



MALAYSIAN INSTITUTE  
OF ACCOUNTANTS

# Report on a Study of Emerging Technology Adoption within the Accounting Programmes by the Higher Learning Institutions in Malaysia



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# Objective

The objective of the report is to outline the findings and recommendations of a study on technology adoption within the accounting courses/programmes by the universities in Malaysia. The study has been undertaken by the Academicians Working Group (AWG) under the Digital Technology Implementation Committee (DTIC) of MIA.

## Why the Study is Conducted

The MIA launched the [Digital Technology Blueprint](#) in 2018 with the aim to guide accountants in developing action plans to respond and prepare for technology in the emerging era of the fourth industrial revolution<sup>1</sup>.

The Blueprint recognises that accountants in academia play a vital role in producing future accountants as well as an active role in research and innovation to address current issues impacting the profession and to enhance existing practices in the profession<sup>2</sup>.

The Blueprint sets out MIA's aspiration of its members which includes members in academia, where it is critical for them to equip the accounting talent pipeline with the necessary skills and knowledge to understand and leverage on the global digital economy ecosystem<sup>3</sup>.

In order to fulfil this aspiration and ensure that future graduates are well-versed in digital technology, it is critical for MIA to determine the future skillset of accounting graduates and understand the current adoption of emerging technologies in the IHLs in Malaysia. MIA then needs to identify the gap exists and provides recommendations on how to move forward.

### INTRODUCTION TO THE STUDY

The study explored the following:

1

The future skillset of accounting graduates in Malaysia

2

Emerging technologies for accounting programmes

3

Incorporation of emerging technologies into the syllabus of accounting programmes

4

Teaching and learning of emerging technologies in accounting programmes

5

Mode and/or types of training on emerging technologies for accounting lecturers

6

Implementation strategies

<sup>1</sup> Malaysian Institute of Accountants (MIA), 2018, *MIA Digital Technology Blueprint – Preparing the Malaysian Accountancy Profession for the Digital World*

<sup>2</sup> *ibid*

<sup>3</sup> *ibid*

The following have been carried out as part of the study over a period of two years:

Literature review, review of the current accounting syllabus of certain universities and professional accountancy bodies, as well as a review of market and technology trends	May to December 2019
Survey of technology adoption within the accounting courses by the universities in Malaysia (refer to Appendix 1 for further details)	February to May 2020
Roundtable discussion with academicians, professional accountancy bodies and industry (refer to Appendix 2 for further details)	December 2020

# Future Skillset of Accounting Graduates in Malaysia

## The MIA Competency Framework (CFM)

The MIA Education Board<sup>4</sup> issued the MIA CFM, which is a set of principles that defines the baseline competencies and skill sets required to become accountancy professionals who are able to demonstrate their proficiency at different levels, namely “Foundation”, “Intermediate”, and “Advanced” as defined by the framework issued by the International Accounting Education Standards Board (IAESB). It is principle-based in nature, focusing on the proficiency requirements of the accountancy professionals across all spectrum of the profession covering the public practice, public sector, commerce industry, and academia<sup>5</sup>.

The IAESB issued International Education Standards (IESs), which present the underlying principles, concepts, and definitions that enhance accountancy education<sup>6</sup>. The IESs improve the quality of professional accounting education worldwide by prescribing requirements for:

- Entry requirements to professional accounting education programs (IES 1);
- Initial Professional Development (IPD) of aspiring professional accountants (IES 2 – 6);
- Continuing Professional Development (CPD) of professional accountants (IES 7); and
- Professional competence for engagement partners responsible for audits of financial statements (IES 8)<sup>7</sup>.

In 2019, four of the IESs were revised to enhance the information and communications technologies (ICT) and professional scepticism learning outcomes. In relation to ICT, the revision was stemmed from the acknowledgement that increased awareness about new and emerging technologies must be partnered with a range of other skills, such as interpretive, analytical, ethical change management and data handling skills. Such acknowledgement was gathered based on extensive consultation with various stakeholders through roundtables and consultation documents, literature review and surveys<sup>8</sup>. The MIA CFM has been benchmarked against 2019 IESs, which have included the revision enhancing the ICT.

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<sup>4</sup> MIA Education Board is an independent committee designated to establish requirements on professional accounting education.

<sup>5</sup> See footnote 6

<sup>6</sup> International Federation of Accountants (IFAC), 2019, *Handbook of International Education Pronouncements*

<sup>7</sup> MIA Education Board, 2020, *MIA Competency Framework*

<sup>8</sup> IAESB, 2019, *Basis of Conclusions for Revisions to IESs 2, 3, 4, and 8 – Information and Communications Technologies and Professional Skepticism*

The future skillset of accounting graduates can be referred to the three proficiency levels as set out in the MIA CFM, which is reproduced below.

### Foundation level of proficiency

*Typically, learning outcomes in a competence area focus on:*

- Defining, explaining, summarising, and interpreting the underlying principles and theories of relevant areas of technical competence to complete tasks while working under appropriate supervision;
- Performing assigned tasks by using the appropriate professional skills;
- Recognising the importance of professional values, ethics, and attitudes in performing assigned tasks;
- Solving simple problems; and referring complex tasks or problems to supervisors or those with specialised expertise; and
- Providing information and explaining ideas in a clear manner, using oral and written communications

*Learning outcomes at the foundation level relate to work environments that are characterised by low levels of ambiguity, complexity, and uncertainty.*

### Intermediate level of proficiency

*Typically, learning outcomes in a competence area focus on:*

- Independently applying, comparing, and analysing underlying principles and theories from relevant areas of technical competence to complete work assignments and make decisions;
- Combining technical competence and professional skills to complete work assignments;
- Applying professional values, ethics, and attitudes to work assignments; and
- Presenting information and explaining ideas in a clear manner, using oral and written communications, to accounting and non-accounting stakeholders.

*Learning outcomes at the intermediate level relate to work environments that are characterised by moderate levels of ambiguity, complexity, and uncertainty.*

### Advanced level of proficiency

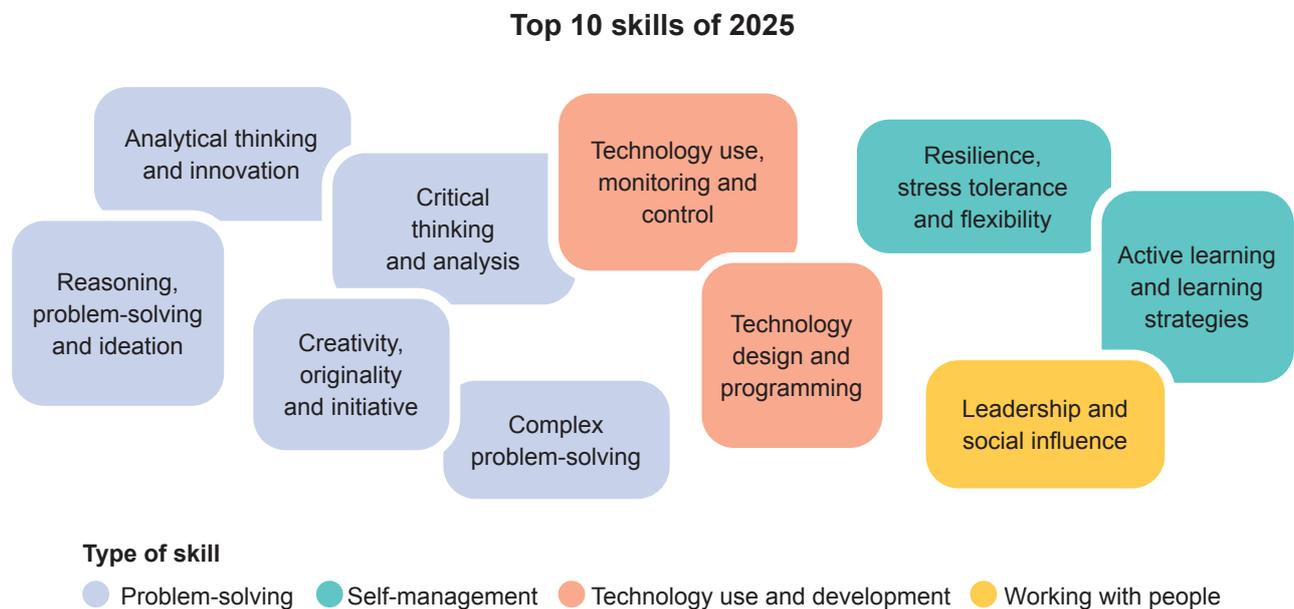
*Typically, learning outcomes in a competence area focus on:*

- Selecting and integrating principles and theories from different areas of technical competence to manage and lead projects and work assignments and to make recommendations appropriate to stakeholder needs;
- Integrating technical competence and professional skills to manage and to lead projects and work assignments;
- Making judgments on appropriate courses of action drawing on professional values, ethics, and attitudes;
- Assessing, researching, and resolving complex problems with limited supervision;
- Anticipating, consulting appropriately, and developing solutions to complex problems and issues; and
- Consistently presenting and explaining relevant information in a persuasive manner to a wide-range of stakeholders.

*Learning outcomes at the advanced level relate to work environments that are characterised by high levels of ambiguity, complexity and uncertainty.*

## Skills of 2025

The Future of Jobs Report 2020, published by the World Economic Forum, identified the following top 10 skills that employers see as rising in prominence in the lead up to 2025.



**Source:** Future of Jobs Report 2020, World Economic Forum.

Based on the roundtable discussion held in December 2020, the following general skills and other skillsets have been identified.

General Skills	Other Skillset
<ul style="list-style-type: none"> <li>• Analytical thinking</li> <li>• Complex problem-solving</li> <li>• Critical Thinking</li> <li>• Leadership and social influence</li> <li>• Stress tolerance and flexibility</li> <li>• Creativity and innovation</li> </ul>	<ul style="list-style-type: none"> <li>• Recognise major trends in predictive analytics, optimisation, correlation of metrics, and big data</li> <li>• Interpret and manage new trends in analytics techniques affecting your organisation</li> <li>• Utilise new tools for data analytics</li> <li>• Critically interpret analytics reports and advise decision makers</li> </ul>

The general and other skills identified above are generally aligned with the MIA CFM, IAESB Framework as well as the skills of 2025 as highlighted by the World Economic Forum.

# Emerging Technologies for Accounting Programmes

Malaysia unveiled its Digital Economy Blueprint in early 2021. The digital economy is expected to contribute 22.6% to the Gross Domestic Product and attracts over RM70 billion in domestic and foreign investment. The digital economy and the pandemic have accelerated the growth of applications related to artificial intelligence (AI), data science, blockchain and cybersecurity in most businesses and industrials. The accounting sector is not spared. Huge strides are being made on the technology front that are enabling accountants to minimise the amount of time they spend on data acquisition and manipulation. Millennials are shaking up the accounting industry, questioning historical hierarchical firm models. Increasingly, niche firms are popping up. The traditional accounting firms are increasingly challenged and may not survive over the next decade. The accounting business model used in the 1980s or 1990s will no longer work in the 2020s.

The use of AI, Data Analytics and Cybersecurity are seeping into applications and software platforms at an increasingly steady pace. AI will have decision-making abilities in evaluating financial and accounting records.

Based on various discussions by the Working Group, survey and roundtable discussion, the following areas of emerging technologies were identified as crucial to be included in the accounting curriculum as these are considered necessary for future accounting graduates:



## Artificial Intelligence (AI)

AI is a very powerful tool. They produce outputs that are accurate, and in some cases, replacing human efforts. Today, algorithms and programs are widely used to carry out repetitive tasks by computers. AI can automate repetitive tasks without having to write algorithms or codes. AI can be used to increase accuracy and improve efficiency as well as discover hidden insights and trends in a business environment. It can decide the best path to achieve an answer while also learning the routines that get the best results.

AI has decision-making capabilities, thus mimicking human decision-making. It can make decisions based on the analysis of large datasets and by machine learning. AI creates greater value with the existing resources. Accountants can spend more time and energy on creativity by analysing and interpreting the results obtained through the use of AI. The application of AI will see three areas of benefits to the accounting profession, namely, invisible accounting, invisible audit and real-time insights.

## Blockchain

Blockchain plays a vital role in supply chain optimisation. It also has strong accounting potential. The distributed ledger technologies are very important for secure process development, auditing purpose, and secure records management. Blockchain technology will impact almost all recordkeeping processes, and this will include the way transactions are initiated, processed, authorised, recorded and reported.

Blockchain could potentially impact the need for the conventional audit. As all entries in a blockchain are distributed and cryptographically sealed, it will be impossible for someone to manipulate or edit the data. Blockchain allows for smart contracts, thus likely removing the need for a third-party intermediary, such as a lawyer. Accountants will need to understand the smart contract concept and how it is enforced. Blockchain will also replace double-entry bookkeeping with triple-entry accounting. Thus, accountants will need knowledge on how triple-entry accounting works on a blockchain platform.

## **Cloud Computing**

Cloud computing is the future of the accounting industry. Cloud computing continues to be a key topic for accountants. The main reason being the scalability and simplicity of the system access it offers across the globe. The new generation of businesses already adopted cloud solutions. Cloud solutions can provide better security, data backup, better control, greater accessibility and mobility.

Future accountants need to have sufficient knowledge of cloud computing. They need to understand the different type of cloud services, service providers, cloud charges, benefits of cloud solutions, cloud-based accounting software and benefits, cloud security, scalability of businesses and other basic cloud requirements for businesses.

## **Cybersecurity**

Cybersecurity continues to impact businesses across the globe. In 2020, the number of records compromised in a business environment exceeded 37 billion, an increase of 141% as compared to 2019. Accounting firms and financial institutions are one of the main targets for cyber attackers. PwC estimates that financial institutions are 30% more likely to be attacked. Thus, cybersecurity is becoming part of the day job for an accountant.

While no businesses are immune from cyberattacks, there is plenty that can be done to prevent such attacks. Accountants are well placed to advise on the steps that a business should take to minimise cyberattacks. Accountants need a broad range of knowledge on the type of cyber threats, security policies, cyber law, and security framework for a business.

## **Data Science/Data Analytics**

The trend of big data is being propelled by the exponential growth of structured and unstructured data as well as the growth in computing power. Applying data analytics to big data creates vast opportunities for businesses. It can help provide insights based on the data available in the organisations. It can help predict outcomes and automate unstructured tasks. It creates greater value and transforms businesses to be more efficient and productive. Accountants will need skills in data science that can help them to analyse large datasets across the different business functions and determine insights of the business.

Data analytics opens new opportunities for accountants to provide great value-added services to their clients. They can use large datasets from inventory, marketing, customer behaviour trends and other data to integrate and analyse these data to arrive at insights to make informed decisions. Data analytics can also be used in audits to improve the quality of audits.

## Possible Actions for Consideration

Following our research and consultation, the emerging technologies could be covered in the accounting curriculum by incorporating the following sub-topics:

Emerging Technologies	Sub-Topics
<p style="text-align: center;"><b>AI</b></p> 	<ul style="list-style-type: none"> <li>• Introduction to AI</li> <li>• Data for AI (Continuous variable, Categories, Features and Labels)</li> <li>• AI applications and use cases</li> <li>• Introduction to machine learning (ML), deep learning, neural networks and unsupervised learning</li> <li>• Regression, classification models</li> <li>• Issues and ethical concerns surrounding AI</li> <li>• Robotic process automation (AI that automates business processes, auto three-way matching)</li> <li>• ML (AI that can analyse big data and identify patterns)</li> <li>• Internet of Things (AI to enable devices without human intervention)</li> <li>• Natural language processing (AI that understands human language)</li> <li>• Smart analytics (machine learning plus business rules)</li> <li>• Programming in Python and R</li> <li>• Tools: Python, TensorFlow, Caffe, Keras, Azure AI, Google Cloud AI, IBM Watson</li> </ul>
<p style="text-align: center;"><b>Blockchain</b></p> 	<ul style="list-style-type: none"> <li>• Introduction to blockchain</li> <li>• Concept of blockchain, importance, limitations</li> <li>• Distributed ledgers, triple entry accounting, etc</li> <li>• Blockchain technology, Blockchain 2.0, Blockchain 3.0. – how blockchain works, design principles for blockchain</li> <li>• Cryptography, cryptocurrency, Bitcoin/Ethereum/XRP, Bitcoin mining, P2P, smart contracts, hash, nonce, proof-of-work, public key</li> <li>• Challenges to implement blockchain technology</li> </ul>

## Cloud Computing



- Introduction to cloud computing
- Benefits and characteristics of cloud computing
- Private cloud, public cloud, hybrid cloud, Infrastructure as a Service (IaaS), Software as a Service (SaaS), Platform as a Service (PaaS)
- Cloud architecture, emerging technologies in cloud computing, business case for cloud computing
- Risks, costs and ethics in cloud computing
- Business considerations for cloud users
- Tools: MS Azure, AWS, Google Cloud

## Cybersecurity



- The security environment – threats, vulnerability and consequences, types of attacks, types of incidents
- DOS, DOSS, spoofing, viruses/malware,
- Principles of cybersecurity – CIA, start model, computer security, information security & information assurance
- Strategic planning for cybersecurity
- Passwords/authentication, email filter, firewalls, access control
- Business security plans and policies, law & regulatory requirements
- Risk management of cybersecurity
- Security education and training
- Tools: Encryption, digital signature, antivirus, firewall, PKI, web vulnerability scanners,

## Data Analytics



- History and Applications
- Business intelligence (BI) vs data science
- Collecting data and cleaning data
- Data manipulation
- Data analysis with statistics and ML
- Different techniques for data analysis
- Data communication and visualisation
- Methodology to handle different types of data science problems
- Data management, governance, security and privacy
- Programming in Python and R
- Tools: Python, R, Tableau, QlikView, TensorFlow, Power BI, RapidMiner, etc

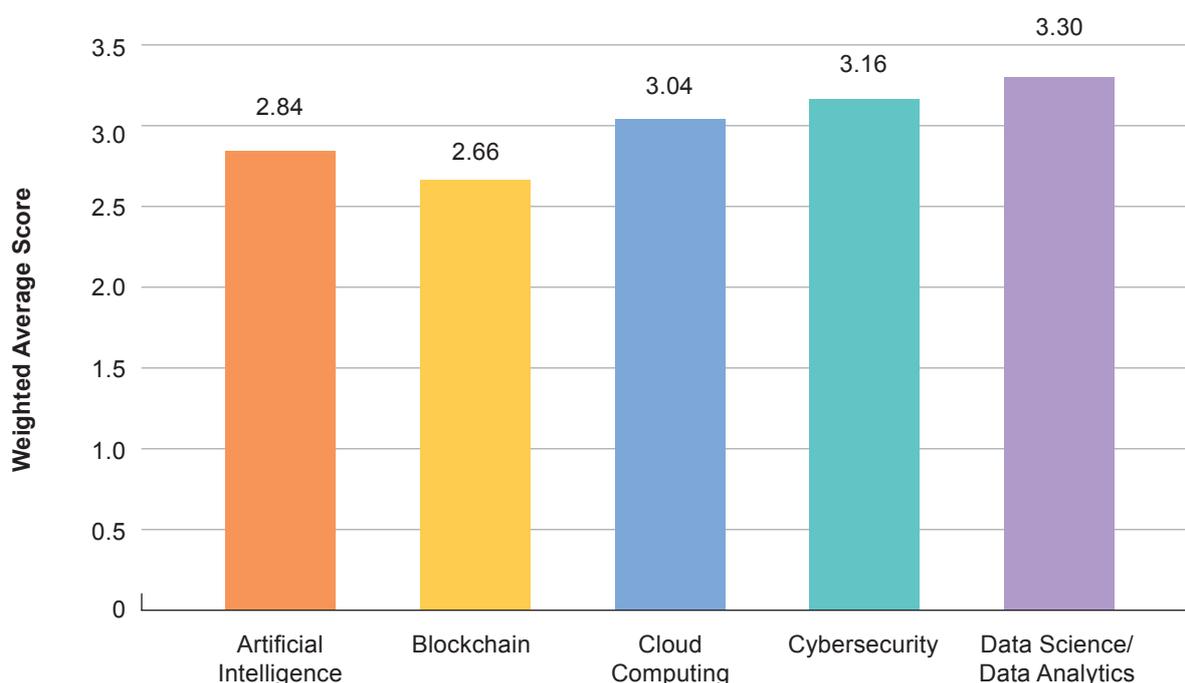
# Incorporation of Emerging Technologies into the Syllabus of Accounting Programmes

## Current View on Incorporating Emerging Technologies into the Accounting Programmes

At the time that the survey was carried out, 52% of respondents indicated that their universities had incorporated emerging technologies into their accounting courses, while 23% responded that the universities that they are attached to have no plans to do so. The remaining respondents shared that their universities plan to incorporate emerging technologies within the next 6 to 24 months.

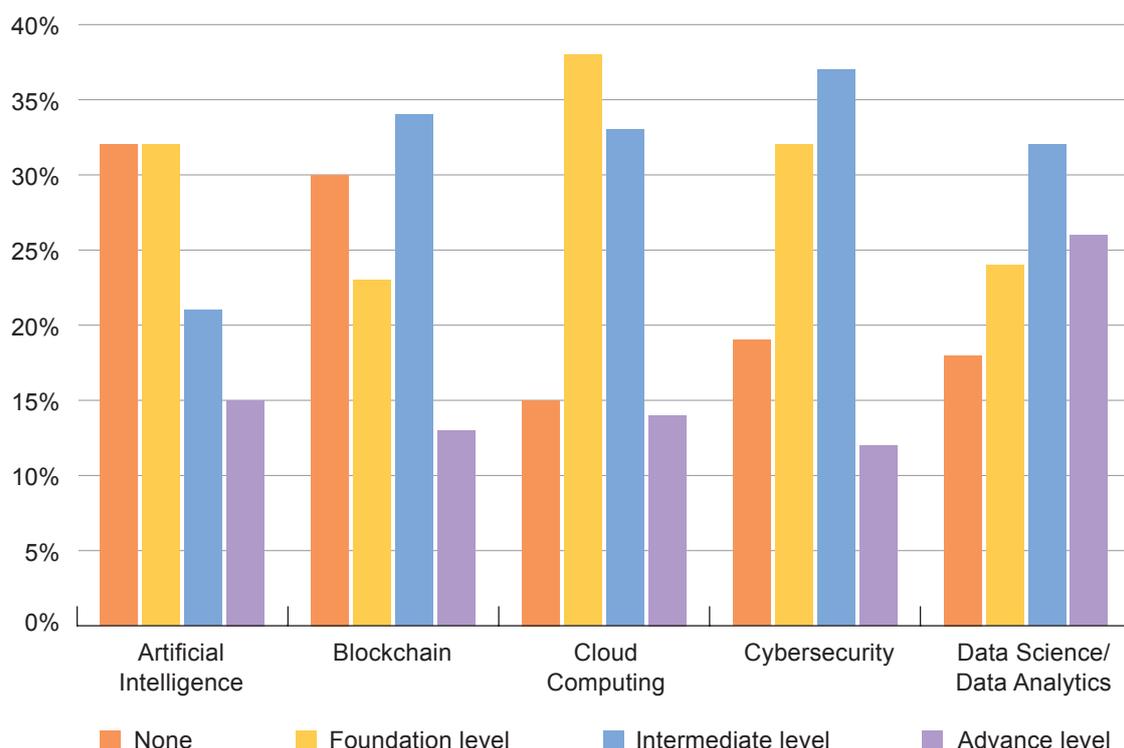
Respondents felt that all the emerging technologies have a comparable level of importance to be incorporated into the accounting courses. Data science/data analytics has the highest score of 3.30, while blockchain scored the lowest at 2.66.

**In your view, which of the following emerging technologies is/are crucial to be incorporated into the accounting courses.  
(Please answer on a scale of 1 being the most crucial to 5 being less crucial)**



In terms of which level that these emerging technologies been incorporated into the accounting course syllabus, more than 15% of respondents indicated that they have not incorporated these technologies in the syllabus especially on blockchain and artificial intelligence. For those that have incorporated the technologies in the accounting course syllabus, the majority of them cover such technologies at Foundation and Intermediate levels.

**At what level have the following emerging technologies been incorporated into the accounting course syllabus?**



The roundtable provided further insights on the existing approaches in incorporating the technology topics in the accounting programmes as follows:

- Some HLIs have included it in the respective core subjects where relevant. Besides integrating the elements in the core subjects, some HLIs provide standalone IT modules as part of the accounting programmes in view that this provides a better focus on more advanced topics.
- Common technology topics taught to students are data analysis and analytics, business intelligence and cybersecurity.
- One HLI offers external certification to students on the foundation to intermediate levels in collaboration with industry, such as ICDL certification.
- None HLIs represented at the roundtable have included technology or digital elements in the tax syllabus.
- A phased learning approach was undertaken – fundamental, application and use of real cases
- Most syllabuses taught on technology are mainly on fundamentals, aligned to the understanding of application and inclusion of suitable case studies.
- A reference was made to the relationship on tech and law, civil liability related to IR 4.0 (e.g. intellectual properties, personal data protection, etc) – the impact on commerce and accounting. Few HLI have started to link and/ or provide understanding related to this subject.
- Tax incentives for IR4.0 related CAPEX – automation, robotic, ICT – currently no HLI have included in the syllabus. Academicians do see the significance of this and IHLs are working to incorporate into tax syllabus.

## Digital Literacy

The level of foundational knowledge on digital for students at entry-level was considered and whether prerequisite knowledge was required. Generally, it was agreed that the issue of the knowledge gap at the entry-level exists. However, as most youths are exposed to smart technology, those lacking understanding of the fundamentals would be able to level up quickly with guidance. Although disparity of knowledge was noted amongst first-year students in the tertiary studies, it was agreed that entry-level assessment to gauge the gap is not necessary.

### Possible Actions for Consideration

To ensure a solid foundation for students, comprehensive knowledge of the basics is essential. HLIs could have a separate short programme at the start of the undergraduate course. This is to cover the fundamentals of the emerging technologies for the following purposes:

- To provide the necessary knowledge to students who lack the basic knowledge
- To align updates and trends on changes to topics for all students

Basic modules can be covered via online / virtual learning through structured online modules with the following features:

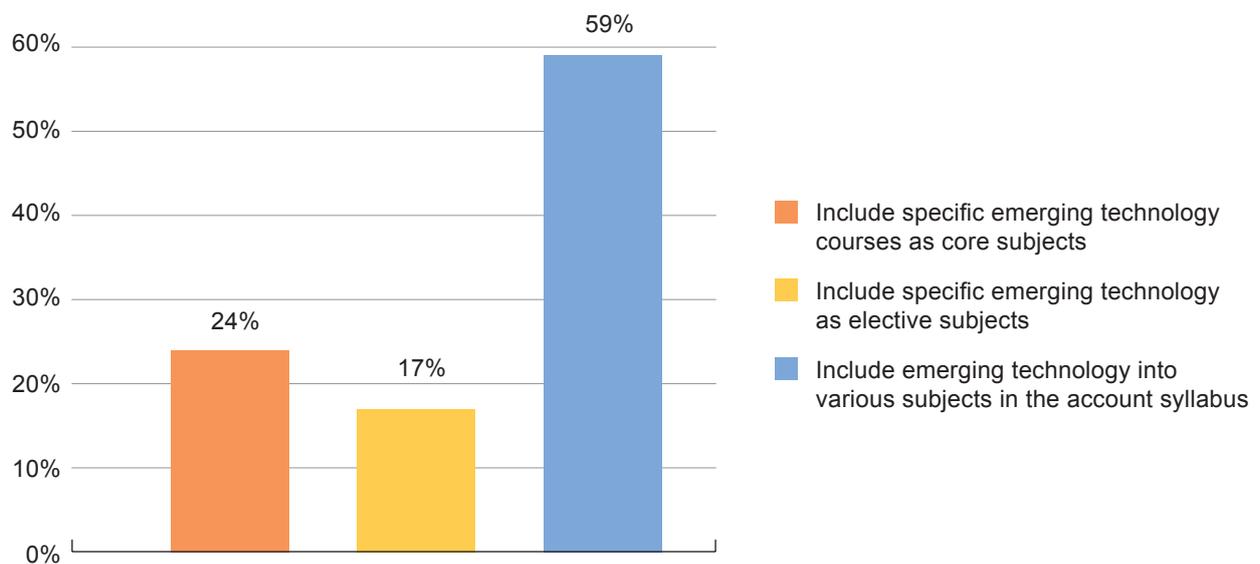
- Flexibility and ease access in a self-learn manner
- Technology and digital fitness tests – continuous learning and by stages / phases
- Allow progression to the next stage / phase after completion of the self-learn with short end of section (built-in virtual) assessment(s)
- Confirmation of the students' technology and digital proficiency level – with virtual certificates. This could facilitate employability upon the conclusion of the course.

## Possible Approaches to Embedding Emerging Technologies into the Accounting Programmes

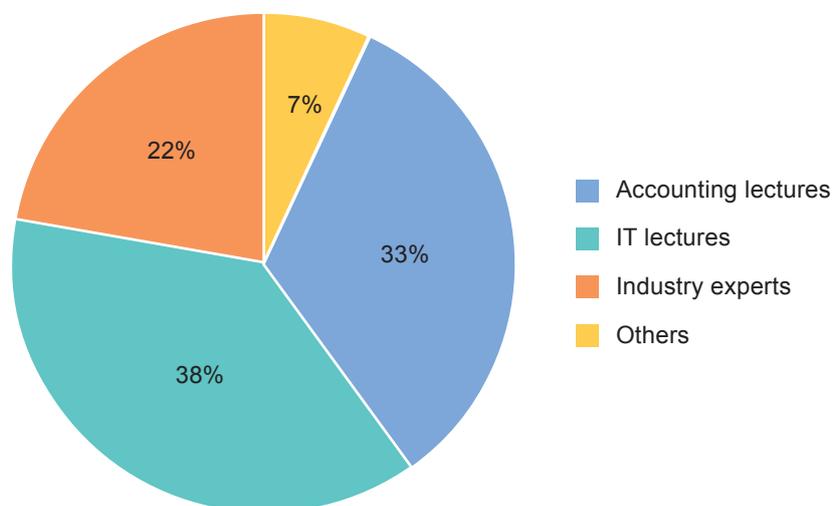
One of the critical issues being debated is how emerging technologies should be incorporated into accounting programmes. The survey indicated that 79% of respondents were of the view that it should be embedded into the existing accounting course/module. Whist, the remaining respondents, felt that it should be taught separately as a course/module.

If the emerging technologies were embedded into the existing accounting course/module, respondents indicated the following:

**Approaches to embed the emerging technologies into the accounting programme**

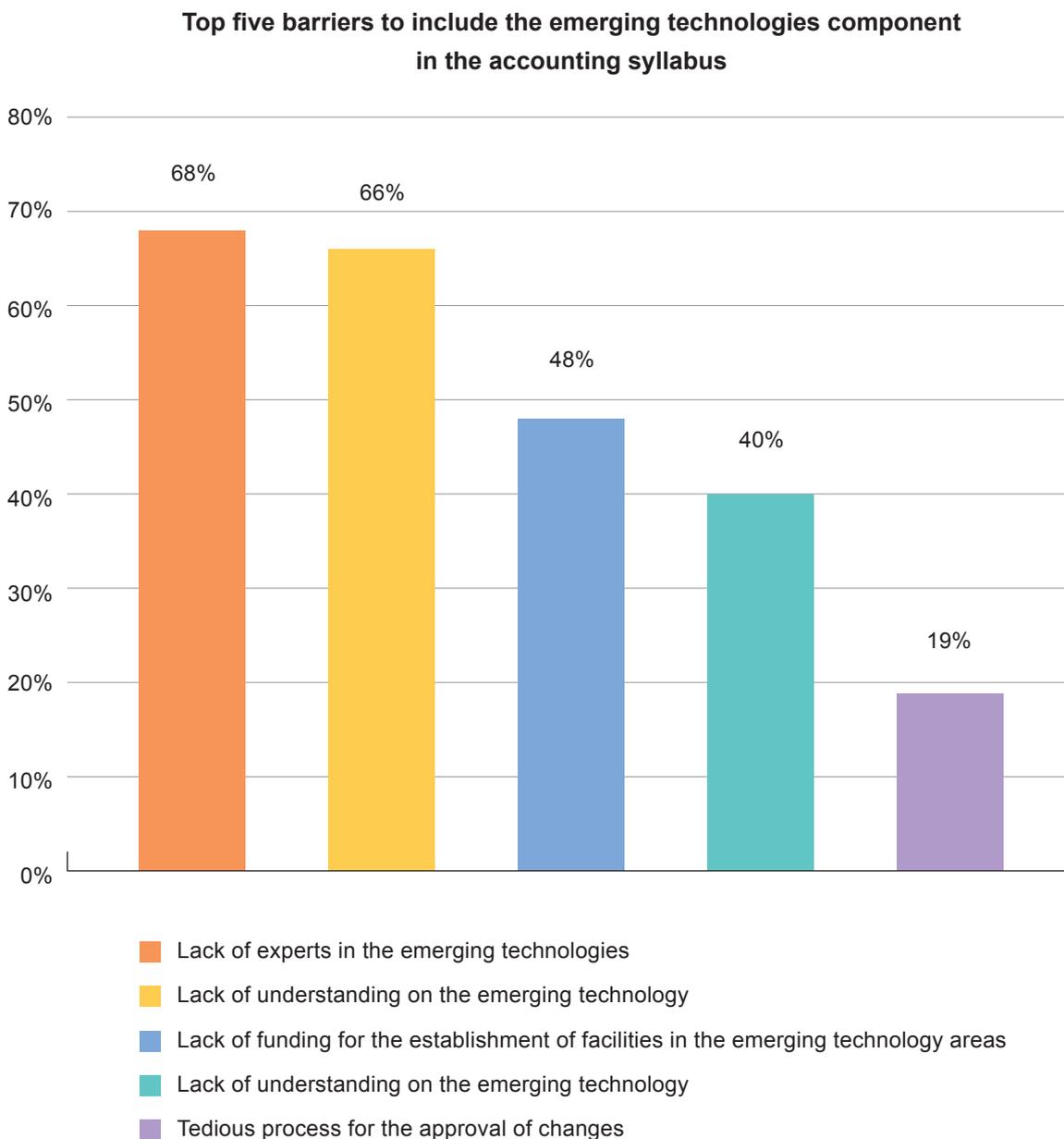


When asked about who should be teaching these technology topics, the survey revealed the following:



## Challenges to Include Emerging Technologies in the Accounting Syllabus

Respondents of the survey indicated that the following are the top barriers to include emerging technologies component in the accounting syllabus:



The following key challenges to the successful incorporation of the emerging technologies topics in the accounting programmes were highlighted during the roundtable:

- Besides the required funding required, the existing teaching resources of the HLIs may not be able to facilitate and/or identify elements of changing trends and topics to incorporate into the syllabus. The required knowledge, experience and skills of these subjects can be complicated and goes beyond the capability of current academicians.
- External support and facilitation would be necessary for topics that are more detailed and complex.
- The additional syllabus may be required if the significant components of technology have yet to be included. This may lead to the comprehensive review of the undergraduate programme, which may lead to extensive revision and alignment of hours / credits of the entire course.
- A standard benchmark or scope needs to be established to ensure the minimum requirements are incorporated into the course.

### **Possible Actions for Consideration**

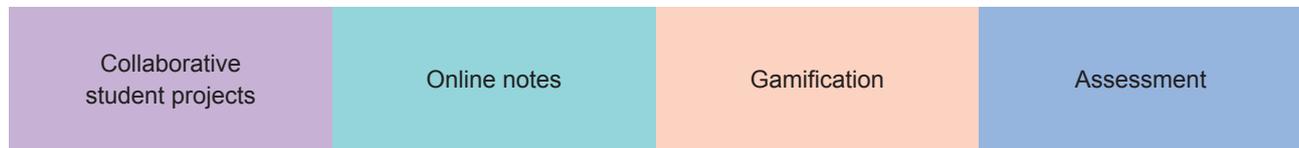
For core subjects of the accounting and finance programme, the following can be considered:

- A blended learning/teaching approach could be undertaken by embedding appropriate technology and digital topics in the syllabus.
- Provide practical learning – reinforce with teaching necessary skills and hands-on learning. A few private HLI have provided experiential learning with simulation online learning. Also, noted some have initiated learning lab.
- For topics that are emerging and have a significant impact on the profession but are not directly link to the core subjects, a separate supplementary programme can be offered to students. This needs to be reviewed on a regular and continuous basis to ensure that it is up to date.

A committee or task force comprising members from the accounting faculties and the IT professionals can be formed to work on areas such as assessing gaps in the syllabus, planning for implementation, virtual learning roll out and others.

# Teaching and Learning of Emerging Technologies in Accounting Programmes

As discussed in the roundtable, the teaching, learning and assessment approaches can be classified into several themes as below.



## Collaborative Student Projects

The collaborative student projects approach enables students to collaborate to solve real-world problems or challenges. Interactive cases, virtual projects, and problem-based learning are among the collaborative student projects discussed during the roundtable. This approach requires students to collaborate to solve complex business and technology problems while also encouraging critical thinking. For example, the problem-based learning approach is used in one HLI for topics on security and control measures in computer-based information systems (CBIS), an AIS application in business and data analytics. In another HLI, students were given a case study as part of a virtual project. The advantages of this approach include the provision of a deeper understanding of the course concepts to students, enabling critical thinking and enhance teamwork skills as they tackle these concepts for their own hypothetical business.

## Online notes

Online notes are a form of interactive technology which can increase students involvement by engaging students with technology. Participants of the roundtable shared their experiences, particularly during the COVID-19 pandemic, on using available technologies or platforms such as Padlet, Whiteboard, MS Teams, Google Classroom, Moodle, UFUTURE (UiTM online T&L platform), and Canva to introduce course concepts, experiences, questions, problems, reviews, and notes. Students, for example, can respond immediately when using Padlet or Whiteboard, encouraging them to learn from one another. When students use these tools, they become motivated by knowledge discovery and reflection. Furthermore, it increases student engagement and interest in course concepts while allowing them to use technology.

## Gamification

Gamification is the process of turning the classroom environment and regular activities into a game. It involves creativity, collaboration, and play. There are numerous ways to incorporate games and gameplay into the classroom to promote learning and deepen student understanding of a subject matter. For example, one HLI uses a virtual project in which students are given a case study and are required to convert/portray the scenario into a live role-play. This enhances students' critical thinking skills by analysing the situation and creatively transforming it into role-play. The main benefits of gamification is the increased student engagement and enjoyment in class, as well as their motivation in the learning process.

The current situation in dealing with COVID-19 pandemic, provides an advantage in which many online gaming platforms and tools have been introduced in teaching and learning and can be embedded in classes. Kahoot, Socrative, Genially and QuizWhizzer are among the online game platforms and tools being mentioned during the roundtable. These gamification platforms and tools use elements such as engagement and motivation for learners to focus during the learning process.

## **Assessment**

Assessment is crucial to measure understanding of the courses taught. Several assessment approaches were discussed, such as formative quizzes and automated technology quizzes.

### ***Formative quizzes***

This involves regular question and answer sessions relating to the lessons taught to enhance students understanding of the course concepts. For example, courses such as big data analytics currently offered by some HLIs required further reinforcement via the quizzes to enable the student to grasp key concepts. For example, for Systems Analysis and Design courses, the use of formative quizzes aims to assist students to comprehend the knowledge at an in-depth level. Through these quizzes, student performance could be measured in a timely manner, and students are able to receive instant feedback on the tested topics/chapters. This allows students to reflect on their understanding of the topic, ensuring they would be better prepared for future exams. At the same time, results from formative quizzes also assist the accounting faculty or school in identifying areas that required further instruction or emphasis.

### ***Automated technology quizzes***

This approach has also been used by many HLIs in evaluating the student's understanding. Applications such as Kahoot, Massive Open Online (MOOC), CANVAS, Google Classroom, Microsoft Team, and UFUTURE (an online teaching & learning platform) are among the popular platforms used.

Lecturers upload the material, usually via CANVAS or Microsoft Teams. Students would then perform the assessment via the same platform. Marking and feedback is automatically captured via cloud storage. The technology quizzes that take advantage of Kahoot or similar automated response technologies (as mentioned above) allow for an interactive way to ask questions in the class. The use of these applications helps increase student involvement and engagement during lessons.

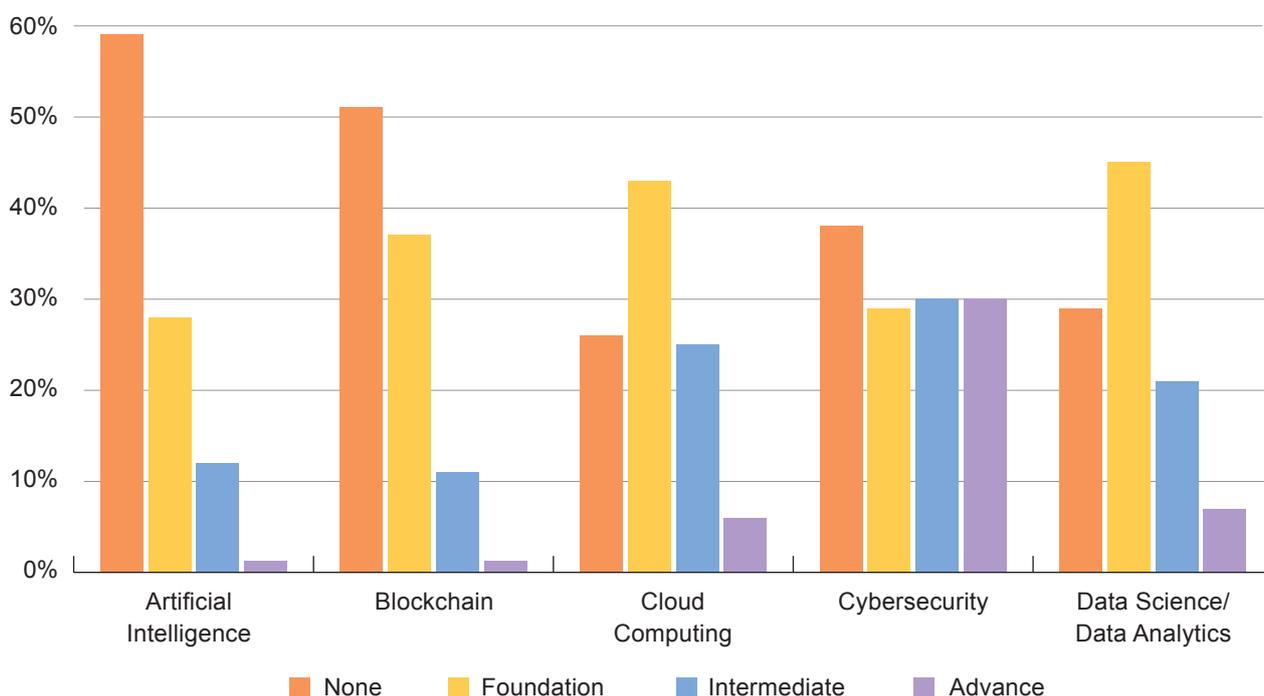
## **Possible Action for Consideration**

The above teaching and learning approaches could be used in the accounting programme to accommodate emerging technologies. It is also acknowledged that there are challenges in adopting these approaches, such as internet connectivity, high investment, training costs, and student's lack of essential technology.

# Mode and/or Types of Training on Emerging Technologies for Accounting Lecturers

As highlighted earlier, the top barriers of incorporating the emerging technologies into the accounting syllabus is lack of awareness and expertise in emerging technologies. This is further supported by the findings of the same survey where more than 65% of respondents indicated that they either do not have any competency or at a foundation level of competencies in all emerging technologies with more than 85% relate to artificial intelligence and blockchain.

**Respondents' competence level to teach technology topics**



The following were the highlights of the roundtable in relation to the above:

- Accountants are users rather than programmers as their role is to assist information IT people/system analysts in identifying which data is relevant. Nevertheless, they must understand the database concept and system as a whole.
- All accounting lecturers must be exposed or well-versed with emerging technologies ET.
- The methodology and type of training differ from one emerging technology to another.
- Current common uses of data science / data analytics in the industry include:
  - Public practice major firms - with technology, auditors are able to gain more meaningful insights from data as auditors are able to go through the complete population transaction rather than sampling-based techniques.
  - Businesses – with technology, businesses are able to access live data and develop a live dashboard for day-to-day operations.

The table below illustrates the identified emerging technologies and possible methods of training required for accounting lecturers to impart their knowledge to students:

Emerging Technologies	AI	Blockchain	Cybersecurity and Cloud Computing	Data Science/ Data Analytics
Scope	Theory/ Understanding (awareness)	Theory/ Understanding (awareness)	Theory/ Understanding (awareness)	Theory & Practical (more practical)
Modes of Trainings/ Tools (F2F, online, Hybrid)	<ul style="list-style-type: none"> <li>Development of AI in business world/ practitioner</li> <li>Programming relevance of AI in accounting – threat to traditional accountants</li> <li>Sharing sessions</li> </ul>	<ul style="list-style-type: none"> <li>Educators – should be aware of what is BC and how it operates</li> <li>Workshop</li> <li>Sharing session</li> </ul>	<ul style="list-style-type: none"> <li>Real case study – what is actually happening in the industry</li> <li>Governance/ Controls</li> <li>Sharing session with Chief Information System Officer (CISO) and practitioners</li> <li>Risk management around cloud computing</li> <li>Cloud-based accounting software</li> </ul>	<ul style="list-style-type: none"> <li>Tools (Microsoft Excel, CaseWare IDEA Data Analysis software, Tableau/ Power BI)</li> <li>Project paper</li> <li>Tutorial</li> <li>Group discussion among lecturers</li> <li>Workshop</li> <li>Real case study</li> <li>Sharing session</li> </ul>
Frequency of training	Series of training (once or twice a year)			
Resources	Financial support – grant from ministries/ industries/ universities			
Who should conduct training?	<ul style="list-style-type: none"> <li>Professional trainers</li> </ul>		<ul style="list-style-type: none"> <li>Industry expert</li> </ul>	

# Implementation Strategies

In relation to implementation strategies, the following have been deliberated during the roundtable:



## Curriculum design

As part of the implementation process, it was suggested that curriculum design should take into account the following:

- Input from MIA, industry practitioners, as well as accountancy professional bodies. Industry players have a vital role in the implementation process, and having major players will allow for matured information on the journey assisting the IHLs. This includes dialogues on strategies and reviews of content.
- The establishment of a working committee to facilitate roundtable discussions (involving all relevant stakeholders).
- Vetting processes within IHLs including ensuring adherence to MIA requirements as stipulated in the MIA Digital Blueprint in producing the correct talents to serve the industry. All IHLs should ensure that all the accounting faculties/departments carry out internal QA to ensure compliance with Malaysia Qualification Agency (MQA) regulatory standards. The messaging of meeting both compliance requirements is vital in the internal dialogues of the accounting faculty.
- QAA/MQA – Programme Outcomes (POs), Course Learning Outcomes (CLOs), Institution of Higher Learning (IHLs) with Self-Accrediting Status Standards compliance is of primary importance. Here using the Quality Assurance Agency (UK) can be utilized as a benchmark as well in reference to MQA.
- Roll Out – Holistic Approach, Stakeholder (Internal/External) involvement – Funding (Management Support), Benchmarking with Other IHLs, NGOs. Further into the quality assurance will be an exercise of benchmarking, which can be done not only between Malaysian IHLs but even more with international IHLs. Stakeholder engagement is also a key driver towards the search for funding to feed the exercises and studies.
- Awareness – Uniqueness, New Norms – ODL (Uniformity in Digital Learning for the Tech Inclusiveness). For all new content within the curriculums, it is important to ensure that they are unique in terms of ingredients to the programmes offered while also incorporating the current new norms of teaching and learning via Online Digital Learning (ODL).

## Key Challenges in Implementation

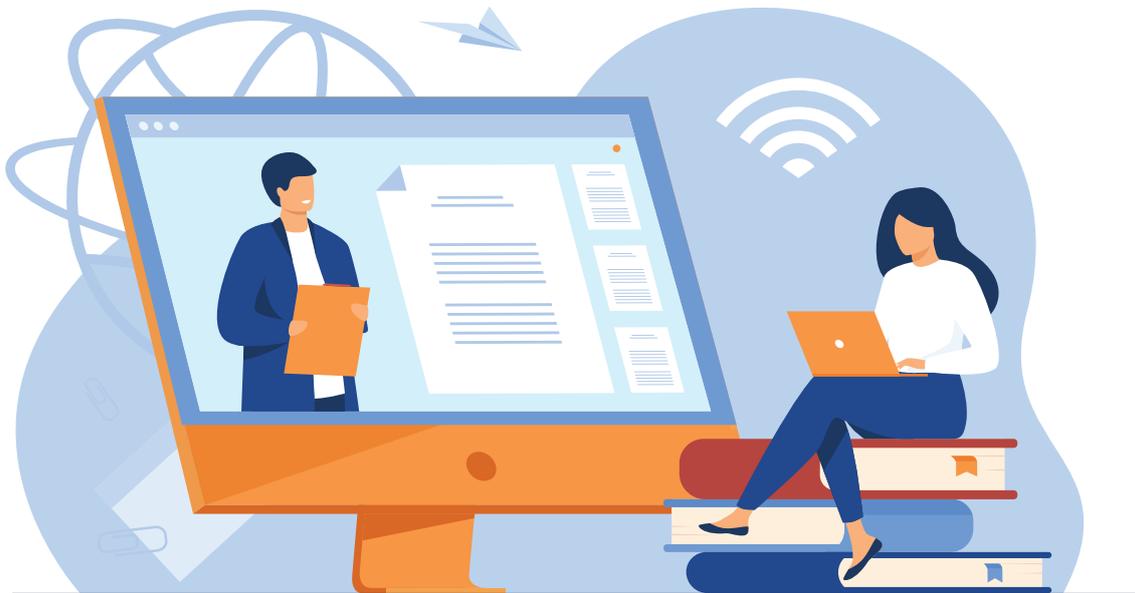
The following outlines some of the potential challenges the IHLs may face in implementing the incorporation of emerging technologies in the accounting programmes.

- **Compliance to HalaTuju (RoadMap)**  
All new developments regarding curriculum design and graduate production must meet the objectives as stated in the Ministry of Higher Education RoadMap.
- **Primary Engine (Infrastructure) – Technology/Software, Platforms, Tools, Internet Connectivity, Bandwidth**  
Every technology initiative is supported by a primary engine and it is crucial that the necessary technology infrastructure be put in place to enable the teaching and learning process.
- **Funding to enhancement to infrastructure, as well as teaching and research grants**  
Substantial funding is necessary to ensure success. Phase by phase scaling could be implemented and the availability of grants could be useful to provide the support required.
- **MQA – conventional & stringent Body of Knowledge (BOKs) and associated standards**  
MQA based on the applied stringent standards could form a challenge. In order to work around the standards this is where a balance has to be created between the body of knowledge versus the technology content which will be embedded into the programme.
- **Diploma level guidance**  
MIA should be consulted on the production of diploma graduates in the discipline aligned towards employment and the various industries that will be utilizing the talents of this qualification.
- **People factor and academic delivery – Skills & Knowledge Uplift, Teaching Awards, Motivation, Promotions & Development (Recognition)**  
Educators need to be upskilled in terms of technology skills and knowledge. A recognition scheme could be implemented to help motivate all educators in this discipline.
- **Industry support**  
As a primary stakeholder, industry should be involved but need to match the relevant compliance to MQA. Hence, it is crucial to strike a balance during the design of a curriculum.

## Adaptation of Academic Expertise Via Knowledge Transfer

The adaptation process should consider the following points:

- Teaching delivery of technology topics  
This is a decision making by the leadership of the faculty/school within an IHL. Both methods or delivery person is possible as suited and feasible based on the IHL's eco-system and resource availability.
- Industry to guide on phase-by-phase adaptation – skills and knowledge transfer  
This relates to the industry as stakeholders and hiring parties to be part of the phase-by-phase adaptation so that the IHL is on the right pathway and does not go off track versus the set designed objectives.
- Academic integrity – Tech Infusion (Time Based)  
What comes with tech infusion is the ability to deal with modern-day ethics and integrity on topics such as data & network security, data sharing provisions on the cloud and also which tech, tools or software to be chosen.



# Recommendations

## Recommendation 1:

The future skillset of the accounting graduates in Malaysia should be based on the three proficiency levels as set out in the MIA CFM, which has been benchmarked against the IAESB Framework.

## Recommendation 2:

The emerging technologies identified as being critical for the accounting programmes are AI, blockchain, cybersecurity, cloud computing and data science / data analytics. The emerging technologies could be covered in the accounting curriculum by incorporating the sub-topics set out on pages 10 to 12.

## Recommendation 3:

The emerging technologies can be incorporated in the accounting programmes by using the following approaches:

- Specific emerging technology courses as core subjects
- Specific emerging technology courses as elective subjects
- Emerging technology components are included in various subjects in the accounting syllabus

In determining the appropriate approach, the specific emerging technologies and its impact to the accounting profession should be considered.

## Recommendation 4:

A careful study should be carried out in determining who best to deliver the technology topics being incorporated in the accounting programmes. A committee or task force comprising members from the accounting faculties and the IT professionals can be formed to work on areas such as assessing gaps in the syllabus, planning for implementation, virtual learning roll out and others.

If the accounting lecturers are in a better position to teach the technology topics, capacity building initiatives are critical to enhance their skills and knowledge in the topics.

## Recommendation 5:

Various teaching and learning approaches could be used in the accounting programme to accommodate emerging technologies. However, there are challenges in adopting these approaches such as internet connectivity, high investment, training costs, and lack of essential technological tools available to students.

## Recommendation 6:

In an effort to change the syllabus, a collaborative effort is required, which involve IHLs, MIA, industry practitioners, MQA and academicians, as well as taking into consideration the technology infrastructure and funding.

# The Way Forward

The report provides insights on the six areas mentioned earlier based on research, various discussions by the Working Group, survey and roundtable discussion. It can be used by relevant stakeholders to understand the technology adoption within the accounting programmes by IHLs in Malaysia as well as the issues, challenges and possible actions for consideration. It can assist various stakeholders in initiating discussions and exploring collaboration. It also serves as the point of reference for IHLs in relation to incorporating technology topics within the accounting programmes.



# Acknowledgements

## Members of Academicians Working Group

- Prof Dr David A/L Asirvatham – Taylor’s University (Chairman)
- Assistant Professor Dr Hawa Ahmad – International Islamic University Malaysia
- Dr Sharina Tajul Urus – Universiti Teknologi MARA
- Siew Wai San – Asia Research & Innovation Alliance
- Tengku Fairuz Tengku Embong – Universiti Teknologi MARA
- Prof Dr IR TS Vinesh Thiruchelvam – Asia Pacific University of Technology and Innovation

## Staff of MIA Digital Economy, Reporting and Risk

- Rasmimi Ramli
- Sharifah Nur Aina Syed Omar
- Nurul Nadira Muhammad Shaharudin

We also wish to thank the respondents of the ‘Survey of Technology Adoption within the Accounting Courses by the Universities in Malaysia’ as well as the representatives of HLIs, professional accountancy bodies and industries who attended the roundtable discussion on 4 December 2020.

# Survey of Technology Adoption Within the Accounting Courses

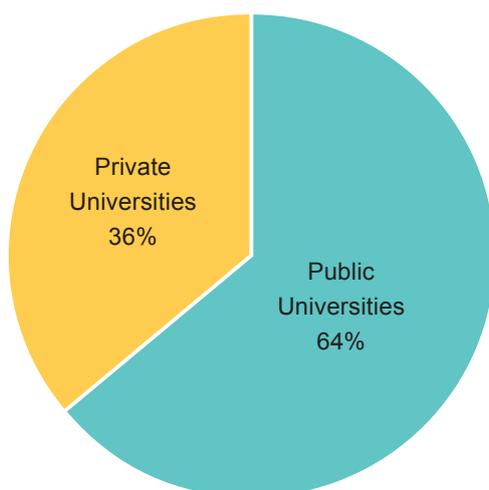
Following the literature review, review of the current accounting syllabus of certain universities and professional accountancy bodies as well as review of market and technology trends carried out by the Academicians Working Group, 'Survey on Technology Adoption within the Accounting Courses by the Universities in Malaysia' was issued to public and private higher learning institutions (HLIs) in February 2020 and responses were collected until May 2020.

The objective of the survey is to gather and understand views of the academicians on the emerging technologies that should be integrated into the accounting programme of the universities and the gaps that are currently present in delivery of teaching on those emerging technologies. The survey focuses on the identified emerging technologies that have significant impact on the profession which are artificial intelligence, blockchain, cloud computing, cybersecurity, data science and data analytics.

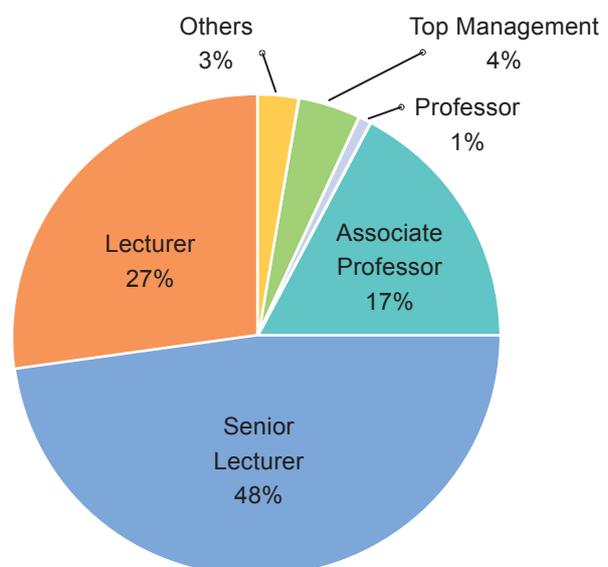
## Profiles of Respondents

A total of 73 academicians responded to the survey with 47 of them are from public universities while 26 from private universities. 92% of the respondents are either an associate professor, a senior lecturer or a lecturer, specialising in the areas of accounting such as financial accounting, management accounting, audit and taxation. While more than 80% of respondents have more than 10 years teaching experience.

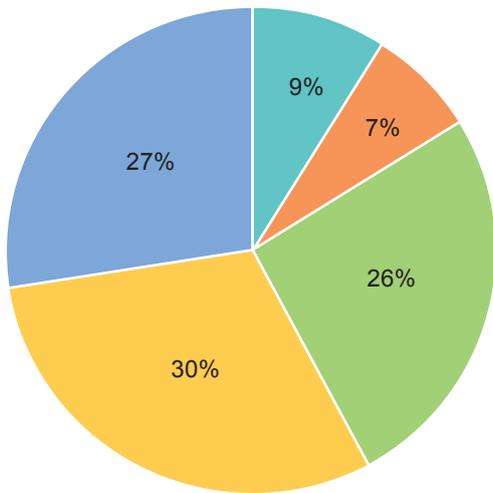
**Type of universities**



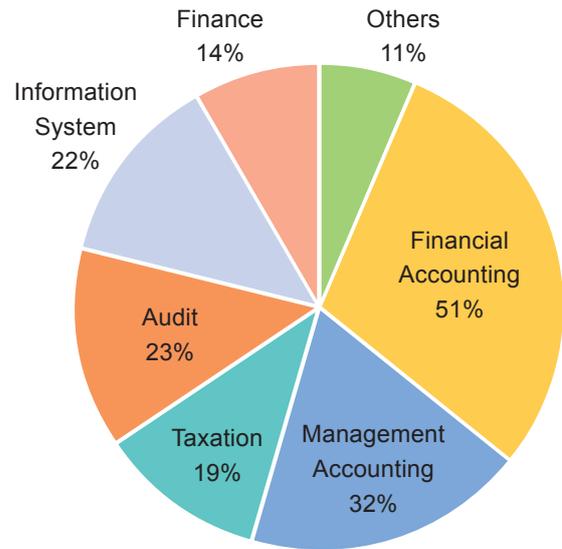
**Position**



Teaching experience

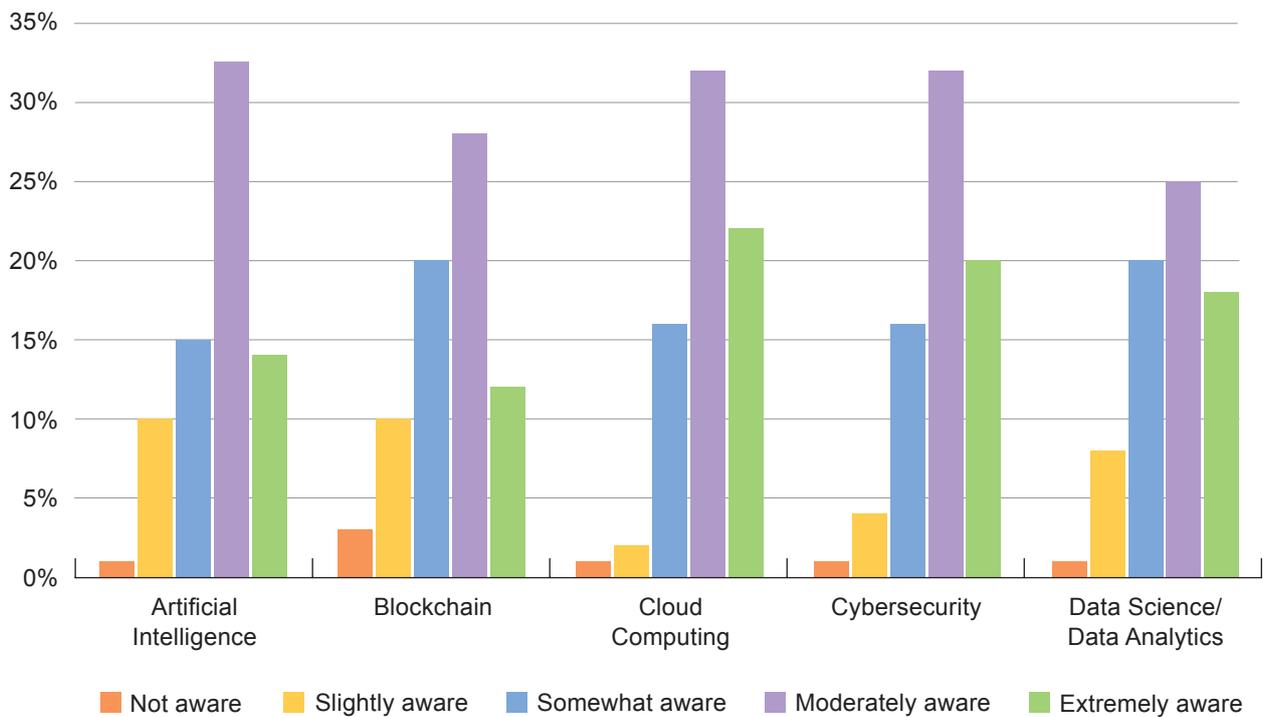


Areas of specialisation

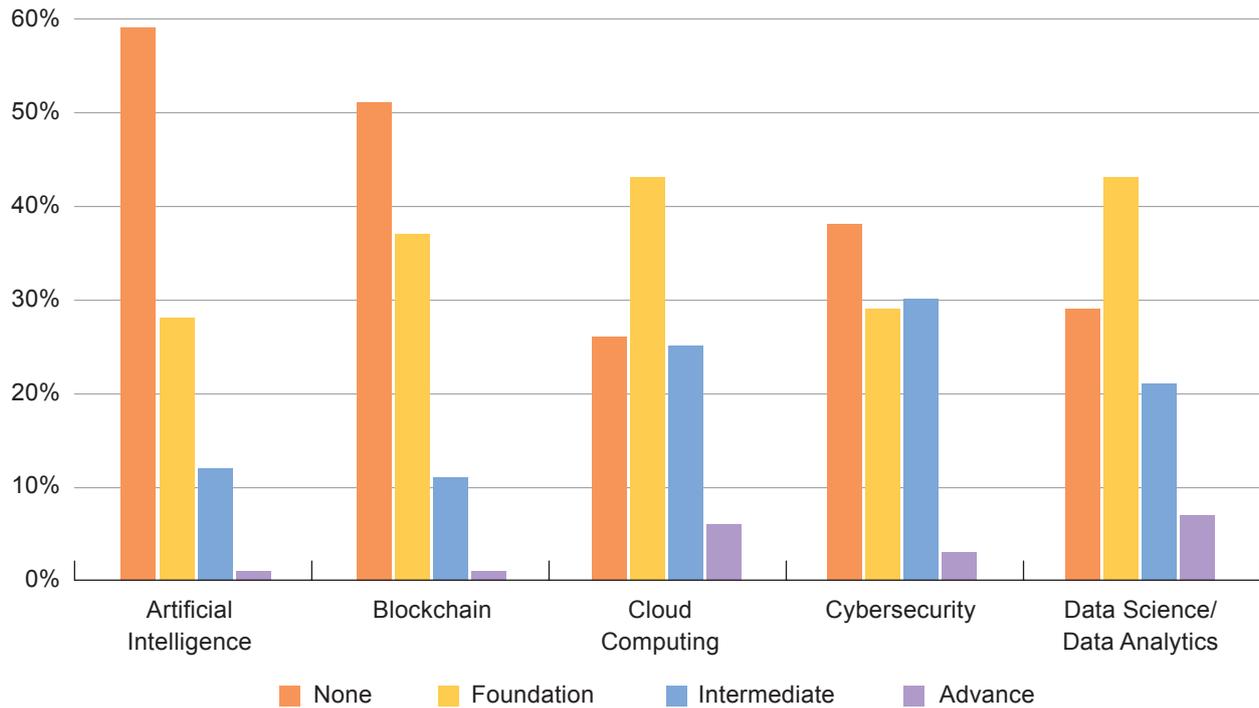


## Respondents' Awareness and Competency of Emerging Technologies

Awareness of emerging technologies

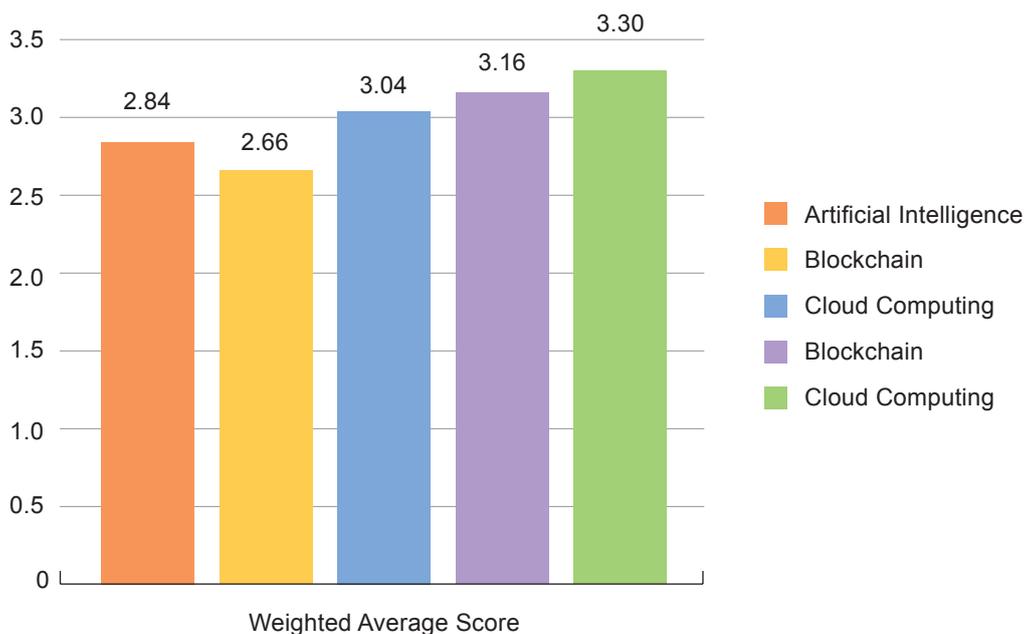


### Competence level to teach emerging technologies

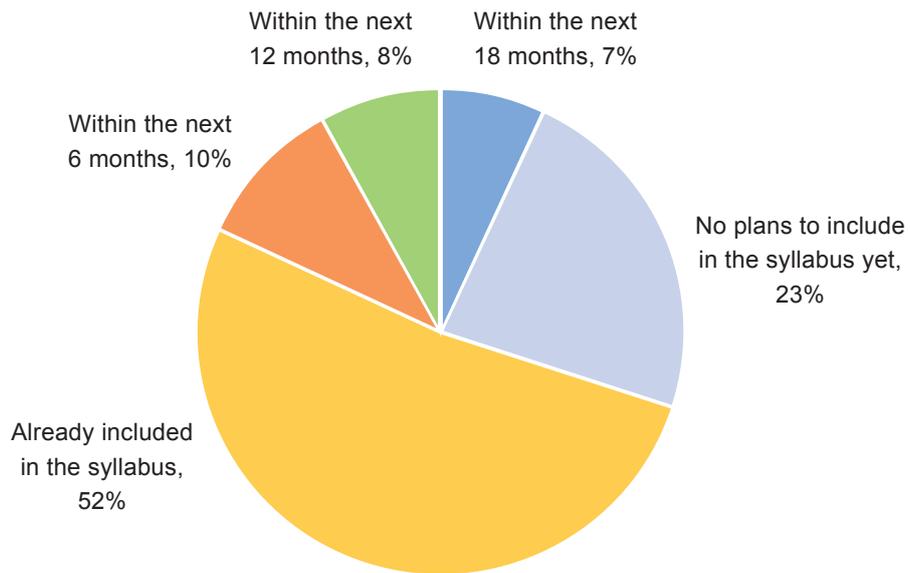


### Current View on Incorporating Emerging Technologies into the Accounting Courses

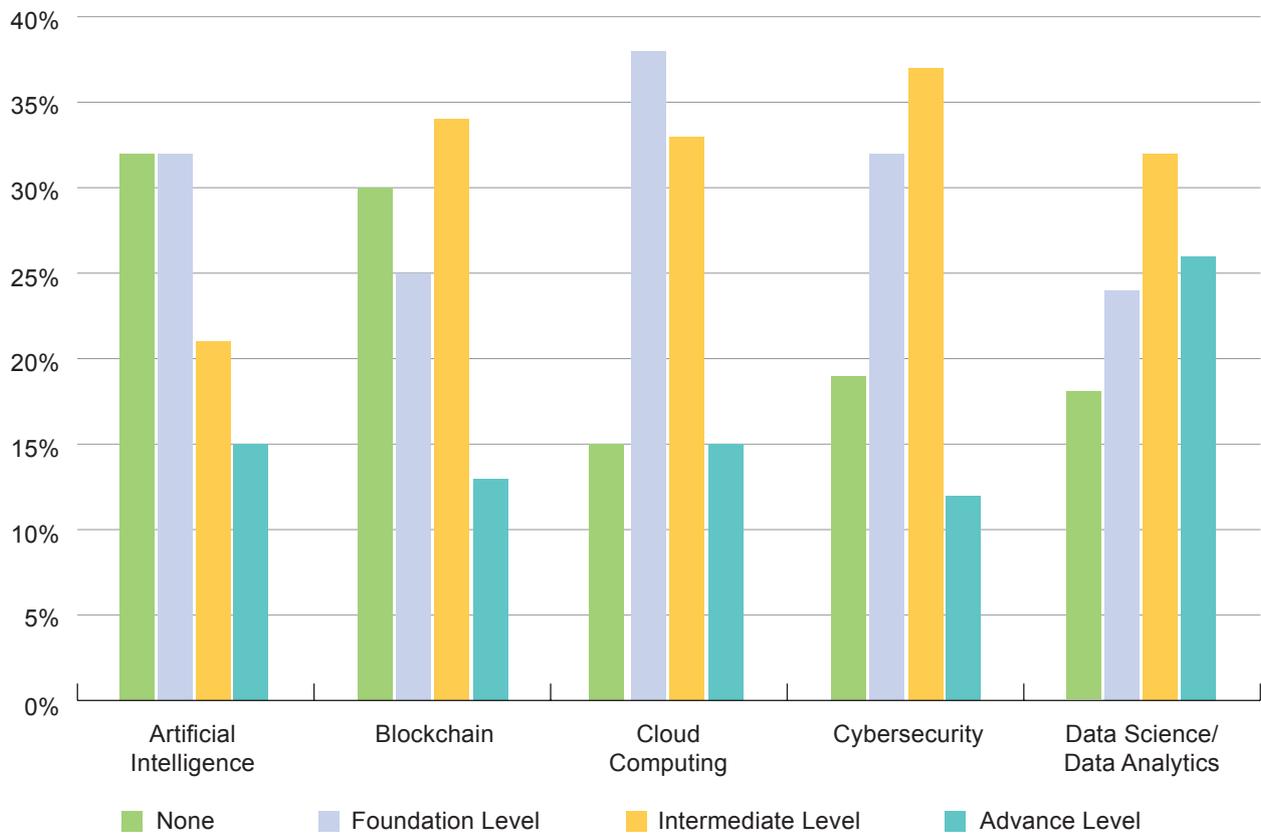
#### Importance of emerging technologies to be incorporated into the accounting courses



**Plan to include the emerging technologies in the accounting syllabus**

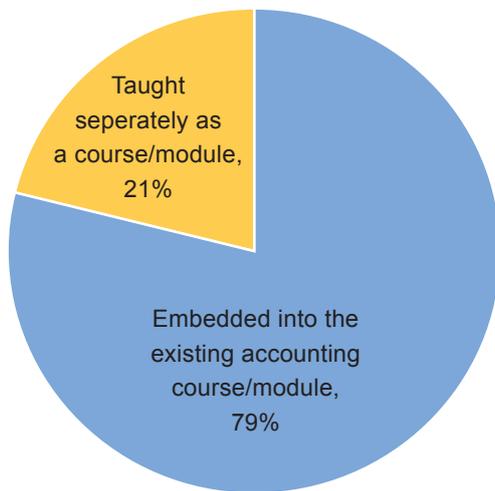


**Level at which the emerging technologies have been incorporated into the accounting courses syllabus**

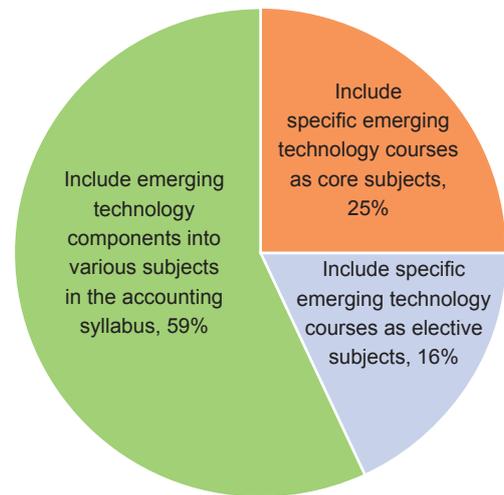


## Approaches to Incorporate Emerging Technologies into the Accounting Courses

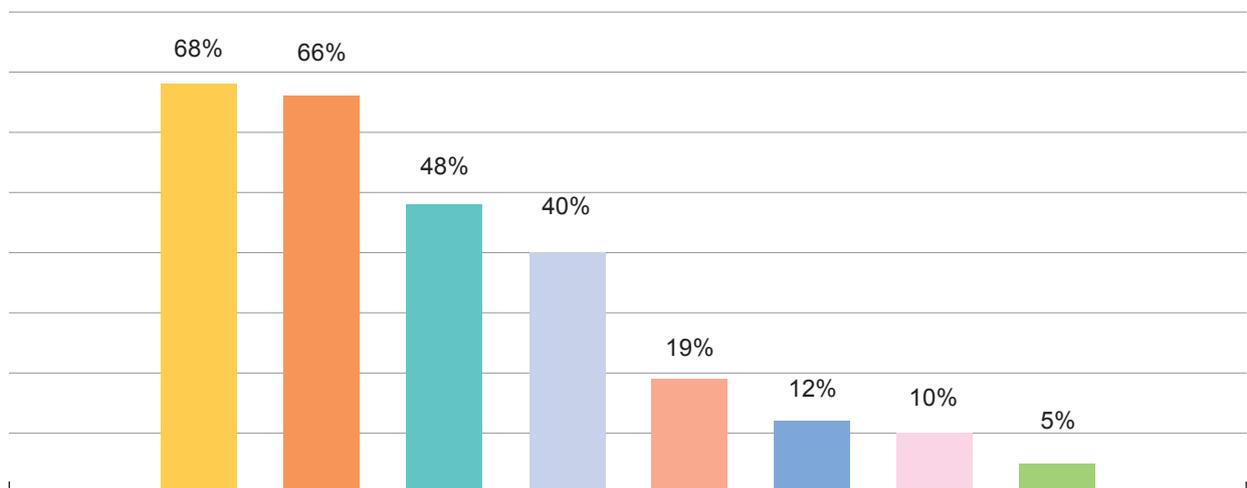
**How should emerging technologies be integrated into the accounting programme?**



**Best approach to embed the emerging technologies into the accounting programme**

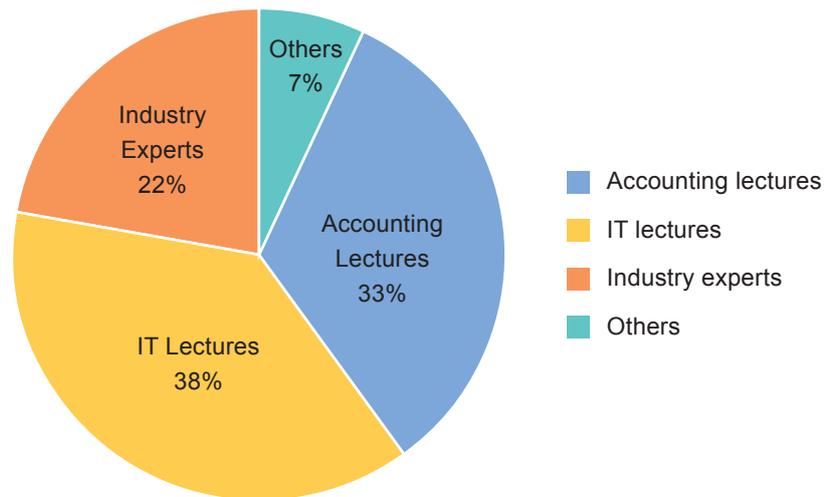


**Barriers to include the emerging technologies in the accounting syllabus**

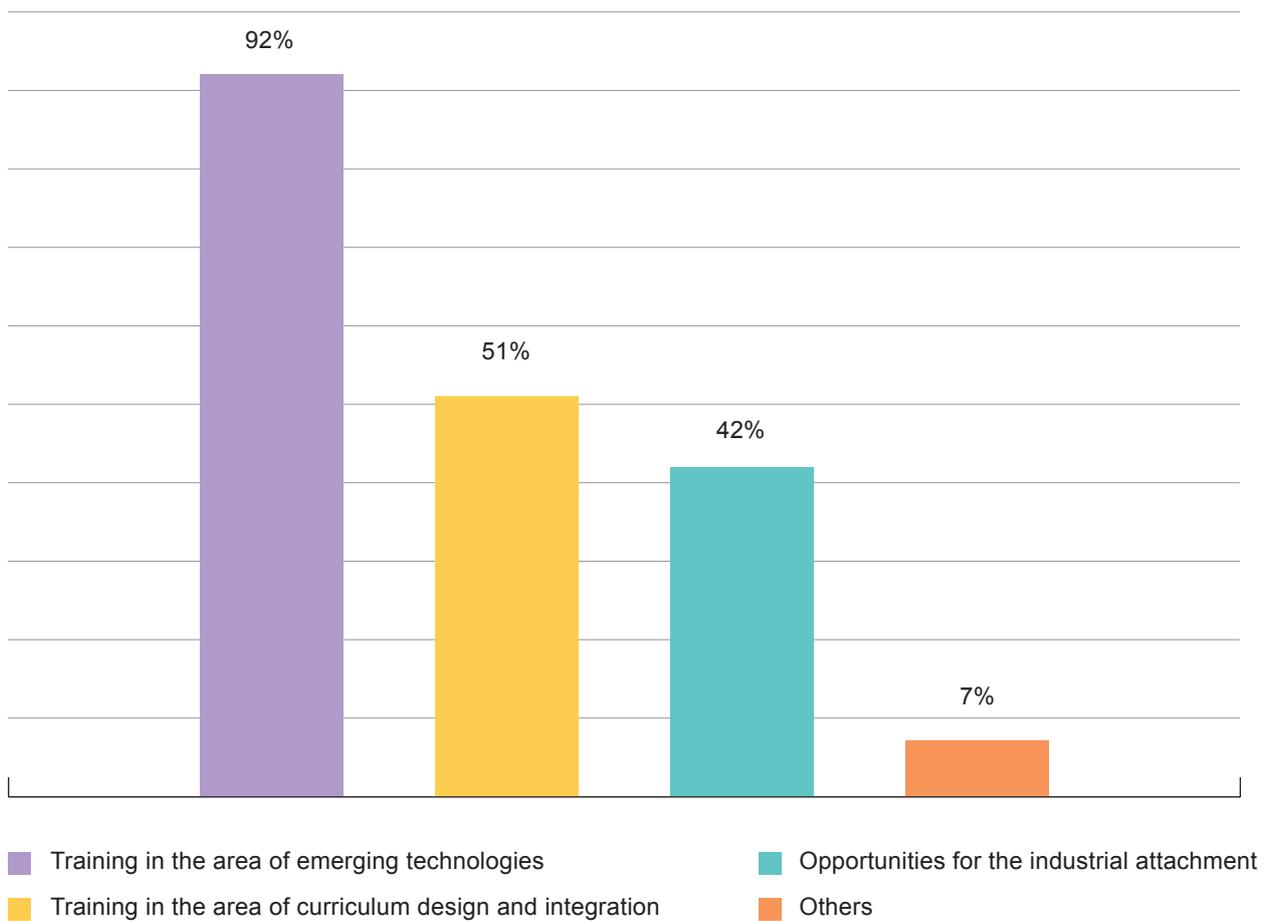


- Lack of expert in the emerging technologies
- Lack of understanding on the emerging technologies
- Lack of funding for the establishment of facilities in the emerging technology areas
- Lack of flexibility of the accounting programme standards
- Tedious process for the approval of changes
- Lack of support from top management
- Lack of clear business case to justify investment
- Others

**Who should teach the technology component?**



**Assistance needed to integrate emerging technologies into existing course/modules**



## Roundtable Discussion

A total of 62 attendees representing both private and public HLIs as well as representatives from accounting bodies and industry, participated in the discussion. The findings of 'Survey were presented to the participants followed by a group discussion which focuses on the following areas:

- Mode/types of training on emerging technologies for accounting lecturers
- Incorporation of technology subjects to the syllabus
- Teaching and learning of emerging technologies in accounting programmes
- Topics of specialisation (emerging technologies) for accounting programmes
- Implementation strategies

### Group 1: Mode/Types of Training on Emerging Technologies for Accounting Lecturers

Name	Organisation
Dr Hawa Ahmad	DTIC Academia Working Group
Assoc Prof Dr Norli Ali	UiTM
Farhana Hasbolah	UNISEL
Amiruddin Ahmad	Unirazak
Dr Ridzwana Mohd Said	UPM
Dr Shahifol Arbi Ismail	UUM
Wan Izyani Adilah Wan Mohamad	UniSZA
Dr Norhayati Abdullah	UniSZA
Lee Eng Teen	KPMG

## Group 2: Incorporation of Emerging Technology Topics into the Curriculum

Name	Organisation
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Dr Indarawati Tarnuji	UiTM
Hazezul Razman Othman	Unitar International University
Dr Sugumaran Selladurai	SEGi University
Norkhazimah Ahmad	UNITEN
Wong Wei Ee	UOW MALAYSIA KDU
Assoc Prof Wong Hwa Kiong	(TAR UC), KL Main Campus
Assoc Prof Dr Azwadi Ali	Universiti Malaysia Terengganu
Dr Nabilah Rozzani	Management & Science University
Aaron Saw	ACCA

## Group 3: Teaching & Learning Emerging Technologies in Accounting Programmes

Name	Organisation
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Tengku Fairuz Tengku Embong	DTIC Academia Working Group
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Mariana Jusop	UniSZA
Noor Fadzlina Mohd Fadhil	UniSZA
Mara Ridhuan Che Abdul Rahman	UKM
Dr Rosmila Senik	UPM
Nur Shahida Ab Fatah	Universiti Malaysia Sabah
Nurul Azirah Mohd Wazir	Management & Science University

## Group 4: Topics of Specialisation (Emerging Technologies) for Accounting Programmes

Name	Organisation
Prof Dr David Asirvatham	DTIC Academia Working Group
Prof Dr Zulkiflee Mohamed	Unirazak
Nor Shaipah Abdul Wahab	Taylor's University, Malaysia
Nor Hashimah Johari	UNITEN
Jainurin Ustine @ Abdul Aziz	Universiti Malaysia Sabah
Bryan Chung	CPA Australia

## Group 5: Implementation Strategies

Name	Organisation
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Dr Mohd Ezrien Mohd Kamal	UiTM
Dr Angelina Yee	University of Nottingham, Malaysia
Dr Amirul Shah Md Shahbudin	Universiti Sains Malaysia
Azina Yaakob	Kolej Poly Tech Mara
Rachel Chee	ACCA
Steven Chong	DTIC Member
Lai Tak Kong	TARUC
Voong Ai Lin	Swinburne University

Abbreviations	Full Name
ACCA	The Association of Chartered Certified Accountants
DTIC	Digital Technology Implementation Committee
KDU	Kolej Damansara Utama
TAR UC	Tunku Abdul Rahman University College
UiTM	Universiti Teknologi MARA
UKM	Universiti Kebangsaan Malaysia
UNIRAZAK	Universiti Tun Abdul Razak
UNISEL	Universiti Selangor
UniSZA	Universiti Sultan Zainal Abidin
UNITEN	Universiti Tenaga Nasional
UOW	University of Wollongong
UPM	Universiti Putra Malaysia
UUM	Universiti Utara Malaysia



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