

EDITORIAL

Digital Transformation in Open and Flexible Education: How Pedagogy is Changing in Response to New Possibilities

Santosh Panda

Indira Gandhi National Open University (Retd.), India

<https://orcid.org/0000-0002-0617-8737>

Technologies and Open Distance Learning

During the past centuries, the developments in critical educational ideas, discourses and alternatives have propelled the fixed elitist education systems to open up to mass education, thereby catering for equality of educational opportunity and democratisation of education through provisions such as alternative schooling, open schooling, lifelong education/learning, non-formal education, open and distance education/learning (ODL), and on-demand learning, among others. Alongside social reforms towards equality, inclusivity, and sustainability, educational reforms have moved towards more of an open and flexible education/learning (OFL) model for mass education and training; and there are parallel technological developments that have significantly influenced the way educational design, delivery, and organisation and management take place.

Starting from ‘teachers’ as the earliest mechanism/technology available in 1500 BC, actual technological developments in the forms of print (1450 AD), postal service (1850 AD), telephone (1890 AD), radio (1920 AD), and television (1950 AD) led to the further technology developments of audio (1965 AD), computer-based instruction (1970 AD), satellite technology (1975 AD), personal computers (1980 AD), conferencing (1990 AD), the world wide web (1990s AD), and networked technologies of the LMS (1995 AD), wiki (1998 AD), social software and OER (2002 AD), virtual reality and blogging (2003 AD), cMOOC (2008 AD), xMOOC (2012 AD), digital badges (2015 AD), AI (1970s AD, but applied widely from 2016 AD), blockchain (2017 AD), GenAI (2020s), and diversified forms of AI and other intelligent systems (Cowin, 2021; Panda, 2026b).

Various contemporary technology developments like AI, virtual reality, machine learning, mobile/ubiquitous learning, cloud-based learning, and adaptive learning promise to make learning more personalised, interactive, networked and scalable. ODL, which started as correspondence education and graduated to open and distance education, has subsequently become more blended, networked, and on-demand and flexible. As underlined by Bozkurt (2019), starting from the technology of postal service to the interactive web and AI, each technology still survives and serves the teaching-learning possibilities of ODL.

Pedagogy Developments and Possibilities

Starting from teachers’ personalised pedagogy during the 1500s BC through direct teaching, dialogue, and questioning, among others, Western scientific reporting on pedagogical theories concerning behaviourism, cognitivism, constructivism, and connectivism have influenced how



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teaching-learning is designed and carried out. The relationship between curriculum, learning theories, and pedagogies is well established (Taber, 2016); the relationship between pedagogies, teaching-learning strategies, instructional design, and pedagogic methods is well mapped (Panda, 2022); and their applications in ODL including ‘interaction’ have been critically ascertained (Anderson & Bozkurt, 2025; Anderson & Dron, 2011). There have also been developments in critical pedagogy (Giroux, 2012), feminist pedagogy (Shrewsbury, 1993), pedagogy of capabilities (Walker, 2006), 21st-century pedagogies (Scott, 2015), innovative pedagogies and future pedagogic possibilities (Coughlan et al., 2026; Kukulska-Hulme et al., 2024; Yerunkar et al., 2026), and questions about scholarship in academic integrity, blogging and Twitter discussions, websites (Henry & Oliver, 2022).

Pedagogic transformations have occurred in view of significant research in the field – from delivery of content to ‘design of learning’; individualised learning vis-à-vis ‘collaborative and networked learning’ (Dohn et al., 2018; Ryberg et al., 2025), from fixed classroom learning to ‘flexible and blended learning’ (Panda et al., 2024; Tlili et al., 2024); from summative and formative assessment to ‘assessment *as* learning’ (GoI, 2020); from discipline-bound learning to ‘interdisciplinary and multidisciplinary learning’ (GoI, 2020; Panda, 2026a); and from behaviourist to ‘constructivist and connectivist’ models of learning and learner support (Siemens, 2005).

In the context of open, distance, digital and blended learning, the shift has already occurred in the design and delivery of learning — from a ‘course material-tutoring’ system to a ‘networked-interactive-intelligent’ system (though both will operate parallel to each other for quite some time to come) (Panda, 2023); from structured time and space-bound learning to ‘on-demand learning’ (Liu et al., 2026; Panda & Mishra, 2026); from the use of one-way mass media and two-way conferencing to ‘synchronous and asynchronous interactive learning’ — use of ‘blogs’ for individual reflection (van Wyk, 2018), ‘wiki’ for collaborative reflection (Kim & Kim, 2020), ‘discussion forum’ for inquiry-based reflection (Wu, 2021), ‘e-portfolio’ for self-reflection and self-management (Chaudhuri & Cabau, 2017), technology-enabled self-regulated learning (Adhya & Panda, 2026), and technology for authentic learning and authentic assessment (Prinsloo et al., 2026).

Artificial Intelligence and Future Technologies

Digital learning, including for open and distance learning, gained momentum during Covid-19, albeit in the form of emergency remote teaching (ERT) (Hodges et al., 2020), though both teachers and students faced considerable difficulties in accessing and coping with technology-enabled teaching-learning. Hartwell and Brown (2026) reported from Canada that though ERT during Covid-19 induced teachers to use a variety of tools and platforms for teaching-learning, post Covid-19 they utilised their technology experiences to more effectively support pedagogic practices in experiential learning, reflective practices, and digital literacy and digital praxis (Peng & Yu, 2022) — which connects theoretical knowledge with classroom application through experiential learning and reflective practice. Covid-19 enhanced teacher growth in digital skills/literacy as a foundational competency and the canvas for educational technology use. The authors suggest authentic experience in-practice as a means towards meaningful integration of technology in teaching-learning, going beyond being tool-driven to being iterative and reflective. In a developing country context, teacher educators’ focus post Covid-19 shifted towards more OER, institutional repositories, multimedia-based teaching, and teacher capacity building (i.e., resource-based learning, and technology integration in teaching-learning) (Adhya & Panda,

2022). There is a perceptible shift towards technology-enabled self-regulated learning and technology engagements for smart learning, learning analytics, and networked intelligent tutoring (Adhya & Panda, 2026; Panda, 2023).

Researchers have therefore underscored continuing professional development of teachers to effectively integrate technology into their teaching practices (Ter Beek et al., 2022). In this context, the thrust of international support by the Commonwealth of Learning has been within the policy-technology-capacity building change management framework and an institutional culture rewarding innovations in inclusive pedagogies (Mishra & Panda, 2020).

Post Covid-19, the design and use of AI in education and ODL has picked up momentum; and its use for teaching-learning and scaffolding therein has significantly contributed to making learner experiences more personalised, immersive, interactive, micro-learning and skill-based (Guralnick, 2021). Critical reviews have shown both the potential as well as the ethical challenges in using AI in higher education (Zawacki-Richter et al., 2019); that this paradigm shift in education needs re-examination of the pedagogical models and community education (Bozkurt et al., 2024); and that besides the support for teachers and students, AI research and practice should also focus on other significant stakeholders to ensure its ethical and effective use (Mustafa et al., 2025). While there is a need to understand the cultural and institutional landscape of its application, it also calls for flexibility in tech infrastructure, which should support diverse pedagogic applications (Bitar & Davidovich, 2024).

The Current Issue

The current issue of *JL4D* is set against the backdrop of the above analysis — that technology developments can find credence in the domain of education and training only when technologies gel well with appropriate pedagogies applied in local contexts (Panda, 2024). The papers included in this issue — eight ‘research articles’ and six ‘case studies’ — underline how digital transformation in open and flexible learning is propelling appropriate and context-specific pedagogies to serve local needs, thereby creating new possibilities for need-based and learning effectiveness-oriented innovations.

In the ‘*Research Article*’ section, we have included eight peer-reviewed papers. Blegur and co-researchers in the first paper report a positive relationship between digital competence and autonomous learning. While Joseph and co-researchers in the second study show that AI literacy was positively related with teaching efficiency of higher education teachers, Rodriguez and co-researchers in the third paper also suggest that AI literacy is positively related to digital confidence and ethical decision-making among higher education students. These findings may be compared with the findings of a critical research review on AI by Nicole D’Silva who underlines that, while AI can simulate some linguistic, logical-mathematical and spatial functions, it still has limitations in adapting to the socially-situated and morally-accountable multiple human intelligences.

In the fifth paper, on challenge-based robotic learning, Jalon, Jr. and Roleda report that CBL is effective in teaching robotics, especially concerning conceptual understanding, though more student autonomy is needed to develop procedural knowledge. Apart from STEM education, in the context of science education within general schooling, Olaniyan and co-researchers report that, while teacher ICT competency, lab resources and teacher workload are related to perceived student performance in ODL, teacher workload had higher predictive value than the other stated variables. In the seventh paper, Toikenova and co-researchers, in a mixed-methods research study, found that game-based learning (GBL) was more effective than

conventional teaching in school ODL, since GBL supports teamwork, critical thinking, and algorithmic reasoning. In the last research paper, Uğurhan, Güler and Bozkurt report the development and validation of an ODL learner experience and satisfaction scale, which should be useful to administrators and teachers to assess and improve various teaching, social and service-related factors.

The ‘*Case Study*’ section contains six research-based and peer-reviewed case studies — dealing with AI-enabled digital competency, AI-enabled research development, integration of human rights and SDGs through scratch programming, open schooling for out-of-school children, digital communities as student support systems, and virtual internationalisation of higher education, which should be useful to readers and researchers.

The two ‘Book Reviews’ on recently published books on ‘e-Portfolios’ and ‘AI in knowledge co-construction in online learning’, reviewed, respectively, by Mohammad Santally and Tony Carr, and coordinated and edited by Jako Olivier, should be of interest to practitioners and researchers of technology-enabled learning.

Conclusion

We hope the findings of the research studies and the case studies (including the two book reviews) shall be of use to both educational leaders and practitioners of education in general and ODL/OFL in particular. The analysis in this paper as well as the research findings derived from the 14 papers in this issue suggest that technological developments have posed significant challenges to educational leaders, managers, teachers, students, researchers and parents, especially in developing and underdeveloped economies in investing and organising for appropriate and effective infrastructure deployment, institutional culture, curriculum and teaching-learning strategies, and faculty capacity-building to reap equitable, inclusive, qualitative, and sustainable educational outcomes. Governments and policy makers are concerned more with skilling and employability, innovation, future skills, holistic individual and community development, and return-on-investment. Besides investments in AI and VR, there are also economic considerations for networked learning platforms, open educational resources (OER) and open educational practices (OEP), micro-learning and micro-credentialing (Palmer et al., 2026). In this context, a teacher also needs to act as learning manager, and any institutional adoption of GenAI tools needs to consider the eco-system, efficacy, ethics, and their pedagogic soundness (Giannakos et al., 2025).

As can be seen, digital transformation in OFL is not confined to technology transformation — it is essentially pedagogic transformation, going beyond the content- and institution-centred practices to those of learner-centred practices, incorporating more interactive, personalised, flexible and networked learning. Institutions and practitioners therefore need to establish a meaningful and practicable relationship between technology, pedagogy, and context — a relationship where pedagogy provides meaning to the immense technological possibilities.

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