



POLICY BRIEF

# The Digital Multiplier Model for Teacher Professional Development at Scale

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## Policy context – the scale of the Teacher Professional Development (TPD) requirement

An estimated 69 million<sup>1</sup> more teachers are needed by 2030 to meet the scale of the educational challenges across the world, and especially in the Global South. The expansion of basic education over the last half century has been unprecedented, to the extent that most children now have access to basic education (World Bank, 2018).

However, the global scale of the current education gap between what is needed and what is being delivered is astonishing:



**263 million**

children are still **without basic education**<sup>1</sup>



**52%**

of low income countries **require less than 9 years** of compulsory education<sup>2</sup>



**125 million**

children are **not acquiring functional literacy or numeracy**, even after spending at least four years in school<sup>3</sup>

Using current models of teacher professional development (TPD), it would take many decades simply to generate the quality of teaching professionals needed for universal basic education that can achieve good learning outcomes.

Current provision is failing:

- Among the 48 countries of sub-Saharan Africa, nearly one quarter of secondary school teachers had no formal training.<sup>4</sup>
- The crisis in TPD in education systems globally is exacerbated in the Global South where many countries cannot find sufficient teachers for expanding systems.<sup>5</sup>

This briefing, based on a recent review (Laurillard, Kennedy, & Wang, 2018), proposes a co-design approach to using a new “digital multiplier” model for TPD that blends the capability of technology to operate on large scale with the expertise of professionals who can adapt generic principles to local conditions.

We have the technology. And we know that digital can help (see box). We also have the professionals.

### How can “digital” help?

“Digital” offers education with unique opportunities to achieve *high quality independent learning* without the continual presence of a teacher, using, for example, animation, augmented reality, learning analytics, adaptive feedback, simulations, digital modelling, online forums, design tools, and authoring tools (Laurillard, 2012; NMC, 2016; Sharples et al., 2014).

Teachers are a massive source of knowledgeable and passionate professionals, who need far more support than they currently receive. Digital technology has the potential to contribute to improved quality and scale. The approach is to develop teachers’ professionalism in three action areas:

- Professionals collaborating online to co-design localized “blended learning”<sup>6</sup> for their learners.
- Supporting innovative pedagogic co-design by teachers.
- Digital infrastructure development bridging the current digital divide.

The following sections discuss the issues and evidence of successful practice in each area.

<sup>1</sup> UNESCO Institute of Statistics. (2016, October). The world needs almost 69 million new teachers to reach the 2030 education goals. *UIS Fact Sheet*, 39. Retrieved from <http://uis.unesco.org/sites/default/files/documents/fs39-the-world-needs-almost-69-million-new-teachers-to-reach-the-2030-education-goals-2016-en.pdf>

<sup>2</sup> UNESCO. (2016). *Education for people and planet: Creating sustainable futures for all*. Paris: UNESCO. Retrieved from <http://unesdoc.unesco.org/images/0024/002457/245752e.pdf>

<sup>3</sup> World Bank. (2018). *Learning to realize education's promise*. Washington, DC: World Bank. Retrieved from <http://www.worldbank.org/en/publication/wdr2018>

<sup>4</sup> UNESCO. (2016). *Education for people and planet: Creating sustainable futures for all*. Paris: UNESCO. Retrieved from <http://unesdoc.unesco.org/images/0024/002457/245752e.pdf>

<sup>5</sup> UNESCO Institute of Statistics. (2015, October). Sustainable development goal for education cannot advance without more teachers. *UIS Fact Sheet*, 33. Retrieved from <http://uis.unesco.org/sites/default/files/documents/fs33-sustainable-development-goal-for-education-cannot-advance-without-more-teachers-2015-en.pdf>

<sup>6</sup> A combination of conventional and digital methods for teaching and learning

## Professionals collaborating online to co-design localized blended learning

### Use a “digital multiplier” model to extend the reach of high quality TPD

The proposal is to redesign the current multi-tier cascade face-to-face (f2f) model into a single-tier online “digital multiplier” model, i.e., use large-scale online courses or MOOCs<sup>7</sup> to provide TPD directly to local teachers, supported in local f2f groups. This is a single-step cascade model that enables teachers anywhere to collaborate in a large online group of say, 10,000 participants, to help them innovate with their own groups of say, 25 teachers each, using blended learning. This would multiply up to 250,000 teachers being taught through effective uses of technology.

The digital multiplier model has these advantages over the “multi-tier” cascade model:

- All teachers have direct access to high quality digital TPD.
- Teachers’ own experience of online learning enhances their local teaching and learning.
- The course orchestrates the process of co-design of innovations by the teacher community.

The critical condition for success is that local educational management structures commit to supporting local

teachers in f2f groups to develop blended learning courses that meet their professional learning needs.

Digital solutions for the areas of interest - such as disadvantaged or remote communities, or migrant populations, for example – present many challenges, in terms of gender, access, culture, and language (Laurillard, Kennedy, & Wang, 2018), outlined in the section below. However, there are several studies indicating that this model could work.

#### ***Examples of evidence that an ICT-enabled TPD model could work***

- A large-scale blended learning course on early language, literacy, and numeracy for K-3 teachers successfully replaced a 4-tier cascade model of face-to-face training for 4,000 K-3 teachers with online resources, local “Learning Action Cells”, and webinars. Participants achieved completion of 95%, improvement in teacher learning, and significantly higher change scores for teachers from rural schools (Oakley, King, & Scarparolo, 2018).
- To counter poor quality in-service TPD and the limited integration of information and communication technology (ICT) in TPD or in teaching, 22,000 teachers in the south India states of Karnataka and Telangana have been trained in

organizing learner-centred, activity-based, participatory learning experiences. The “technological pedagogic content knowledge framework” enables teachers to assess how well they integrate technology into their teaching practices (Schmidt et al, 2009).

- A TESS-India MOOC successfully used a “hybrid model” of contact classes for participants to meet, get online, and complete activities, who then took on the “role of facilitators” for the MOOC, where many more classes took place, enabling a multiplier effect (Hooker, in press).

### Use activity-based costing to promote affordable solutions

To understand and manage a valid and affordable approach to ICT-enabled TPD@Scale, it is important to compare the costs and benefits of both conventional and online/blended models. An activity-based costing approach can help to assess and optimize the trade-offs between high/low cost design and the value to participants. This will inform experiments with reducing the costs of online production, rather than under-resourcing the teaching time needed for learner support (Kennedy, 2018).

## Supporting innovative pedagogic design by teachers

### Use online platforms to scale up TPD for disadvantaged teachers

There is an increase in the researchers and education providers now developing online and blended TPD courses that introduce teachers to exemplars of effective online learning and assessment. When delivered online,

these courses can now reach many of the teachers who need them most.

#### ***Examples of evidence that online TPD courses can reach disadvantaged teachers***

- Of the 25 million people enrolled in MOOCs between 2012 and 2015, 39% were from less-developed

countries (Kizilcec, Saltarelli, Reich, & Cohen, 2017).

- Peking University’s Flipped Classroom Pedagogy MOOC found that 60% of the 126,000 teacher participants came from the less developed regions of China, and more than 15% were persistent teacher-learners, who enrolled in two or more runs of the course (Wang, Chen, Fan, & Zhang, 2018).

<sup>7</sup> Massive Open Online Courses

- Of the 60 “countries of focus” identified by the Department for International Development, UK Government, as having the most challenging educational problems, 27 registered a total of 1,300 participants in a TPD MOOC on digital learning. Their completion rates were lower, but they still achieved 19% against the 28% average (Laurillard, 2016).

## Develop digital design tools for teachers to collaborate on innovation

Online design tools enable teachers to build on each other’s innovative ideas

for learning resources and lesson plans, to adapt them for their own learners, and to share their own successful designs. In ICT-enabled TPD courses, these tools support a global community of practice among teaching professionals, enabling teachers across the world to share and critique the exploration of new teaching ideas, and co-design their teaching to improve learning outcomes.

### *Examples of evidence that online TPD courses can orchestrate the co-design process*

- The Kenyan Elimika national OER platform offers primary teachers the opportunity to discuss topical

educational issues with their fellow teachers (Gacicio, 2017).

- Teachers use free and open source editors to create text, image, audio, animation, mind maps, and video resources, shared through networked Professional Learning Communities for mentoring and peer support (Kasinathan, 2018).
- Teachers on a global TPD MOOC rate highly the activities of giving and receiving peer reviews of learning designs, because they are productive learning activities, promoting more critical analysis of the participant’s own design (Laurillard, 2016).

## Digital infrastructure development

The conditions necessary for large-scale online courses to achieve equity are defined in terms of language and culture, gender, and geographic location.

### Promote blended learning for educational equity

Teachers using online TPD can use the resources and learning activities in the courses to create blended learning groups with their own learners, and so begin to address inequalities in educational opportunity.

#### *Examples of evidence that digital methods can improve equity in education*

- Using online courses within a “blended learning” model (i.e., integrating the resources they offer with the classroom mode), enables learners to ask questions with a teacher present, and so improve their engagement and completion of intended outcomes (Yu, 2015).
- More sensitive approaches to supporting learners from different social, economic, and ethnic groups can deliver substantial improvements to completion rates (Kizilcec, Saltarelli, Reich, & Cohen, 2017).
- Social media sites can support local

group discussions beyond a MOOC (Almutairi & White, 2015). This blend of the online and the classroom gives segregated women access to more senior experts as well as having the benefits of social learning online and in class.

Millions of people are capable of studying online, and are motivated to use lifelong learning and professional development opportunities, but live too far from affordable campus education. Online learning is their only hope. Given that the digital world now enables remote employment, online learning would be a lifeline to a level of prosperity that has never before been possible (Dillahunt, Wang, & Teasley, 2014).

### Provide wider access to ICT

#### *Examples of evidence that access is progressing but is far from reaching the most disadvantaged*

- The use of smartphones for education across the Global South is increasing (Curioso & Mechael, 2010; Sahu, Grover, & Joshi, 2014; Shrivastave & Shivastava, 2014) as open online course providers, such as FutureLearn and iTunesU, ensure delivery on all platforms (Chen, 2013).

- As smartphone access improves in more African countries, it will also transform access to online learning. Access is already above 20% in Ghana, Kenya, Nigeria, and South Africa (Manji, Jal, Badisang, & Opoku- Mensah, 2015).

However,

- Over 1.7 billion women in low- and middle-income countries do not own mobile phones. Women in South Asia are 38% less likely to own a phone than men (World Bank, 2018).
- Several Latin American countries have declared the universal access to Internet as a human right, yet the ICT infrastructure in the region is still very low and unequal (García Zaballos & López-Rivas, 2012). The best smartphone access among Latin American countries is Argentina, at 73%.<sup>8</sup>

Technology access typically moves faster than human-organizational capacity to optimize its use for improving social equality. Good ICT access could bring quality courses to remote localities and excluded groups such as women, ethnic minorities, and refugee communities. The effort to make optimal use of future access must begin now, to keep pace with technology change.

<sup>8</sup> <http://afteraccess.net/wp-content/uploads/After-Access-Website-layout-r1.pdf>



## Potential outcomes

This policy brief offers a way of addressing the three policy responses proposed in the World Bank's ambition "to realise education's promise" (World Bank, 2018):

### **Assess learning to make it a serious goal.**

The proposed ICT-enabled TPD@Scale courses can show teachers how to assess and track learning better, and use the results to guide their teaching practice.

### **Act on evidence to make schools work for learning.**

The courses orchestrate and guide the crowd-sourcing of innovative ideas, and evidence of what works from research, and from the teacher participants, to develop their community knowledge.

### **Align actors to make the entire system work for learning.**

Courses could also target policymakers and education leaders as a community of professional participants developing a new approach to professionalizing teaching, and themselves collaborating on ways of supporting their local teaching communities in innovation and reform.

Any intervention must take a holistic and systemic approach to addressing the local conditions. A large-scale digital multiplier model for TPD is one slim thread of action needed. It is one that has never been tried, and has the potential to knit together the disparate local actors that can make an intervention work for the long-term benefit of the community.

## References

- Almutairi, F., & White, S. (2015). *Investigating the impact of integration MOOCs into Saudi women's higher education*. Paper presented at the 13th International Conference on e-Society 2015, Funchal, PT.
- Chen, J. (2013). *Opportunities and challenges of MOOCs: Perspectives from Asia*. Paper at the International Federation of Library Associations and Institutions World Library and Information Congress, Singapore.
- Curioso, W., & Mechael, P. (2010). Enhancing "m-health" with south-to-south collaborations. *Health Affairs*, 29(2), 264-267. doi:10.1377/hlthaff.2009.1057
- Dillahunt, T., Wang, Z. G., & Teasley, S. D. (2014). Democratizing higher education: Exploring MOOC use among those who cannot afford a formal education. *International Review of Research in Open and Distance Learning*, 15(5), 177-196.
- Gacicio, E. (2017). *Addressing inadequate human capacity / skills in primary schools: A case of Elimika Online*. Paper presented at the ADEA Triennale Sub-Theme 2 – Prioritizing Science, Mathematics and ICT.
- García Zaballos, A., & López-Rivas, R. (2012). *Socioeconomic impact of broadband in Latin American and Caribbean countries*.
- Hooker, M. (in press). Learning at scale: An African perspective. In Lim, C. P., & Tinio, V. L. (Eds.). (2018). *Learning at scale for the global south*. Quezon City, Philippines: Foundation for Information Technology Education and Development.
- Kasinathan, G. (2018). *Professional learning communities – an ICT based approach to TPD@Scale in Indian public education*. Paper presented at the Building a TPD@Scale Coalition for the Global South Workshop, The Education University of Hong Kong, 17-19 January 2018.
- Kennedy, E. (2018). An activity-based costing approach to planning digital learning in the Global South. In Lim, C. P. (Ed.), *Cost effectiveness of digital learning innovations in the Global South*. Quezon City, Philippines: Foundation for Information Technology Education and Development.
- Kizilcec, R. F., Saltarelli, A., Reich, J., & Cohen, G. (2017). Closing global achievement gaps in MOOCs. *Science*, 355(6322), 251–252. doi:10.1126/science.aag2063
- Laurillard, D. (2012). *Teaching as a design science: Building pedagogical patterns for learning and technology*. New York, NY: Routledge.

Laurillard, D. (2016). The educational problem that MOOCs could solve: Professional development for teachers of disadvantaged students. *Research on Learning Technology*, 24.

Laurillard, D., Kennedy, E., & Wang, T. (2018). How could digital learning at scale address the issue of equity in education? In Lim, C. P., & Tinio, V. L. (Eds.). (2018). *Learning at scale for the global south*. Quezon City, Philippines: Foundation for Information Technology Education and Development.

Manji, F., Jal, E., Badisang, B., & Opoku-Mensah, A. (2015). *The trajectory of change: Next steps for education*. In eLearning Africa Report 2015, Berlin: ICWE.

Moon, B., & Villet, C. (2017). Can new modes of digital learning help resolve the teacher crises in sub-Saharan Africa? *Journal of Learning for Development*, 4(1), 23–35.

New Media Consortium. (2016). *NMC Horizon Report: 2016 Higher Education Edition*. Retrieved from <https://www.nmc.org/publication/nmc-horizon-report-2016-higher-education-edition/>

Oakley, G., King, R., & Scarparolo, G. (2018). *An evaluation of ELLN Digital: Technology-supported teacher professional development on early language, literacy and numeracy for K-3 teachers (Executive Summary)*. Quezon City, Philippines: Foundation for Information Technology Education and Development.

Sahu, M., Grover, A., & Joshi, A. (2014). Role of mobile phone technology in health education in Asian and African countries: A systematic review. *International Journal of Electronic Healthcare*, 7(4). doi:10.1504/IJEH.2014.064327

Sharples, M., Adams, A., Ferguson, R., Gaved, M., McAndrew, P., Rienties, B., Weller, M., & Whitelock, D. (2014). *Innovating Pedagogy 2014: Open University Innovation Report 3*. Milton Keynes: The Open University.

Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J. & Shin, T. S. (2009). Technological Pedagogical Content Knowledge (TPACK). *Journal of Research on Technology in Education*, 42(2), 123-149, doi:10.1080/15391523.2009.10782544

Shrivastava, M., & Shivastava, S. (2014). Political economy of higher education: comparing South Africa to trends in the world. *Higher Education*, 67(6), 809-822.

Wang, Q., Chen, B., Fan, Y., & Zhang, G. (2018). *MOOCs as an alternative for teacher professional development: Examining learner persistence in one Chinese MOOC*. Quezon City, Philippines: Foundation for Information Technology Education and Development.

Wolfenden, F., Cross, S., & Henry, F. (2017). MOOC adaptation and translation to improve equity in participation. *Journal of Learning for Development - JL4D*, 4(2), 127-142.

World Bank. (2018). *World Development Report 2018: Learning to realize education's promise*. Retrieved from <http://www.worldbank.org/en/publication/wdr2018>

Yu, C. J. (2015). Challenges and changes of MOOC to traditional classroom teaching mode. *Canadian Social Science*, 11(1), 135-139.



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