Monkman (Eds.), *Globalization and education: Integration and contestation across cultures* (pp. 315–332). Rowman and Littlefield.

Lee, M. N. N. (2004). Global trends, national policies, and institutional responses: Restructuring higher education in Malaysia. *Educational Research for Policy and Practice*, *3*, 31–46. https://doi.org/10.1007/s10671-004-6034-y

Lee, M. N. N. (2004). Private higher education in Malaysia: Expansion, diversification and consolidation. In M. N. N. Lee (Ed.), *Restructuring higher education in Malaysia*. Universiti Sains Malaysia.

Lee, M. N. N., et al. (2017). Hybrid universities in Malaysia. *Studies in Higher Education*, *42*(10), 1870 –1886. https://doi.org/10.1080/03075079.2017.1376871

Liew, A. (2021). *APEL (A), (C) and (Q)* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Malaysia, M. O. H. E. (1996). *Private Higher Educational Institutions Act*. Act 555. Malaysia, The Commissioner of Law Revision in collaboration with Percetakan Nasional Malaysia Bhd. https://putrabusinessschool.edu.my/wp-content/uploads/2020/02/Act-555IPTSBI.pdf

Malaysia, M. O. H. E. (2007). *National higher education action plan (2007-2010)*. Putrajaya, Ministry of Higher Education, Malaysia.

Malaysia, M. O. H. E. (2011). The national higher education strategic plan; Beyond 2020 (The national higher education action plan: Phase 2, 2011-2015) D. o. H. Education. Kuala Lumpur, Ministry of Higher Education, Malaysia. http://www.ilo.org/dyn/youthpol/en/equest.fileutils.docHandle?p_uploaded_file_id=477

Marginson, S., & Considine, M. (2000). *The enterprise university: Power, governance and reinvention in Australia*. Cambridge University Press.

Mat Som, H., & Abdul Rajak, R. F. (2021). *The analysis on organisational integrity in KYP Group of Education (KESB)* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Mok, K. H. (2011). The quest for regional hub of education: Growing heterarchies, organizational hybridization, and new governance in Singapore and Malaysia. *Journal of Education Policy, 26*(1), 61–81. https://doi.org/10.1080/02680939.2010.498900

Muller, J., & Gamble, J. (2010). Curriculum and structuralist sociology: The theory of codes and knowledge structures. In P. Peterson, E. Baker & B. McGaw (Eds.), *International encyclopedia of education*. Elsevier Ltd.

Nadarajah, J., Shanmugam. V., & Tan, T. H. (2021). *Digital and data literacy skills assessments for the promotion of career readiness* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Peters, M. A., & Besley, T. (2020). *Pandemic education and viral politics*. Routledge.

Pinar, W. F. (2003). *International handbook of curriculum research*. Lawrence Erlbaum Associates, New Jersey. http://www.khuisf.ac.ir/dorsapax/userfiles/file/motaleat/080583222x.pdf

Sim, T. Y., & Dewika, M. (2021). *Transition due to COVID-19: Insights on what is important from the management, faculty member and students' perspective* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Sim, T. Y., & Ng, B. L. (2021). *Advantages and challenges of inter-department team teaching: A case study* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Sockanathan, S., Nadarajah, J., Yap, J., & Radzali, A. A. (2021). *Developing workplace soft skills in students of the American Degree Transfer Program* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Tan, A. M. (2002). Malaysian private higher education: Globalisation, privatisation, transformation and marketplaces. Asean Academic Press.

Thian, L. B. (2021). *Fluid and dynamic curriculum* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Tong, T., Chen, J. E., Lim, W. L., Chew, J., & Veerakumarasivam, A. (2021). *Evaluating perceived effectiveness of online learning among Biological Sciences undergraduates during the COVID-19 pandemic* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Wan Jaafar, W. M. (2021). *IR 4.0: Convergence curriculum* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Wilkinson, G. (2021). *Higher education as enterprise: Embedding and evolving the quality assurance culture for a changing world* [Seminar Paper]. Seminar on Internal-External Quality Assurance 2021, Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Yaacob, Y., Mahmud, M. M., Mohamed Shariff, M. N., Mohd A'Seri, M. S., Ahmad, R., Ishak, N.1, Saparman, M. S., & Mustamam, N. (2021). *In search of meaning about digital teaching: A collective reflection* [Seminar Paper]. Seminar on Internal-External Quality Assurance. Kuala Lumpur. https://university.sunway.edu.my/sites/default/files/webuni/SieQA2021_info_ebrochure_150320.pdf

Young, M. (2008). From constructivism to realism in the sociology of the curriculum. *Review of Research in Education, 32*(1), 1–28. https://doi.org/10.3102/0091732X07308969

Young, M., & Muller, J. (2010). Three educational scenarios for the future: Lessons from the sociology of knowledge. *European Journal of Education, 45*, 11–27. https://doi.org/10.1111/j.1465-3435.2009.01413.x

Ziguras, C. (2005). International trade in education services: Governing the liberalization and regulation of private enterprise. *Counterpoints, 280*, 93–112. http://www.jstor.org/stable/42979301