Pedagogy 4.0: Technology Enhanced Teaching and Learning

28 November 2024

Keynote address
Teaching with 21st Century Technology Conference
University of the West Indies, Moana, Jamaica

Dr Tony Mays
Director: Education, Commonwealth of Learning (COL)

Thank you for the invitation to speak at the UWI Mona Teaching with 21st Century Technology Conference. After feedback from Dr Chisholm, I settled on the title indicated here: Pedagogy 4.0: Technology Enhanced Teaching and Learning to echo SDG4, IR4, and Jilly Salmon's article "May the Fourth Be with you: Creating Education 4.0".

Slide 2: Overview

We will start with a reflection on the term pedagogy and then begin to unpack a pedagogy for the 21st C. Then, we'll go through the same process regarding technology. Then we can explore the link between pedagogy and technology and the implications for teachers. Having established a framework, we will then explore the possible disruptive influence of AI. Finally, I want to end with assessment because I think if we change our assessment, then other things fall into place.

Slide 3: Pedagogy

In this presentation, I am using pedagogy as an overarching term as the art and science of teaching, realising that it needs to be nuanced for different populations – adults (andragogy), self-directed learning (heautagogy), cultural context (e.g. ubuntugogy from southern Africa) etc. And I promote the notion of "open" pedagogy as explained by Bates, 2022.

Slide 4: Learning Theory

We have no shortage of theories about how people learn, as the interactive map (accessible at the link provided) created by Richard Millwood, 2013, 2021 demonstrates.

Slide 5: To oversimplify …

Despite the diversity of learning theories, we can probably identify four broad approaches: behaviourist/instructivist, cognitive/constructivist, socio-constructivist, connectivist.

I don't see these as mutually exclusive positions – my practice draws on all four to a lesser or greater extent at different times.

Slide 6: Technology

I have a pragmatic approach to use of technology. In many countries we still need to make provision for content that can be printed and/or shared digitally to a basic device at a Wi-Fi-enabled centre, especially for the more rural areas. But we can enrich the core content with for example, video and audio content – whether using broadcast technology or embedded in an open textbook for learners with higher end devices but limited access to the internet, We might then also need a version that is fully online, exploiting H5P for interactivity and including online discussion fora, which could be synchronous and non-synchronous, as well as involving social media. I call this Moodle cubed (different versions for different contexts but ensuring the complete curriculum is covered for all learners in the least technology-enabled contexts). We also made extensive use of MOOCs during the pandemic (although not always massive and often not always completely open), and like you, we are exploring the use of AI.

Slide 7: Horse and Cart

Should technology drive pedagogy or the other way round?

Slide 8: What we assume shapes what we do …

We use video technology in different ways depending on our purpose and assumptions …

Slide 9: … but sometimes

… but sometimes the introduction of new technologies to teachers whose whole experience has been classroom-based, opens up opportunities to address pedagogical assumptions from a different viewpoint …

Slide 10: The 'padagogy' wheel

Once we know what we want to teach, why and how, there is no shortage of technologies to choose from. The latest version of the padagogy wheel provides some examples … but as the creator noted in 2015, it's not about the technology, it's about the pedagogy … …

Slide 11: SECTIONS model

Tony Bates offers a useful heuristic in this regard …

Slide 12: AI & Khan Academy

But what about AI? Khan Academy has been using this kind of approach for many years. Learners work through activities and earn badges for motivation. A dashboard shows them how, with each small achievement, they progress towards the completion of the whole. Within a few minutes a group of learners will each be following a different trajectory through the course content in a way that is not easily replicated by a lone teacher in a physical classroom. Moreover, the backend tutor functionality allows the tutor to check progress and provide further individualised feedback where needed … often only a small % of students need this personalised human engagement.

Slide 13: AI review

The latest 7th edition of research on AI (Perrault & Clark, 2024), concludes:

- AI beats humans on some tasks, but not all.
- Robust and standardised evaluations for LLM responsibility are seriously lacking.
- The data is in: AI makes workers more productive and leads to higher quality work.
- Scientific progress accelerates even further, thanks to AI.
- People across the globe are more cognizant of AI's potential impact – and more nervous.

Slide 14: Stoker – an early adopted of AI

Stoker (2024) a LINC instructor for ISS of BC regularly uses Chat GPT in his work. He notes it has helped reduce the time needed for planning, assessment design, differentiation, analysis of what worked and what did not so that changes can be made before a topic is taught again, and that over time, working with the application, it has learned what he likes and makes increasingly useful recommendations.

Stoker (2024) also observes that AI has been used to support learning in multiple contexts ranging from Georgia State University, which in 2013 introduced AI to identify and automate feedback to students who were at-risk, linking them directly with a human tutor where indicated, to schools in rural India which developed AI tools for tablets to provide feedback to students on their subject-based learning. In both cases resulting in improved retention and success. He notes that Singapore even experimented with humanoid robots to provide support for learners whose teachers were off sick. He notes that AI in the classroom could take care of a lot of routine tasks freeing the teacher to spend more time interacting directly with students.

Slide 15: Samoa AI

In similar vein, COL has collaborated with the National University of Samoa (NUS) to conduct a pilot project on providing online learner support using GPT-powered technology for Moodle, which is the LMS used in NUS.

COL and NUS organised a webinar with staff and faculty members at NUS to brief them on the features of the system and how to use the chat interface as well as the GPT-powered help desk. The technology includes human interaction in the loop with AI.

In the three-week pilot, participants had the opportunity to explore the system and sent over 300 messages in one week. The results were assessed in a post-pilot survey and revealed high to very high levels of user satisfaction.

Professor Ioana Chan Mow of the Department of Computer Science at NUS served as the lead for the NUS team. She says, "NUS faculty and staff are excited and greatly appreciate this collaboration with COL on the AI-powered Moodle help desk. The AI-automated help desk will greatly reduce the workload of the ICT help desk section and will improve the timeliness of responses to Moodle queries. NUS thanks COL for its continued support over the years. We are excited to be the first institution in the Pacific to trial this AI-powered technology."

Slide 16: USP AI

The Commonwealth of Learning (COL) and the University of the South Pacific (USP) have successfully enhanced the Semester Zero programme of USP. This programme, designed to help prospective students transition smoothly into university life, now incorporates advanced GPT 3.5-turbo technology. This integration has significantly improved the learning experience, allowing students to learn from the safety, convenience and comfort of their own homes.

The programme notably assisted 2,588 active participants, effectively handling over 619 queries related to course content and operational information, demonstrating the potential for integration of AI in educational settings in the Pacific. A survey of learners revealed that the AI experience was highly satisfactory. This effort not only facilitates a smooth transition to university life but also encourages the effective use of AI tools among students in the Pacific region.

Slide 17: COL GenAI project

- In Ghana and India, COL is implementing a co-creative mentoring model that uses COL's pioneering technology, the AI-Powered OER Generator, to generate and adapt curriculum-aligned OER.
- This model provides a supportive space where teacher mentors and pre-service teachers collaboratively develop subject-specific resources while reinforcing pedagogical skills.
- COL is involving the Vocational Training Development Institute (VTDI) that is based in Jamaica in the Gen AI TVET project. They will be involved in the development of Open Educational Resources (OER) for fashion design.

Slide 18: GAI: A pragmatic response

- Use AI "intelligently"
- Automate routine admin and teaching tasks
- Find a balance between personalised support and over-dependence
- Support students and teachers to use and critique AI responses
- Focus on authentic assessment
- Address cybersecurity and academic integrity
- Consider digital twins or avatars
- Make ethical uses of analytics
- Provide CPD for teachers
- Create an imagination for what could be

Bates, 2024; Du, et al., 2024; Kizilcec, 2024; Law, 2024; Sevnarayan & Potter, (2024); Williamson, 2024

Slide 19: Assessment and ODL

"If we wish to discover the truth about an educational system, we must look into its assessment procedures. What student qualities and achievements are actively valued and rewarded by the system? How are its purposes and intentions realised? To what extent are the hopes and ideals, aims and objectives professed by the system ever truly perceived, valued and striven for by those who make their way within it? The answers to

such questions are to be found in what the system requires students to do in order to survive and prosper. The spirit and style of student assessment defines the de facto curriculum." [Rowntree, 1987:1]

We have long argued the need for a particular focus on our assessment practice …

Slide 20: Applied Competence

And many countries have adopted competency-based frameworks in this regard …

Slide 21: Education, Training and Credentials

This graphic shows how competencies can be built up over a period. Notice the move from the generic and cross-cutting to the increasingly more specialised. You can click on the link to learn more.

Slide 22 Future Learn Microcredentials

The UK Open University has taken this a step further. They make sample courses available for free which lead to recognition of learning. But, if students choose to subsequently register for the full programme to which they are related, they can get credit for the work completed. This can help reduce the numbers of students dropping out of our programmes because they chose the wrong course.

Slide 23: COL Microcredentials Project

This is another are which COL is currently exploring through a collaborative project …

- The aim of this project is to develop a common Commonwealth Credit Transfer Framework for Micro-credentials
- First phase (2024-2025): three research reports, regional consultation meetings in five regions and development of the Framework
    - Caribbean regional consultation meeting to be held in Jamaica March 26-27th, 2025
- Second phase (2025-2026): Country-specific contextualisation, development and implementation of micro-credential frameworks for 10 pilot countries
- Third phase (2026-2027): Implementation in 10 pilot post-secondary institutions

Slide 24: Authentic Assessment

But how authentic is the assessment we are doing?

Slide 25: Assessment and AI

So, now lets us consider the new challenges related to assessment and generative AI technology.

The first example assessment is a pretty standard exam task. It could be answered effectively by ChatGPT, Bing Chat or Bard in a few seconds.

The second example is a bit trickier in two ways. First it uses artefacts and second it uses the same facts to create an alternative narrative. Since we can now scan PDFs into Generative AI platforms, it would take a bit more time, but we'd possibly still get a reasonable response.

How could we manage the third example? Yes, we could use text to speech and still get help from Generative AI with the essay writing, but a human has to do something first … and to decide whether the essay is a true reflection of the interview in terms of the messages conveyed e.g. the emotions elicited.

Slide 26: Assessment and AI2

Again, some guidelines are useful …

Slide 27: Assessment and AI3

And here are some additional very practical guidelines …

Slide 28: Teaching with AI

So, how do we prepare ourselves as teachers? Consider short courses like this one where you can grapple with issues in manageable bite-size chunks …

Slide 29: AI Competency Framework

Explore the AI competency framework developed by UNESCO …

Slide 30: Newsfeeds

And consider subscribing to relevant newsfeeds …

Slide 31: References

It used to be that we should try to limit our references to the past 5 years. Then it became the last 3 years. With the explosion of GAI, it feels like our references should be the last 5 minutes!

Baidoo-Anu, D., & Owusu Ansah, L. (2023). Education in the Era of Generative Artificial Intelligence (AI): Understanding the Potential Benefits of ChatGPT in *Promoting Teaching and Learning (January 25, 2023)*. SSRN: https://ssrn.com/abstract=4337484 or http://dx.doi.org/10.2139/ssrn.4337484

Bates, A. W. (u.d.) *Teaching in a Digital Age – Second Edition.* 11.4 Open pedagogy – Teaching in a Digital Age – Second Edition

Bates, A. W. (2022). *Teaching in a Digital Age – Third Edition.* https://pressbooks.bccampus.ca/teachinginadigitalagev3m/

Bates, A. W. (2024, April 26). *What should universities do about AI for teaching and learning?* https://www.tonybates.ca/2024/04/26/what-should-universities-do-about-ai-for-teaching-and-learning/

Bozkurt, A. & Sharma, R. C. (2023). Generative AI and Prompt Engineering: The Art of Whispering to Let the Genie Out of the Algorithmic World. *Asian Journal of Distance Education*, 18(2). https://www.researchgate.net/profile/Aras-Bozkurt/publication/372650445_Generative_AI_and_Prompt_Engineering_The_Art_of_Whis

pering_to_Let_the_Genie_Out_of_the_Algorithmic_World/links/64c1af66c41fb852dd9d8ace/Generative-AI-and-Prompt-Engineering-The-Art-of-Whispering-to-Let-the-Genie-Out-of-the-Algorithmic-World.pdf

Carrington, A. (2015). *The Padagogy Wheel: It's Not About The Apps, It's About The Pedagogy*. https://www.teachthought.com/technology/the-padagogy-wheel/

COL. (2023). *Samoa pioneers AI-powered learner support*. https://www.col.org/news/samoa-pioneers-ai-powered-learner-support/

COL. (2024). *USP enhanced its Semester Zero programme with GPT-powered AI support.* https://www.col.org/news/usp-enhanced-its-semester-zero-programme-with-gpt-powered-ai-support/

Cooper, G. (2023). Examining Science Education in ChatGPT: An Exploratory Study of Generative Artificial Generative Intelligence. *J Sci Educ Technol* 32, 444–452 (2023). https://doi.org/10.1007/s10956-023-10039-y

Du, H., Sun, Y., Jiang, H., Atiquil Islam, A. Y. M., & Gu, X. (2024). Exploring the effects of AI literacy in teacher learning: an empirical study. *Humanities and Social Sciences Communications*, 11, Article 559. https://doi.org/10.1057/s41599-024-03101-6

Eke, D. O. (2023). ChatGPT and the rise of generative AI: Threat to academic integrity? *Journal of Responsible Technology*, 13. https://doi.org/10.1016/j.jrt.2023.100060

Hegarty, B. (2015). Attributes of open pedagogy: a model for using open educational resources *Educational Technology*, July-August

Kizilcec, R. (2024). To Advance AI Use in Education, Focus on Understanding Educators. *Int J Artif Intell Educ* 34, 12–19 (2024). https://doi.org/10.1007/s40593-023-00351-4

Kuperman, L. (2023, November 27). Exploring the Boundaries of AI at The Sphere with Aura: A Family Adventure to AWS re:Invent. LinkedIn, https://www.linkedin.com/pulse/exploring-boundaries-ai-sphere-aura-family-adventure-aws-kuperman-24g2c/

Law, L. (2024). Application of generative artificial intelligence (GenAI) in language teaching and learning: A scoping literature review. *Computers and Education Open*, Volume 6, June 2024. https://doi.org/10.1016/j.caeo.2024.100174

Linderoth, C., Hultén, M., & Stenliden, L. (2024). Competing visions of artificial intelligence in education—A heuristic analysis on sociotechnical imaginaries and problematizations in policy guidelines. *Policy Futures in Education*, 0(0). https://doi.org/10.1177/14782103241228900

Lockwood, F. (1992). *Activities in Self-Instructional Texts*. London: Kogan Page.

Morgan, C., & O'Reilly, M. (1999). *Assessing open and distance learners*. London: Kogan Page.

Nikolic, S., Daniel, S., Haque, R., Belkina, M., Hassan, G. M., & Grundy, S. (2023). ChatGPT versus engineering education assessment: a multidisciplinary and multi-institutional benchmarking and analysis of this generative artificial intelligence tool to investigate assessment integrity. *European Journal of Engineering Education*, 48 (4), 559-614. https://doi.org/10.1080/03043797.2023.2213169

OER Africa. (2023, July 28), Three Ways Artificial Intelligence could change how we use Open Educational Resources (Blog). https://www.oerafrica.org/content/three-ways-artificial-intelligence-could-change-how-we-use-open-educational-resources

Perrault, R., & Clark, J. (2024). *Artificial Intelligence Index Report 2024*, Human-Centered Artificial Intelligence. United States of America. https://policycommons.net/artifacts/12089781/hai_ai-index-report-2024/12983534/

Ratten, V., & Jones, P. (2023). Generative artificial intelligence (ChatGPT): Implications for management educators. *The International Journal of Management Education*, 21 (3). https://doi.org/10.1016/j.ijme.2023.100857

Rowntree, D. (1987). *Assessing Students: How shall we know them? Second Edition*. London: Kogan page. pp 1, 136.

Salmon, G. (2019). May the Fourth Be with you: Creating Education 4.0. *Journal of Learning for Development*, 6(2). https://doi.org/10.56059/jl4d.v6i2.352

Sevnarayan, K., & Potter, M-A., (2024). Generative Artificial Intelligence in distance education: Transformations, challenges, and impact on academic integrity and student voice. *Journal of Applied Learning & Teaching*, 7. https://doi.org/10.37074/jalt.2024.7.1.41

Smolansky, A., Cram, A., Raduescu, C., Zeivots, S., Huber, E., & Kizilcec, R. F. (2023). *Educator and Student Perspectives on the Impact of Generative AI on Assessments in Higher Education*. L@S '23: Proceedings of the Tenth ACM Conference on Learning @ Scale July 2023Pages 378–382, https://doi.org/10.1145/3573051.3596191

Stoker, M. (2024). *Collaborating with AI to Create a Collaborative Classroom*. Presentation CCBYSA, Personal Communication.

Thorpe, M. 2006. *Using ICT for curriculum design, development and delivery: design for active and interactive networked learning*. Nadeosa, Pretoria, 2006.

Williamson, B. (2024). The Social life of AI in Education. *Int J Artif Intell Educ* 34, 97–104. https://doi.org/10.1007/s40593-023-00342-5