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AI LITERACY FOR BUSINESS AND/OR SMART CITIES

ABSTRACT:

Nowadays, as organisations and companies increasingly harness the power of artificial intelligence (AI), there is a growing need to ensure future professionals in fields such as business and management can possess relevant necessary knowledge, skills, and mindset for navigating the ethical and social implications of AI technologies. This study evaluated the effects of a specialised AI literacy course designed for business students at a university in Hong Kong. The course aimed to equip participants with a basic understanding of AI concepts via self-paced materials, hands-on activities, case study discussion and design thinking activities. Through a mixed-methods approach involving evaluation surveys, student and teacher reflections, this case study examined how effectively the course developed the students' AI literacies as future business leaders and global digital citizens. AI competencies include understanding basic AI and GenAI, using AI applications ethically, critically analysing AI-powered systems, identifying potential societal risks, and making data-driven decisions while upholding ethical principles. The findings provide valuable insights into the role of targeted AI education in preparing the next generation of business professionals for navigating the evolving data landscape and contributing to the responsible advancement of these transformative technologies.

KEYWORDS:

1. AI competency
2. AI literacy
3. Business
4. Smart city
5. Generative AI
6. Digital citizenship

1. Background and Course Overview

This case study evaluated the effect of a global citizenship course designed for business undergraduates to learn AI at a university in Hong Kong. The course aimed to equip participants with a basic understanding of AI concepts, through self-paced materials, hands-on activities, case study discussions, and design thinking activities.

1.1 AI and Generative AI

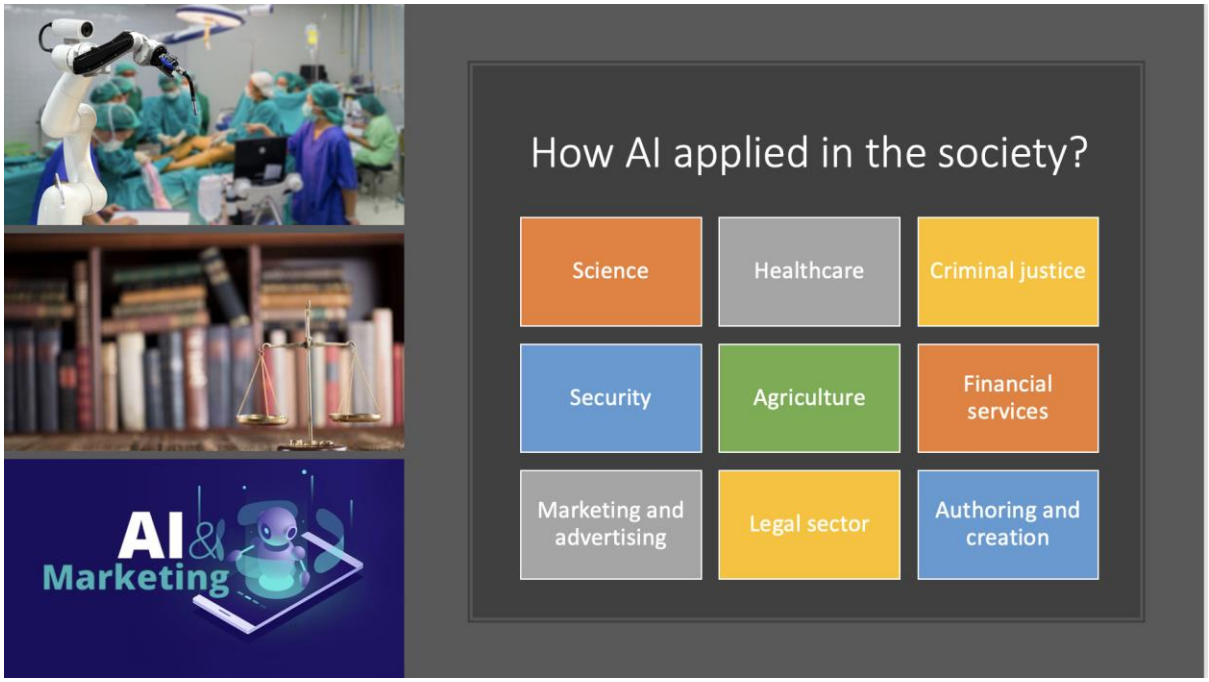
Artificial Intelligence (AI) emerged in the 1950s, when it was first conceptualised as the science and engineering of making intelligent machines (Smith, 1956; Ng et al., 2021). Over several decades, AI has evolved progressively, manifesting in the development of intelligent machines and algorithms that can reason and adapt based on sets of rules and environments, closely mirroring human intelligence (Russell & Norvig, 2016). Consequently, the definition of AI has been further expanded, as it can now perform diverse cognitive tasks through the application of machine learning, natural language processing, and neural networks (Goodfellow et al., 2016). One of the latest advancements in AI is the emergence of Generative AI (GenAI), which refers to AI systems that can generate new content, such as text, images, audio, or even computer code, based on the training data they have received (Feuerriegel et al., 2024). Generative AI models, such as GPT-3, DALL-E, and ChatGPT, have demonstrated remarkable capabilities in producing human-like outputs. Thisleads to growing interest and adoption across various domains, including education, content creation, and problem-solving (Alto, 2023). With technological advancement, more and more applications, and systems have become available for citizens.

As such, in the first part of the course, students were taught basic AI knowledge and ethical considerations. Students could realize the benefits of digital innovation and smart city development while avoiding adverse outcomes. They also recognized the importance of incorporating AI ethics considerations when implementing IT projects and services, seeking a balanced approach that safeguards public interest while facilitating innovation.

1.2 Using AI for the Smart City initiatives in Different Fields

After gaining knowledge and skills in the first part of the course, students then studied self-paced materials via an online platform Moodle (Figure 1), and conducted group case study discussions to showcase various AI applications across disciplines during their face-to-face classes. The application of AI has been extensively explored across various industries to enhance user experience and improve efficiency within diverse sectors of a smart city (Chui et al., 2018). First and foremost, AI assists researchers in collecting and processing large-scale data, accelerating scientific discoveries (Jiang et al., 2022). These "AI scientists" may offer an alternative form of scientific inquiry (Mickunas & Pilotta, 2023). Moreover, AI helps diagnose and prevent diseases, discover treatments, and enable self-monitoring tools (Topol, 2019). On the other hand, AI-driven smart healthcare systems focus on real-time self-monitoring and timely medical intervention (Accenture, 2021). AI also contributes in law and finance industry. AI assists in drafting contracts, extracting and analysing legal content (Susskind, 2020), and improving criminal justice through predictive policing and security threat detection (Mayer-Schönberger & Cukier, 2013) while it also helps detect fraud, assess creditworthiness, automate trading, and personalize marketing (Davenport & Harris, 2017; Baeck et al., 2019). In terms of traffic management, AI-powered traffic management and autonomous vehicles can improve traffic flow and reduce emissions.

Figure 1. Self-paced materials to learn basic AI knowledge



1.3 Potential Real-world Challenges of AI

The rise of AI has raised concerns about its potential repercussions. The misuse and poor design of AI systems can potentially pose threats to humans and society (Jobin et al., 2019; Mittelstadt et al., 2016). Concerns have been raised about the ethical implications of AI, such as issues related to privacy, bias, transparency, and accountability (Hagendorff, 2020; Jobin et al., 2019). Therefore, enabling students to learn how to alleviate challenges via design thinking, the third part of the course required students to develop a prototype that addressed a real-world problem using AI technologies. Students had to design their prototype solutions with key ethical principles in mind. They then implemented their prototypes, leveraged their AI literacy skills, and evaluated its effectiveness, efficiency, and alignment with ethical AI guidelines. Finally, students presented their prototype and ethical considerations to their classmates for fostering valuable feedback. This design thinking project was intended to prepare students for the responsible development of AI-powered solutions, balancing innovative problem-solving with a strong ethical foundation.

2. Course overview

The focus of this course was on developing AI literacy among business students. This included building knowledge of AI fundamentals, exploring practical applications of AI in business, and examining the relevance of AI to smart city initiatives. We recorded a set of videos for the take-home module delivery that aligns with the strategies in the business world. Students are expected to develop a range of AI literacy skills, including:

- Comprehending the fundamental AI principles and capabilities of AI systems via self-paced materials and hands-on experience;
- Providing showcase of the potential applications of AI for business and/or smart city initiatives via case study discussion across disciplines;
- Evaluating the ethical and social implications of using AI for business and/or smart city initiatives;
- Discussing how to reinforce the development of AI in an institution and/or city as industrial leaders;
- Designing AI-driven solutions to resolve real-world problems as a business and/or smart city leader via design thinking project design.

3. Course and Pedagogical Design

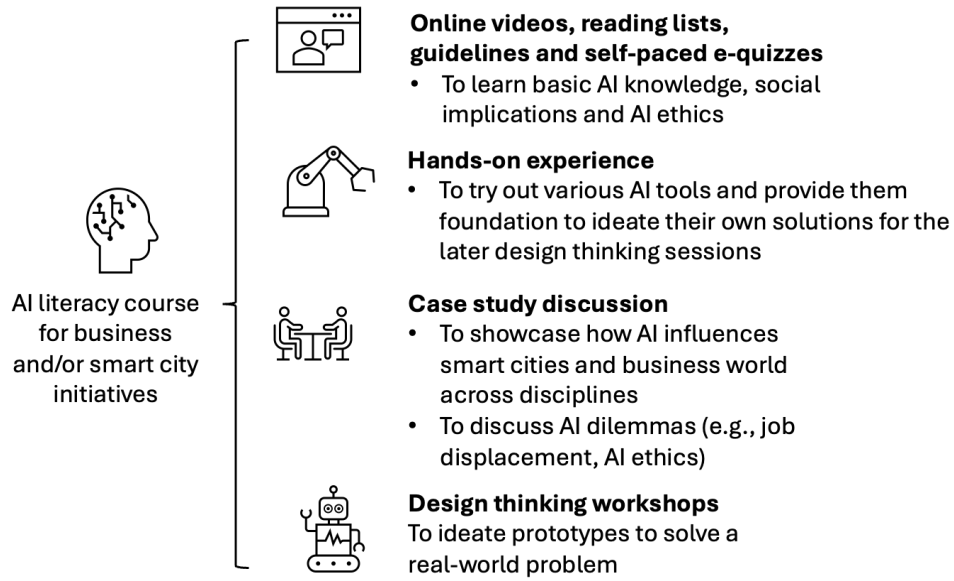
The pedagogical approach combined online lectures to present the theoretical knowledge in an easy-to-understand manner and arouse interest (Mayer, 2009), case study discussions to apply concepts to real-world scenarios (Brundiers et al., 2010), and hands-on exercises/projects to help students understand the practical relevance of the course material to their daily lives (Biggs & Tang, 2011). This multi-modal approach was intended to provide an authentic learning experience that engaged students through different content delivery and application methods. The following first describes the major pedagogical elements, and examples are further elaborated.

3.1 Major Pedagogical Elements

This course adopted a hybrid approach combining asynchronous video instruction and synchronous face-to-face discussions. This learning strategy helped leverage the strengths of blended teaching, enabling students to familiarise themselves with the core AI concepts before delving into deeper discussion, exploration and analysis during the face-to-face sessions (Mayer, 2009). The course objective was not to deliver a comprehensive and detailed exploration of AI, but rather to foster students' understanding of the fundamental AI concepts and discuss how AI influences different disciplines in various real-world applications. The inclusion of hands-on and design thinking activities was intended to help students develop basic practical skills to ideate prototypes to solve real-world problems that connect the AI concepts that they have learnt in their everyday lives (Biggs & Tang, 2011). By doing so, students worked as a leader to empathize and observe what people's needs are and propose strategies to improve their lives and test them to refine it (Beckman & Barry, 2007). The four major pedagogical elements are explained in Figure 2.

Online lectures.
A set of self-paced materials such as video presentations, reading and self-paced materials was provided. Key contents were included in the videos: what is AI?, how is AI applied in society?, challenges about AI, and AI ethics. The videos also incorporated e-quizzes with multiple-choice questions, which helped consolidate students' knowledge for further hands-on experience, and prepare them for case study discussion.

Figure 2. Four pedagogical elements for course design



Hands-on experience. Hands-on experience provided students with valuable experience working with AI. Students created a simple chatbot or virtual assistant using platforms like Dialogflow and Chatfuel,

experimenting with training the chatbot, and defining its capabilities. Students were also introduced to fundamental machine learning concepts through hands-on activities, training a basic image and/or facial classification model using a tool like Teachable Machine, which they can apply in various scenarios such as shopping experience, searching and rescuing, ride-sharing and care-taking services. Additionally, students had the opportunity to experiment with generative AI applications, such as text generation, image creation, or audio synthesis, enabling them to compare capabilities and limitations of these GenAI-empowered tools with simple AI chatbot solutions. The experience helped students gain basic practical skills and prepare them for design thinking activities.

Case study discussion. This activity enabled students to showcase how AI influences smart cities and business world across disciplines, and discuss various AI-related dilemmas (e.g., job displacement, AI ethics). The case study discussion showcased AI adoption across fields such as healthcare, education, and transportation. It also addressed concerns relating to AI replacing jobs and ethical implications. This enabled students to debate the social and ethical impacts, such as job displacement and algorithmic bias. Case study-based group discussions analysed AI-related ethical dilemmas through case studies, prompting students to propose solutions.

Design thinking workshops. Design thinking frames the discussion as an inquiry into what AI solutions would be feasible to solve real-world problems. In the workshops, students demonstrated how their AI ideas or prototypes can be used to automate delivery services, and improve customer experiences. This empowered students to become adaptive marketers and customer experience leaders while they were also equipped with the AI-powered skills to succeed in the modern business world. Figure 3 shows the four key pedagogical designs for this course.

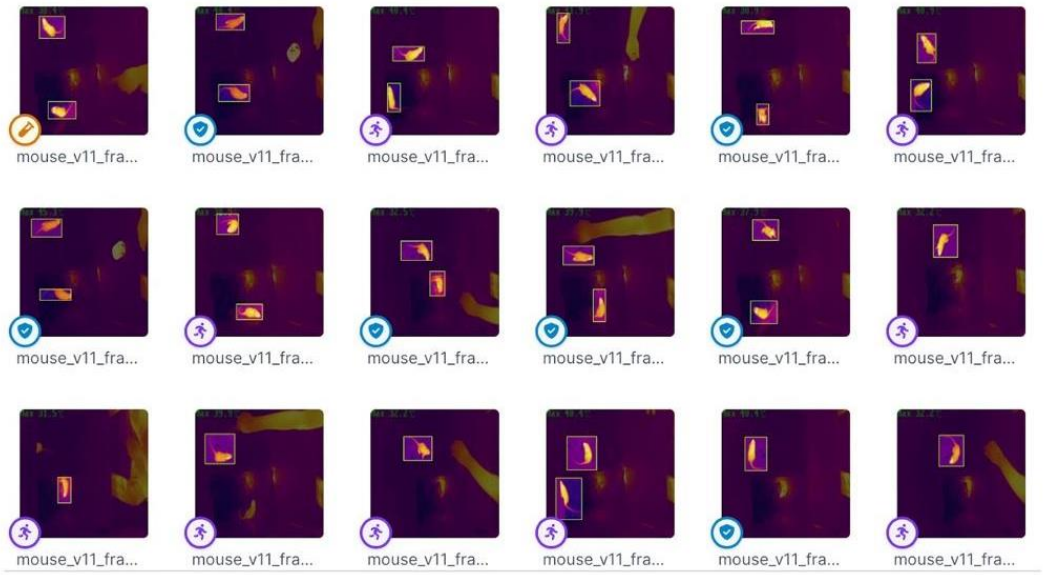
3.2 Examples of students' presentation and work

Here are some examples of how students learnt in the course. After studying self-paced materials (e.g., online lectures) to learn the basic AI knowledge, students participated in hands-on activities to try out various AI applications (e.g., data visualization tool, chatbot), and apply what they have learnt to ideate their solutions for later design thinking projects. After that, students were engaged in case study-based group discussions, and learnt how AI influences different fields via case studies. In this activity, students shared how AI provided smart solutions for different real-world scenarios such as marketing, investment, logistics, transportation, and cybersecurity. For example, a student learnt from a case study of TechTalk system, and demonstrated how AI facilitates simulation and optimization for on-demand ride service (Figure 3).

Figure 3. AI ride service operations (TechTalk, 2024)

In the design thinking workshops, students made observations and identified problems that they want to improve during the design thinking project. For example, a group of students showcased a project on how to use computer vision technology to identify rats in urban areas of cities. Students recognized that rats could carry diseases and pose health risks in densely populated cities. By deploying computer vision systems, such as cameras and AI-powered thermal-imaging object detection, students could demonstrate how to create a prototype for tracking automatically presence of rats in real-time. In the design thinking project, students leveraged computer vision and machine learning to detect rats in video footages. Students suggested developing a web platform to visualize the rat sightings data across the city.

Figure 5. A screen capture of how students identify rats using computer vision



4. Student feedback and evaluation

Student evaluation was conducted through a survey (complete rate=100%) after the completion of the module. Students were asked to rank various aspects of the module, including the clarity of content, relevance of the applications, and effectiveness of the teaching approach. The overall feedback was positive, with the module receiving an average score of 5.2 out of 6, which is higher than typical average of 4.5 for similar courses. This revealed a significant improvement in the students' AI literacy skills. Post-survey showed that students demonstrated a grasp of core AI concepts and hands-on experience by the end of the course. They were able to articulate a nuanced understanding of AI applications, highlighting both the opportunities and risks associated with the technology. They showcased various AI applications in different disciplines in their case study discussions, and ideated AI-driven products to solve real-world business and/or smart city problems.

Students' feedback (N = 6) on the module has been positive in an interview. A student commented, "The topic helps me understand AI in a simple way." Another student agreed with this, "Now I pay more attention to surroundings around me about AI." Additionally, a student expressed, "The mysteries of AI have been resolved and I as a laymen user can develop an AI product." In addition to course satisfaction, dimensions of AI literacy were also assessed. One of the key outcomes was the students' enhanced ability to critically analyse AI-powered systems. Through discussions and case studies, students developed skills to scrutinise the potential biases, privacy implications, and societal impacts of AI-driven algorithms and decision-making processes. Students reported that they felt more confident in their capacity to identify and mitigate ethical concerns related to the use of data and AI.

Furthermore, the course equipped students with knowledge to make responsible, data-driven decisions while upholding ethical principles. Reflections from the students indicated a heightened awareness on the importance of data governance, transparency, and accountability in the context of AI implementation. They expressed commitment to apply these principles in their future professional roles. Students valued the opportunity to engage with real-world examples and explore the multifaceted challenges surrounding the societal impact of AI. Students highlighted their improved ability to anticipate and address potential risks, such as algorithmic bias, privacy concerns, and job displacement, through proactive and collaborative approaches.

5. Tutors self-reflection

Participating in and preparing for the video lectures were a valuable experience for all authors. One reason is that teaching content was successfully delivered in a manner that was easy to understand and effectively aroused students' interest in AI and smart city technologies before face-to-face discussion. However, the lecture format did present limitations in terms of student interaction. The instructors observed a lack of immediate feedback and inability to provide in-depth information during lectures, although they were able to address individual inquiries subsequently through email and could be solved by later study-based group discussions.

Furthermore, instructors noted the additional challenges of discussing AI and other rapidly evolving technologies. The pandemic and emergence of GenAI have served as a catalyst for the widespread adoption and integration of AI technologies. This highlights the importance of keeping the teaching content up-to-date, as examples and applications may become outdated in a short period of time.

6. Future plan and recommendations

The instructors observed that various governments have begun formulating a series of legislation to regulate the utilisation of AI and other technologies for striking a balance between degree of convenience and relevant security with privacy concerns. Incorporating this aspect of policy and governance frameworks would be a valuable addition to the upcoming lectures. Furthermore, the instructors have explored the technological, organisational, and city administration dimensions of AI. As these technologies become increasingly ubiquitous, the instructors recommend incorporating content on international collaboration and introduction of relevant policies in the future iterations of the module.

Regarding the lecture format, the instructors strongly recommend the use of a flipped classroom approach instead of pre-recorded online video lectures. This would allow students to know better what AI is. This approach would facilitate better interaction between the instructors and students, enabling hand-on and interactive activities during the lessons. This format may be particularly beneficial for guest lectures, which aim to pique the students' interest rather than a standard course structure.

(2496 words excluding abstract)

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