Holistic competencies and AI in education: A synergistic pathway

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This editorial explores the integration of artificial intelligence (AI) and holistic competencies in education, highlighting the necessity of fostering both technical skills and human values. As AI technologies revolutionise educational methodologies, there arises an urgent need to balance technological advancements with the cultivation of holistic competencies – skills that prepare individuals not only for professional success but also for societal contributions. I reflect on my cross-disciplinary journey from engineering to education and underscore the importance of developing competencies that enhance personal and professional well-being. The paper discusses various dimensions of AI integration in education, including the ethical challenges posed by AI-giarism, AI guilt and AI literacy, and introduces the dynamic AI literacy model, which adapts AI education to specific professional needs. I also extend an invitation to all to join the global scale – Generative AI Assessment Project, aiming to collaboratively refine AI integration strategies in assessments. The editorial advocates for AI to complement, not replace, human-centric education, urging a synergistic approach to develop both AI skills and holistic competencies. By fostering AI literacy alongside traditional values, educators can ensure that students are equipped to thrive in a rapidly evolving technological landscape.

Keywords: holistic competency; AI literacy; AI guilt; AI-giarism; AI assessment; Generative AI Assessment Project (GAP)

Introduction

It is a great honour to contribute this editorial to the *Australasian Journal of Educational Technology*, a journal that explores the critical relationship between education and technology in shaping the future of learning. I want to extend my sincere thanks to Professor Jason Lodge and the editorial team for this opportunity. Although I have had the privilege of delivering countless keynote speeches, writing commentary pieces for media and speaking on radio and TV about my work, this particular editorial provides a distinct platform for me to share my academic journey and research insights, offering an additional experience that compels me to pause and reflect.

There are three key messages I wish to share. First, I aim to share personal reflections on my academic and professional pathway, and how my life experiences have shaped my beliefs about education. Second, I will highlight some of my scholarly work focused on artificial intelligence (AI), which includes AI-giarism, AI guilt, AI literacy, and AI and assessment. Finally, I hope to offer a meaningful message to my fellow researchers – one that encourages us to look beyond technology and focus on the human element of holistic competencies, which remain at the heart of education.

How did everything begin for me? My cross-disciplinary journey: Engineering and education

I am a product of cross-disciplinary studies, with my academic background a blend of two seemingly distinct disciplines – engineering and education. With a bachelor's degree in mechanical engineering and a PhD focusing on digital signal processing and machine learning, my early career was rooted firmly in engineering. However, after several years in industry and teaching engineering at the university level, I discovered a profound passion for engineering education and educational research. This led me to pursue a postgraduate diploma and, while expecting my first child, a master's degree in higher education.

These academic pursuits were initially driven by a genuine interest in understanding student motivation and retention among my own engineering classes. At the time, I didn't anticipate that this combination of disciplines and further studies would become the foundation of my academic career. But as I moved quickly through the ranks (i.e., programme coordinator, then to assistant head of department at my university), my educational qualifications became instrumental in convincing others of the pedagogical value I could bring – particularly in a male-dominated engineering department. As the sole female professor there, and only in my mid-twenties, the expertise I developed through these educational qualifications gave me the credibility to advocate for academic leadership while promoting innovative teaching approaches and student-centred learning.

The quest for holistic competencies

In recent years, many unexpected global events have changed the lives of us all. We have experienced things that we have never experienced before, from quarantines, lockdowns, job loss and sickness, to behavioural changes including social distancing and shifts in our consumer, and even personal behaviours. These events have completely disrupted our daily living in an unavoidable and permanent manner. Many of us have new values, attitudes and approaches towards life. Of course, all of these changes required us to adapt, be confident, be considerate, be able to think critically, be empathic and be resilient. But have we adequately prepared the younger generation to face unexpected situations that they are likely to encounter in the future? Do they have the competencies to handle these unforeseen circumstances?

For over 2 decades, my research has revolved around what I call "holistic competencies". Many terms have been used to refer to these attributes: soft skills, generic skills, transferable skills, 21st-century skills, employability skills and, more recently, with the emergence of generative AI (GenAI) – human values. I prefer the term holistic competencies because it captures the idea that individuals need to cultivate competencies for themselves, their relationships, their careers and society as a whole. These competencies are interconnected and relevant across various life stages, disciplines and contexts (Holistic Competency & Virtue Education, 2021).

Holistic competencies include not only career-oriented skills but also personal and interpersonal qualities that foster well-being and ethical responsibility. The need for such competencies has become increasingly evident in education. Over the years, the focus of education has shifted from purely "prepare for a job" skills to a more comprehensive approach that incorporates the development of softer skills, shaping students and graduates into responsible global citizens who are adaptable, critical thinkers and lifelong learners (Oliver & Jorre de St Jorre, 2018).

Flashback to 25 years ago in my engineering teaching when I first noticed a gap in fundamental holistic competencies among my students. Many lacked essential skills that I had developed informally, such as problem-solving, teamwork and ethical decision-making skills that I attribute to early influences, including shadowing my parents. For instance, at a career speed dating lunch I organised, some students lacked the basic professional sense to initiate meaningful conversations with potential employers. One student, without irony, directly asked an employer about his prospective salary. I also encountered students who were friends but struggled to work effectively as a team. These experiences drove me to explore how engineering education could be redesigned to address these gaps, ultimately leading me to develop new teaching methods and curricula that integrate holistic competency development alongside technical skills.

I found that students needed to improve a range of their non-academic skills including teamwork, motivation, values, attitudes, integrity, creativity and common sense – a broad skillset that I consider "life jewels".

Some psychologists argue that competencies cannot be taught, and I agree to an extent. They cannot be learned via textbooks or lectures, but rather must be developed through experience. Holistic competencies are often best developed through experiential learning activities (Chan, 2023a, Ch3). For example, leadership skills cannot be learned through simply attending a lecture or reading a book; the

learner must be given opportunities to observe, experience and reflect on what leadership is. To explain students' approach to developing holistic competencies, a holistic competency development framework (HCDF) (see Figure 1) was established (Chan, 2023a, Chapter 3; Chan & Yeung, 2020). One particularly important element in the HCDF is students' rationales or motives for developing holistic competencies. Students may engage with an activity if its outcomes align closely with their personal rationales, allowing them to develop their holistic competencies. If these aspects are not aligned, students may avoid the activity altogether. This is quite different compared to academic knowledge. In my research, five categories of rationales were identified (Chan & Yeung, 2020), namely meaning-driven, career-driven, enjoyment-driven, course-driven and family-driven. Course designers are encouraged to incorporate these rationales into their experiential learning courses, enhancing students' motivation to actively join and engage in the activities.

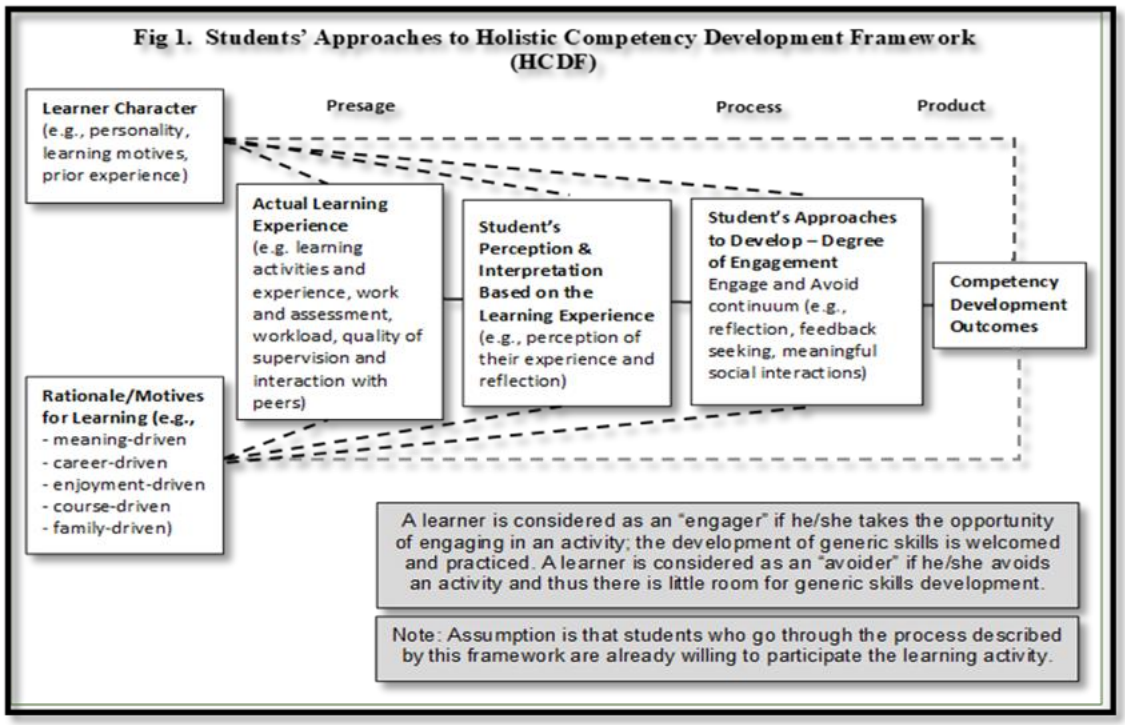

Figure 1. The HCDF (Chan & Yeung, 2020, pp. 28–30)

The HCDF modifies Bigg's (1999) presage, process and product model to better suit holistic competencies development, recognising that traditional academic "deep learners" may not necessarily engage deeply in developing holistic competencies as well. This potential disparity led to the introduction of the newly coined phrase approach to develop instead of approach to learn, as shown in Figure 2. The terms deep and surface are replaced with engage and avoid to describe learners' involvement in competency development, where engagers actively participate in activities to develop their competencies, and avoiders shy away, limiting their competency growth. When teachers or coordinators design an experiential learning course or activity, the HCDF guides them through a student-centred learning design process. One of the major challenges of developing holistic competencies is that they are often not explicitly written as learning outcomes in courses and do not form part of the assessment. To thus motivate students (and teachers) to develop such competencies, teachers must pay additional attention to the design of their activities. Such challenges are documented in my review paper (Chan et al., 2017).

Academic Knowledge	Vs	Holistic competency
Learn	Vs	Develop
Approach to Learn 'Deep' and 'Surface'		Approach to Develop 'Engage' and 'Avoid'

Figure 2. Approach to developing holistic competencies

Many employers have noted that, today, nearly everyone has at least an undergraduate or master's degree. What employers seek is individuality and the ability to integrate into the organisation (Chan et al., 2024). Indeed, research shows that excellent academic qualifications alone are "no longer enough" (Carey, 2012). A number of international corporations, including Google, Ernst and Young, Bank of America, Apple and IBM no longer view academic qualifications as the sole criterion when hiring staff (Connley, 2018).

In today's society, it is evident that our education system is often assessment-driven, placing emphasis solely on assessable content. Despite widespread acknowledgement of the importance of holistic competencies by students, educators, employers and governments, effective assessment of these competencies remains a challenge. Competencies are typically embedded within disciplinary learning and indirectly assessed, leaving teachers to struggle in aligning holistic competencies with curriculum outcomes, assessment, and feedback. This misalignment results in gaps in accurate measurements and recognition of student's' competency acquisition. Furthermore, assessment practices vary widely across universities, with no clear guidelines or consistent approaches, causing competency assessment literacy issues among faculty and inaccurate student evaluations.

A systematic review (Chan & Chen, 2021) highlighted the need for a structured process to document, report, and certify students' holistic competencies in higher education. This process should also establish a broader, overall recognition of these competencies to take into consideration. In addition, our studies have found that both students and teachers agree that it is important to assess students' competencies, or at least provide them with a form of recognition (Chan & Luo, 2020a; Chan & Yeung, 2021). Therefore, holistic competencies must be evaluated to be valued and prioritised.

Believing that students need meaningful ways to develop and valid ways to showcase their skillsets, I established the International Holistic Competency Foundation together with a global network of partners. This foundation acts as an accreditation system for courses that aim to enhance students' holistic competencies. Supported by universities, industries, communities and an extensive network of reviewers, the accreditation process offers detailed, transparent guidelines to help educators integrate and assess holistic competencies in their courses. To date, over 30 courses worldwide have been accredited, and their coordinators are recognised as Fellows of the Foundation. This is just the beginning – I believe it will continue to gain momentum.

Several instruments were developed to evaluate students' holistic competencies, and some of these are now even used by industries. Although holistic competencies are not solely for students' careers, the HCDF has concurrently revealed that career-driven motivations significantly influence students' engagement in developing these competencies. In response, I, together with an industry partner, further created an AI-driven career support platform, enabling students to identify the holistic competencies they need for their potential or intended future paths. This student-centred, evidence-based platform is set to launch across universities to increase students' awareness of holistic competencies, as well as provide guidance and course selection support to help users improve their various competencies in preparation for their transition into the workforce.

Beyond my research in this area, I have also developed numerous holistic competencies-related student development programmes and professional development activities for staff, including peer mentoring initiatives (Chan & Luo, 2020b; Chan & Luo, 2022), train-the-trainer sessions, and reflection literacy workshops (Chan & Lee, 2021; Chan et al., 2021). Through these programmes, I have deepened my understanding of holistic competencies themselves and their broader significance. Recently, I was awarded the Hong Kong National Teaching Award for my work in this area.

The quest for holistic competencies continues: From critical thinking to AI literacy

Through my research, I have come to believe that there is no fixed set of holistic competencies. As the world evolves, new skills become essential, becoming interconnected into the web of other necessary competencies that contribute to a person's holistic development. These competencies encompass lifelong learning attitudes, professional ethics and values that ultimately support the well-being of society. With the rise of GenAI since such tools became publicly accessible in November 2022 (OpenAI, 2022), AI literacy has also become an important holistic competency.

AI has taken the world by storm, and its rapid integration into education has both excited and concerned educators (see Table 1 on the weaknesses and potential threats using GenAI in education; more information can be found in Chan & Colloton, 2024, Chapter 3). As the founding director of my university's teaching and learning centre, a professor in education and an engineer by training in machine learning, I felt it was almost a calling when GenAI arrived. Understanding the challenges and opportunities this technology brings became imperative. I redirected all my research and teaching efforts towards AI, navigating the tension between fascination and apprehension, driven by the need to fully understand what we are facing. My research in this space has been diverse, ranging from AI-giarism evaluation to the development of AI literacy frameworks. I also developed AI literacy online courses for the students and teachers at my university, local secondary schools in Hong Kong and for UNESCO.

Table 1
Weaknesses and potential threats using GenAI in education (Chan & Colloton, 2024, Chapter 3; Chan & Hu, 2023)

Student/teacher category	Educational institutional category	Society category
Over-reliance	Resource intensive	Bias
Accuracy concerns	Technical challenges	Data privacy concerns
Lack of judgement	Security risks	Economic implications
Loss of personal touch	Reputation risks	Inequitable areas
Neglection of essential skills	Adaptability	Over-commercialisation
Homogenisation of thought	Dependency on connectivity	
Interactivity limits		
Ai overload		
Academic misconduct considerations		

AI-giarism

One of the most compelling areas of my AI research has been the concept of *AI-giarism* – a term I use to describe a new, AI-specific form of academic dishonesty (Chan, 2024a). AI-giarism refers to instances where students use AI-generated content in their work without proper acknowledgment, effectively "borrowing" ideas or language as if they were their own. Unlike traditional plagiarism, which involves copying another person's ideas or text, AI-giarism raises unique ethical and pedagogical challenges related to originality and authorship. Given the increasing prevalence of AI in academic settings, understanding and addressing AI-giarism is essential to upholding academic integrity in a rapidly evolving educational landscape.

Through a comprehensive study involving over 390 students across various disciplines, I found diverse perspectives on AI use in assignments, highlighting the complex nature of AI-giarism. While most students viewed direct copying of AI-generated responses to be dishonest, there was less consensus on subtler forms of AI use. For example, using AI to rephrase content or generate initial ideas was perceived as less of a violation. These findings highlight that while students recognise blatant misconduct, they struggle with understanding when and how AI support crosses into academic dishonesty.

The ambiguity surrounding AI-giarism points to a critical need for new standards and guidelines in academia. Traditional concepts of plagiarism are defined by well-established norms around citations and originality, but these conventions do not fully address the role of AI-generated content. AI's presence in academic work challenges long-standing definitions of authorship as the boundary between human and machine contributions becomes increasingly blurred. Without clear guidance, students may unintentionally engage in misconduct or miss out on the potential learning benefits that AI offers.

To address this, I developed an AI-giarism scale as part of my study, which categorises AI use along a continuum of ethical considerations. This scale serves as a practical tool for educators and institutions, helping them navigate the complexities of AI use in coursework. By establishing a framework for discussing and evaluating AI-based misconduct, this scale helps to lay the groundwork for more detailed educational policies on AI ethics. Such a framework not only clarifies expectations for students but also enables educators to integrate AI in ways that enhance learning without compromising integrity. More on how to develop AI policy can be found in my paper "A Comprehensive AI Policy Education Framework for University Teaching and Learning" (Chan, 2023b) and in Chapter 5 in my book (Chan & Colloton, 2024).

Moreover, the scale and related findings highlight the importance of AI literacy as a holistic competency itself. Just as we educate students on proper citation and sourcing practices, we must also teach them how to ethically and effectively incorporate AI into their academic work. This emphasis on AI literacy helps students understand not only when and how to use AI responsibly but also why it matters in the context of personal integrity and professional ethics.

The rapid rise of AI in academia brings forth pressing questions that challenge conventional views on academic honesty: Does using AI in one's work carry the same ethical obligations as human-generated contributions? How does the concept of plagiarism shift when ideas or language are sourced from algorithms rather than other authors? Should universities redefine what constitutes original work in an AI-enhanced world? And, most importantly, how do we guide students in appreciating the value of authentic, human-driven thought and creativity within a learning environment increasingly shaped by technology?

AI guilt

Another significant aspect of my research explores the concept of AI guilt (Chan, 2024b), a form of moral discomfort experienced by students using AI tools for tasks traditionally performed by humans. This emerging phenomenon captures the complex emotional response to AI's role in academic contexts, where students may feel that they are compromising personal integrity, authenticity or effort by relying on technology. AI guilt is deeply tied to the shifting norms of learning and intellectual effort, presenting both psychological and ethical challenges for students and educators.

In a study examining AI guilt, I identified three key dimensions that contribute to this discomfort: perceived laziness or inauthenticity, fear of judgement, and concerns about identity and self-efficacy (Chan, 2024b). The first dimension, perceived laziness, reflects students' beliefs that using AI may serve as a shortcut, potentially undermining their sense of achievement. Many students have expressed concerns about how using AI feels like cheatingor detracting from genuine effort. This sentiment is similar to the impostor syndrome (Clance & Imes, 1978, where individuals feel undeserving of their accomplishments; students may worry that their academic success is due more to AI assistance than their own abilities. For instance, one student remarked that using AI made their work feel less authentic, creating a psychological tension between their actions and the traditional values of learning through individual effort.

Fear of judgement is another significant factor, where students are apprehensive about how their AI use will be perceived by peers, educators and society at large. This fear can lead to social discomfort and hesitancy in using AI openly, as students anticipate that others may view AI assistance as intellectual laziness or a lack of creativity. In academic environments that emphasise originality and self-reliance, students can feel pressured to hide or minimise their AI use, reducing transparency and fostering further

guilt. This fear highlights a potential stigma around AI in education, where societal expectations of learning conflict with technological capabilities that are available today.

The third dimension, identity and self-efficacy concerns, addresses deeper questions about students' own abilities and the implications of relying on AI tools. Many students worry that using AI will erode their personal skills or devalue their intellectual contributions. For some, AI's effectiveness can even lead to existential concerns (Davis, 1989), where they question the relevance of human effort in a technology-driven world. Although AI can perform complex tasks with ease, students may experience a diminished sense of self-efficacy, doubting their competence in areas where AI excels. Cognitive dissonance theory, proposed by Festinger (1957), offers a useful framework here, as students' use of AI may conflict with their beliefs about authentic learning, generating discomfort and internal conflict.

This research on AI guilt underscores the importance of addressing this phenomenon in academic settings. Educators have a pivotal role in fostering environments that encourage responsible AI use and ethical literacy, reducing the internalised guilt that arises from misunderstandings or social pressures. To navigate these challenges, I propose creating ethical guidelines that promote transparency in AI usage, encourage AI as a supplementary tool rather than a substitute for work done by oneself and support students in maintaining a balance between AI's advantages and their own learning efforts. Such guidelines can help students integrate AI into their educational experiences without compromising their sense of integrity or achievement, providing clarity on how to use AI responsibly and reducing any associated stigma.

Although AI guilt presents immediate challenges, my research suggests it may be a short-term concern as society adjusts and normalises the use of AI in learning and professional settings. However, addressing this issue in the present is essential to ensure that students feel supported and ethically grounded as they navigate new learning technologies.

As we consider the future of AI in education, several questions remain: How can educators help students balance the benefits of AI without compromising personal integrity? What strategies can reduce AI guilt to encourage productive and ethical AI use? And, as AI continues to evolve, will feelings of guilt fade as AI becomes an accepted part of the academic experience, or will new ethical concerns arise? These questions prompt us to reimagine educational ethics in an AI-integrated world, guiding students towards a balanced and reflective approach to AI-enhanced learning.

AI literacy

Building on the concepts of AI-giarism and AI guilt, it is evident that responsible and informed use of AI necessitates a foundational level of AI literacy. In my research, I define AI literacy for the typical individual as the ability to comprehend, assess, interact with and make informed decisions regarding AI technologies in daily life (Chan & Colloton, 2024, Chapter 2). It involves understanding the basic principles of AI, recognising its applications, being aware of its ethical, social and privacy implications, as well as understanding the impacts AI has on humans and our values and emotions, all while responsibly engaging with AI systems. AI literacy is crucial not only in terms of technical knowledge but also for fostering ethical awareness, critical thinking and societal responsibility. This foundational AI literacy framework has five components:

(1) Understanding AI concepts: This foundational component involves grasping the essential principles of AI, including core concepts like machine learning, algorithms and data processing. A solid understanding of these fundamentals enables individuals to engage with AI meaningfully, discerning its capabilities and limitations.
(2) Awareness of AI applications: This component emphasises recognising AI's varied applications across sectors, such as education, healthcare, finance, and the arts. This awareness equips individuals to select and apply AI tools with purpose, understanding how these applications align with their professional or personal needs.
(3) AI affectiveness for human emotions: AI is built to mimic human behavior and emotions. It increasingly interacts with and influences human emotions, with the technology able to

interpret and respond to our affective cues. Understanding how AI systems manage these interactions promotes emotionally intelligent engagement and fosters adaptability in how individuals use AI in social, educational or professional contexts.

(4) AI safety and security: As AI systems engage with sensitive data, understanding privacy concerns and security risks is crucial. This component encourages individuals to navigate AI interactions with a heightened awareness of safety protocols, data handling and ethical data management.

(5) Responsible AI usage: This final component focuses on ethics, encouraging individuals to recognise and address AI's potential biases, limitations and ethical implications. A responsible AI user actively promotes fairness, transparency and accountability, ensuring AI is used as a tool to enhance, rather than undermine, human effort and decision-making.

To address the complexity of AI literacy in our rapidly evolving landscape, I further developed the dynamic AI literacy model (DAILM; see Figure 3), which provides a layered, adaptable approach to AI education. This model extends the foundational AI literacy framework by incorporating context-specific learning, enabling individuals to develop AI literacy competencies that are both universal and applicable to more specific domains, such as healthcare, finance and education. The DAILM acknowledges that although basic AI literacy is essential for all, the depth of literacy in AI literacy's various components needed will vary by field and professional context. For instance, although all students benefit from a foundational understanding of AI, healthcare professionals may need a deeper understanding in the component of AI safety and ethics, given the sensitive nature of patient data. Similarly, educators require a more detailed understanding of AI's applications in learning environments, including adaptive learning technologies and AI-driven assessments. The DAILM thus ensures that AI literacy remains relevant and actionable to different fields and professions, preparing individuals to responsibly and effectively engage with AI in ways that directly support their goals and responsibilities. By implementing the DAILM, educators and institutions can better foster an AI-aware society – one that not only uses AI effectively but also engages critically with its ethical and social implications.

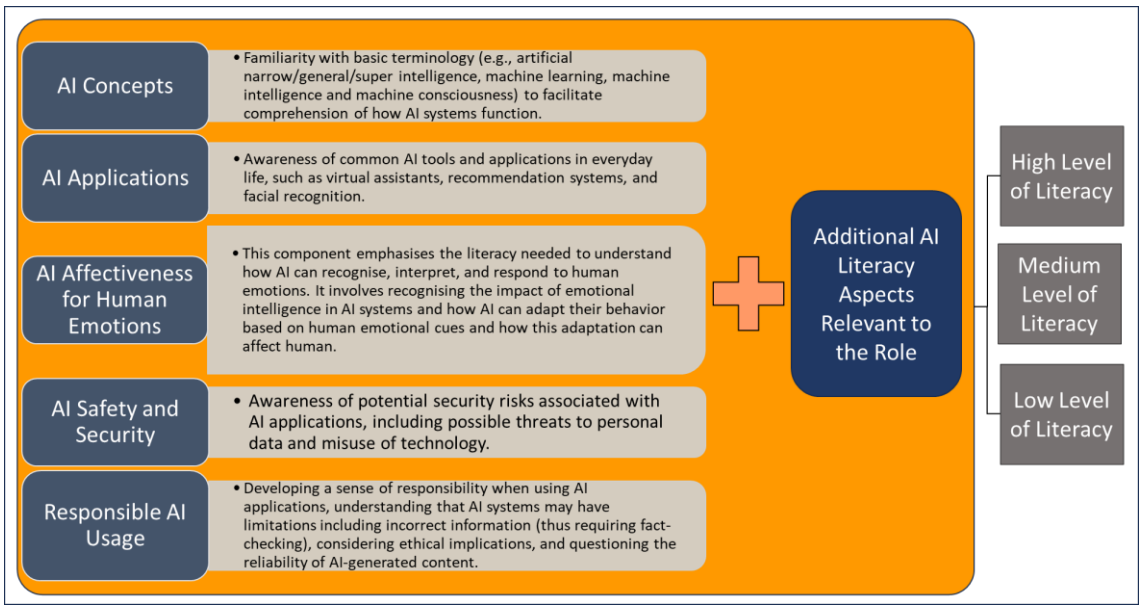

Figure 3. The DAILM for specific roles (Chan & Colloton, 2024, Chapter 2, p. 34)

As we integrate AI literacy into education and professional training, deeper questions arise: Will those with advanced AI literacy ultimately hold more influence or power in society, reshaping leadership and decision-making dynamics? How might AI literacy widen or bridge social and economic divides, as some excel in AI engagement while others lag behind? And, as AI tools become essential to daily life, will a person's ethical approach to AI use become a defining aspect of personal integrity and trustworthiness? These questions push us to consider not only the practical but also the societal implications of AI literacy,

urging us to build frameworks that not only educate but also elevate our collective understanding and ethical engagement with AI.

AI-integrated assessment

The final facet of my AI research that I would like to share is my ongoing work on integrating AI into assessment – a complex challenge that requires balancing innovation with educational integrity. My current focus is on developing a structured approach for AI-integrated assessments that upholds the authenticity and educational value of student work. To address this, I developed the AI assessment integration framework (Chan & Colloton, 2024, Chapter 4), which provides a foundation for thoughtfully incorporating AI across nine distinct assessment types, ranging from performance-based to ethical and societal impact assessments. Each assessment type within the framework is designed to promote diverse learning outcomes within an AI-enhanced environment.

For example, in performance-based assessments, AI may offer guidance and insights, but the essential task still requires students to demonstrate critical thinking, creativity and practical application of skills. Similarly, assessments centred around human-centric competencies emphasise uniquely human qualities – such as empathy, teamwork and ethical judgement – that AI cannot replicate. Through these nine assessment approaches, the framework promotes a balanced use of AI, allowing the technology to support learning while setting clear boundaries to ensure that essential competencies are still developed and demonstrated by students.

As I delve deeper into the intersection of AI and assessment, more fundamental questions arise: What defines "authentic" student work in the age of AI? At what point does AI use in assessment shift from a learning support to a crutch, potentially undermining student growth? If students begin to rely on AI in ways that bypass critical thinking and diminish personal effort, we risk cultivating a dependency that could erode core human competencies. Many researchers and educators suggest redesigning assessments or using authentic assessments – such as presentations, interviews or invigilated exams – so that students' work can be verified as genuinely their own. However, this so-called redesign often avoids engaging with GenAI, rather than understanding its complexities and co-partnering with it.

Balancing the integration of AI in assessment is therefore crucial, and I am actively exploring strategies for maintaining this equilibrium. To support this endeavour, I invite educational institutions to research on and collaborate in creating policies that foster ethical and effective AI integration. I extend an invitation to universities worldwide to join me in this shared pursuit on a global scale Generative AI Assessment Project – the GAP. There is currently a gap in our understanding of how AI should be integrated into the assessment. Together, we can build robust, research-driven frameworks and guidelines that ensure AI in assessment promotes authentic learning while preparing students for a future enriched by technology. If you are interested, please contact me or check my Linkedin post.

As we shape the future of AI-integrated assessment, several questions for consideration emerge: Can we develop a universally accepted framework that balances AI's advantages with the need for genuine student achievement? How do we safeguard the integrity of learning experiences while leveraging AI's powerful capabilities? And ultimately, will AI redefine what we value in student work, or will it amplify our commitment to human-centred learning? These questions will guide us in creating assessments that respect both technological advancement and the enduring significance of human learning.

The synergy between AI and holistic competencies

Although AI has the potential to enhance education through personalised learning, administrative automation and the fostering of creativity, we must not lose sight of the fact that education is fundamentally about people. One of my mentors on our holistic competencies projects left me a thank-you card when she moved on, and a particular excerpt from it has stayed with me and continues to energise me. It read, "Apart from your outstanding leadership, communication, and overall professionalism, the most important thing I have learned from you is how to be an amazing human being.

From guiding us on career paths to counselling students through personal challenges, you have shown me the true meaning of humanity." Her words remind me that education is not only about academic and technical development but also about shaping ethically responsible individuals who are holistically prepared to contribute to society. Be humane!

This is where the integration of AI and holistic competencies becomes crucial. In my view, AI should not replace the human elements of education but rather complement them (Chan & Tsi, 2024). For example, AI can assist in providing personalising learning experiences, allowing students to focus on areas where they need improvement, while also encouraging them to develop soft skills like critical thinking and communication. However, the use of AI must be accompanied by a strong foundation in holistic competencies to ensure that students can use these technologies ethically and effectively.

The challenge lies in balancing the benefits of AI with the need for human development. In my AI literacy course, students learn not only how to use AI tools but also how to critically reflect on their applications of these tools. This hands-on approach helps students develop a deeper understanding of both the potentials and limitations of AI. Through reflection, they become more aware of the ethical implications of AI use and the importance of developing their holistic competencies alongside their technical skills (Chan et al., 2020).

A call to educators and educational researchers: Treasure the "jewels" in life

As educators and researchers, we stand at a pivotal moment in the evolution of education. AI is transforming the way we teach and learn, but it is up to us to ensure that this transformation is guided by ethical principles and an enduring commitment to holistic human development.

Now, as a professor in education at the University of Hong Kong, the chief expert of future readiness and AI literacy in higher education for UNESCO and a mother of three munchkins, I am more convinced than ever of the critical importance of holistic competencies. For my children, holistic competencies truly represent the "life jewels" that will help them thrive in this rapidly changing world. I hope that I have done enough to help them, as well as other students of the future generation, to develop these competencies and become global citizens. My hope is that my research will inspire others to explore the intersection of AI and holistic competencies, thinking critically about how these two domains can work together to enhance education.

In closing, I would like to echo the words of Oscar Wilde, who once said, "Experience is the hardest kind of teacher. It gives you the test first and the lesson afterward." As we navigate the uncharted waters of AI in education, we may not always have the luxury of previous experiences to guide us. But, by reflecting on our work, learning from authentic cases and continuously adapting, we can create a future where technology and humanity are not in opposition but instead in harmony.

References

Biggs, J. (1999). What the student does: Teaching for enhanced learning. *Higher Education Research Development, 18*(1), 57–75.

Carey, K. (2012, March 1). Skill, with no credential, are no longer enough. *The New York Times*. https://www.nytimes.com/roomfordebate/2012/03/01/should-college-be-for-everyone/skills-with-no-credential-are-no-longer-enough

Chan, C. K. Y. (2023a). *Assessment for experiential learning*. Taylor & Francis Group. https://doi.org/10.4324/9781003018391

Chan, C. K. Y. (2023b). A comprehensive AI policy education framework for university teaching and learning. *International Journal of Educational Technology in Higher Education*, *20*, Article 38. https://doi.org/10.1186/s41239-023-00408-3

Chan, C. K. Y. (2024a). Students' perceptions of 'AI-giarism': Investigating changes in understandings of academic misconduct. *Education and Information Technologies*. https://doi.org/10.1007/s10639-024-13151-7

Chan, C. K. Y. (2024b). *Exploring the factors of "AI guilt" among students: Are you guilty of using AI in your homework?* ArXiv. https://doi.org/10.48550/arXiv.2407.10777

Chan, C. K. Y. & Chen, S. W. (2021). Students' perceptions on the recognition of holistic competency achievement: A systemic mixed review. *Educational Research Review*, *35*, Article 100431. https://doi.org/10.1016/j.edurev.2021.100431

Chan, C. K. Y., & Colloton, T. (2024). *Generative AI in higher education: The ChatGPT effect*. Routledge. https://doi.org/10.4324/9781003459026

Chan, C. K. Y., Fong, E. T. Y., Luk, L. Y. Y., & Ho, R. (2017). A review of literature on challenges in the development and implementation of generic competencies in higher education curriculum. *International Journal of Educational Development*, *57*, 1–10. https://doi.org/10.1016/j.ijedudev.2017.08.010

Chan, C. K. Y., & Hu, W. (2023). Students' voices on generative AI: Perceptions, benefits, and challenges in higher education. *International Journal of Educational Technology in Higher Education*, *20*, Article 43. https://doi.org/10.1186/s41239-023-00411-8

Chan, C. K. Y., Kwong, T., Chan, Y. B., Ko, A. W. Y., & Tse, S. S. K. (2024). What employers really want: a deep dive into résumés and holistic competencies. *Education + Training*, *66*(4), 395–407. https://doi.org/10.1108/ET-06-2023-0252

Chan C. K. Y., & Lee, K. K. W. (2021). Reflection literacy: A multilevel perspective on the challenges of using reflections in higher education through a comprehensive literature review. *Educational Research Review, 32*, Article 100376. https://www.sciencedirect.com/science/article/pii/S1747938X20308368

Chan, C. K. Y., & Luo, J. (2020a). A four-dimensional conceptual framework for student assessment literacy in holistic competency development. *Assessment & Evaluation in Higher Education*, *46*(3), 451–466. https://doi.org/10.1080/02602938.2020.1777388

Chan, C. K. Y., & Luo, J. (2020b). Towards an inclusive student partnership: Rethinking mentors' disposition and holistic competency development in near-peer mentoring. *Teaching in Higher Education*, 27(7), 874–891. https://doi.org/10.1080/13562517.2020.1751606

Chan, C. K. Y. & Luo, J. (2022). Youth mentoring strategies and impacts on holistic competencies of secondary school students in Hong Kong. *British Journal of Guidance & Counselling*, *51*(6), 922–935. https://doi.org/10.1080/03069885.2022.2030858

Chan, C. K. Y., & Tsi, L. H. (2024). Will generative AI replace teachers in higher education? A study of teacher and student perceptions. *Studies in Educational Evaluation*, *83*, Article 101395. https://doi.org/10.1016/j.stueduc.2024.101395

Chan, C. K. Y., Wong, H. Y. H., & Luo, J. (2021). An exploratory study on assessing reflective writing from teachers' perspectives. *Higher Education Research & Development*, *40*(4), 706–720. https://doi.org/10.1080/07294360.2020.1773769

Chan, C. K. Y., & Yeung, N. C. J. (2020). Students' 'approach to develop' in holistic competency: an adaption of the 3P model. *Educational Psychology, 40*(5), 622–642. https://doi.org/10.1080/01443410.2019.1648767

Chan, C. K. Y., & Yeung, N. C. J. (2021). To assess or not to assess holistic competencies – Student perspectives in Hong Kong. *Studies in Educational Evaluation*, *68*, Article 100984. https://doi.org/10.1016/j.stueduc.2021.100984

Clance, P. R., & Imes, S. A. (1978). The impostor phenomenon in high achieving women: Dynamics and therapeutic intervention. *Psychotherapy: Theory, Research & Practice, 15*(3), 241–247.

Connley, C. (2018, October 8). Google, Apple and 12 other companies that no longer require employees to have a college degree. *CNBC*. https://www.cnbc.com/2018/08/16/15-companies-that-no-longer-require-employees-to-have-a-college-degree.html

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340.

Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford University Press.

Holistic Competency & Virtue Education. (2021). *What are holistic competencies?* Retrieved October 30, 2024, from https://www.have.hku.hk/

Oliver, B., & Jorre de St Jorre, T. (2018). Graduate attributes for 2020 and beyond: Recommendations for Australian higher education providers. *Higher Education Research & Development*, *37*(4), 821–836. https://doi.org/10.1080/07294360.2018.1446415

OpenAI. (2022, November 30). *Introducing ChatGPT*. https://openai.com/index/chatgpt/

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