

Evaluating the Effectiveness of a Professional Development Course on Artificial Intelligence Literacy for Administrative Staff in Higher Education

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Abstract: This study reported the effectiveness of a professional development course on artificial intelligence (AI) literacy for administrative staff in higher education. The course aims to support administrative staff to improve their efficiency and the quality of their work in the workplace. A number of 38 administrative staff from a university in Hong Kong took part in this three-month course which was divided into 10 face-to-face lessons (30 hours). Basic concepts, practical use of AI tools, and AI ethics were taught, and group project-based learning was implemented. Many groups built chatbots using their expert knowledge in their workplace deploying concepts and skills acquired in the course. Data collection included pre- and post-concept tests, evaluation surveys, and self-reported written reflections. The result of a paired t-test on a concept test of AI literacy confirmed an improvement in the participants' understanding of AI literacy after joining the course. The result of a project-based survey and an evaluation of the course indicated a positive perception of the design and the effectiveness of the course after they finished taking the course. An analysis of the reflective writing of the participants revealed that they benefited from the course, and they confirmed that the course could help them pursue further how to improve the efficiency and quality of their work in their workplace by deploying the concepts and skills acquired from the course.

Keywords: administrative staff; artificial intelligence literacy; evaluation; higher education; professional development

1. Introduction

Artificial intelligence (AI) will change the future workplace model and job market structure (Ng et al., 2021). According to the estimate by Manyika et al. (2017), by 2030, 15% of global working time will be automated, and 47% of US jobs will be at high risk of automation. And it is worth noting that of all jobs, administrative jobs will be the most vulnerable to being eliminated by AI. It is believed that people with knowledge of AI will replace those without it. Anyone who uses AI to achieve task completion more efficiently will be more competitive in the work environment (Zirar et al., 2023). In order to enhance people's AI capabilities, AI literacy studies for juveniles or university students have emerged in recent years, such as the works by Su and Yang (2023), Ng et al. (2022) and Hornberger et al. (2023), and former projects done by our team (Kong et al., 2023a; Kong et al., 2023b). Existing literature indicates that while AI profoundly impacts workers, there are currently few studies focused on helping adults to improve their skills (Laupichler et al., 2022), especially for admins. Our project aims to contribute to this underexplored area. In this study, three research questions were addressed: (1) To what extent did the AI literacy course help administrative staff improve their

conceptual understanding of AI literacy? (2) How were the administrative staff motivated by the course? (3) What was the administrative staffs' perception on the course?

2. Literature Review

The potential of generative AI to transform administrative tasks and improve overall efficacy has drawn significant attention. Generative AI encompasses a range of techniques, including natural language processing (NLP) to represent and analyze human languages (Cambria & White, 2014), computer vision (CV) to acquire, process, and analyze images (Nam, 2020), and generative adversarial networks (GANs) to guide the subsequent cycle of pitting two deep neural networks against one another to generate outputs (Kurni et al., 2023). Large language models (LLMs) like ChatGPT have demonstrated remarkable capabilities in text generation, summarization, and content creation (Hubert et al., 2024). These models can assist administrative professionals by automating routine tasks (Miao et al., 2021). By offloading these repetitive duties, administrative staff can allocate more time to strategic thinking and problem-solving.

For the widely spread opinion that AI would replace human work and cause worldwide unemployment in the future, publications were found to support that generative AI should complement human expertise rather than replace it. For example, the arguments of AI technologies replacing human beings in the future organization of work were opposed in Acarturk et al. (2022). In the recent development, although OpenAI (2023) advertised that the new GPT-4 model was "more creative" particularly "on creative and technical writing tasks" compared to previous versions, Rahaman et al. (2023) argued that there were semantic limitations such as nonsensical answers or possible generations of incorrect information. Although humans continue to introduce various AI ethics guides, new problems continue to emerge (Morley et al., 2023). In this regard, organizations ought to also address ethical concerns related to AI adoption to ensure that staff understand the limitations of AI and always be cautious when using it.

Organizations must foster a culture of collaboration, where staff and AI systems work synergistically (Zirar et al., 2023). It is strongly believed that generative AI holds immense promise for administrative efficiency and quality improvement. The professional development training that strategically integrates AI into their workflows will empower their staff, and enhance productivity.

3. Methodology

3.1 Procedure

This 3-month course introduced AI basic knowledge and tools to administrative staff through a series of courses. The design of the experiment was set for 10 face-to-face sessions. The time duration of each session is 3 hours. Considering that the course is aimed at admins who barely have any knowledge in coding, the content was specially designed for them to achieve better comprehension and get to know the most practical things, focused on application, resources, and AI ethics. In the beginning, administrative staff participants were asked to take a conceptual test which aims at depicting their experience level at the beginning of the course. The ten lessons included five offline teaching lessons, two self-study days with designated materials, two project workdays and one presentation. In each teaching lesson, we introduced one to two techniques, about their use, advantages, and caveats to consider. Hands-on demonstration was then presented, followed by hands-on activities by students. Four to five tutors were arranged for each lesson and supervised by the leading professor, taking turns to lecture and instruct. At the end of the course, students were required to do a group project in which they built products together using the platforms learnt in lessons based on workplace needs and introduced their products by presentation.

3.2 Participants

All the participants were recruited from administrative departments in a government-financed university in Hong Kong. They were required to submit an online application with a self-declaration form and a consent form. No previous programming experience was demanded (Kong et al., 2023c). A total of 38 administrative staffs participated, including 15 males (39%) and 23 females (61%). In terms of age, there are six people aged 20-30 (16%), 23 people aged 31-40 (61%), eight people aged 41-50 (21%), and one person aged 50-60 (3%). As for education levels, there is one person with a diploma or certificate (3%), 18 with a bachelor's degree (47%), 18 with a master's degree (47%), and one with a doctoral degree (3%).

3.3 Data Collection and Analysis

Data collection included surveys, concepts tests, and self-reported reflections. To address the first research question, paired t-test of the concepts test was adopted. To address the second question, descriptive analysis was used. To address the third question, qualitative analyses were conducted on the feedback to know about their detailed perceptions and suggestions. The pre-and post-concepts test aimed at examining students' concept understanding of NLP and generative AI. The project-based learning evaluation survey was adapted from the ARCS model in Keller's motivation theory (2009) with 12 five-point Likert scale items in four dimensions: attention, relevance, confidence, and satisfaction. This aimed to measure their perception on the learning process.

We also collected and analyzed feedback words by an evaluation survey and a self-reported reflection. The evaluation survey included six questions of five-point Likert scale and three open-ended questions. The first six questions aimed to know how satisfied they are, and the last three required them to write down their opinions on the courses.

The reflection tasks asked students to write down their reflections on the use of generative AI tools in the workplace using between 50 and 100 words. We could see their thoughts on their career development, how they solve problems, and the inspiration they give us in the process of promoting AI literacy work.

4. Results

4.1 The Effect of AI Literacy Course on Conceptual Understanding of AI Literacy

Table 1 shows the statistical results of pre- and post-concepts tests. This test showed a statistically significant result. Pre-test has a mean mark of 4.26 and a standard deviation of 1.82, and post-test has a mean mark of 5.08 and a standard deviation of 1.62. Two-sided p in correlations is 0.105, indicating no significant correlation. And two-sided p in paired samples test is 0.021, which means the course had positive effect on students' conceptual understanding.

Table 1. Statistical Result of Concepts Tests

	Pre-test		Post-test		t-value
	Mean	SD	Mean	SD	
Score	4.26	1.82	5.08	1.62	0.021*

* $p < 0.05$

4.2 Motivation of the AI Literacy Course

The Cronbach's alpha reliability coefficient for the motivation test is 0.976, indicating a high level of reliability. The statistics of answers are listed in table 2. The survey results indicated that students' learning motivation of using generative AI in the workplace was high regarding

attention ($M = 4.21$, $SD = 0.66$), relevance ($M = 4.25$, $SD = 0.65$), confidence ($M = 4.13$, $SD = 0.78$), and satisfaction ($M = 4.28$, $SD = 0.70$).

Table 2. Descriptive Statistics of Students' *Motivation of the AI Literacy Course Using ARCS*

Items	N	Min	Max	Mean	SD
Attention	38	3.00	5.00	4.21	0.66
Relevance	38	3.00	5.00	4.25	0.65
Confidence	38	2.00	5.00	4.13	0.78
Satisfaction	38	2.00	5.00	4.28	0.70

4.3 Course Evaluation and Reflection

Table 3 shows the statistics result of questions 1-6 in the evaluation. The result shows that most of them believe that the course is well-structured and helpful, which enables them to have a deeper understanding of AI. Overall, the course is worth attending and they would recommend it to other colleagues. The Cronbach's alpha reliability coefficient for this test is 0.923, indicating a high level of reliability.

Table 3. *Questions 1-6 in Course Evaluation*

Item	Mean	SD
1 I understand more about Artificial Intelligence (AI) after attending the course.	4.45	0.55
2 The hands-on activities in workshop help me better understand AI.	4.42	0.55
3 I like the blended learning mode of this course (self-learn and attending workshop)	4.16	0.86
4 Overall, the course is worth attending.	4.45	0.69
5 Overall, the course is well organized.	4.21	0.62
6 I will recommend this course to my colleagues.	4.26	0.64

Regarding the most useful part of the course, 10 people referred to the theoretical aspect. They believed that the series of courses helped them enhance their understanding of AI, including basic concepts, benefits of AI tools, leading-edge information in this field, limitations and ethics, and indications of a clearer learning direction. One student mentioned that these courses made her realize that there are so many open resources in the daily work environment that can be used to promote work.

In contrast, more staff were impressed by the hands-on practical content in the applied courses. A number of 23 people expressed their approval of the application-focused teaching mode, and Chatbot was mentioned 9 times about the advantages of having it as a helper in their work. Material generation and some AI platforms were also frequently referred to, such as converting voice/video to text or using text to generate images, automatically generating PowerPoint slides using Office 365, using Flowise and POE, etc.

In the reflection writings, a number of 33 students (87%) mentioned that they gained proficient knowledge in the AI field, about the concepts, principles, tools, and ethics. These let them become less afraid of AI and have much more confidence in learning in the future. They learned to identify the existence of AI in various aspects and be prepared to embrace the rapid development of AI in daily life and workplace. They have started to apply the knowledge they learned in actual work, such as working with colleagues to build a chatbot for their department. A number of 22 people (58%) expressed the impressiveness of building a chatbot as a helper and using material generation tools.

Four of the participants made suggestions on the courses in the reflection, mainly about demanding a less stressful schedule, and more support in practice and materials. A number of 16 students (42%) mentioned that they had already recommended those tools to their colleagues and received highly positive reviews.

Interestingly, some of them also mentioned that the experience in the course let them realize that AI cannot replace humans at all and would remain an auxiliary tool. This made them become more confident in their career development.

5. Conclusion

This study evaluated the effectiveness of a 3-month AI literacy course for administrative staff in the university. The results of the pair-t-test confirm members' successful achievement in learning contents, and the results of the evaluation and reflection questionnaires confirm students' positive motivation and perception of the design and effectiveness of the AI literacy courses. This study gathered feedback on aspects that were either well-executed or in need of improvement. Administrative staff were particularly impressed by the segments on building chatbots and enhancing office skills, such as generating materials and using prompts effectively. They also shared their feelings and suggestions, primarily regarding the need for a better schedule and enhanced support. Future research will refine the course.

Acknowledgements

The authors would like to acknowledge the funding support received for this artificial intelligence literacy project from the Li Ka Shing Foundation and the Research Grants Council, University Grants Committee of the Hong Kong Special Administrative Region, China (Project No. EdUHK CB326, CB357).

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