New Learning Opportunities in a Networked World: Developing a Research Agenda on Innovative uses of ICTs for Learning and Teaching (executive summary)

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Executive summary

The executive summary briefly describes outcomes of the activities carried out for the project “New Learning Opportunities in a Networked World: Developing a Research Agenda on Innovative uses of ICTs for Learning and Teaching”.

The project

The *New Learning Opportunities in a Networked World: Developing a Research Agenda on Innovative uses of ICTs for Learning and Teaching* project seeks to develop a research agenda focused on new opportunities / directions of learning and teaching in an increasingly networked world, and how they can benefit people in developing countries (with an emphasis on people from Low Income Countries). This research agenda is aimed at studying how interconnected information and communication technologies (ICTs) can expand the reach of educational opportunities and improve learning outcomes (i.e., lead to more effective and efficient learning).

To this end a 2-stage project was being carried out by the Open University of the Netherlands and entailed: (1) establishing a southern-led research agenda, and (2) developing a project proposal for a follow-up project with a concomitant Call for Research Proposals. The general objective is to establish an empirically based and developmentally relevant research agenda on issues of new digital learning opportunities in developing countries (DCs) by:

1. identifying and prioritizing key development problems that new digital learning opportunities can address;
2. identifying key developing country exerts, researchers, and institutions in, Latin America, Caribbean, Sub-Saharan Africa, and Asia working on new digital learning opportunities; and
3. laying the groundwork for the development of a new research network on new digital learning opportunities in DCs.

The research consists of two main activities, namely desk research and an group concept mapping study involving a 2-day workshop and a follow-up with experts who could not attend the workshop. These activities are interconnected elements of the consultative approach to establishing a research agenda.

Desk research

Although the desk research was aimed at conducting a targeted (scoping) literature review on innovative uses of Information and Communication Technologies (ICTs) for education in developing countries, efforts were made to cover as many of the characteristics of systematic review as possible, namely: an explicit search strategy, comprehensive sources of information, criterion-based selection, specific research questions, critical appraisal and text mining (Travaglia, Braithwaite, & Debono, 2008).

A combined search in databases Academic Search Elite®, Psychology and Behavioral Sciences Collection®, ERIC®, PsycINFO® and PsycARTICLES® was conducted, applying the Boolean / Phrase “ICT AND developing countries AND education AND research” to select the articles. The search was expanded to allow for related words and requiring a search within the full text of the articles but limited to the period 2010-2014, available full text and peer-reviewed articles. The abstracts, and when necessary, the full texts of articles, were screened to identify those that were most relevant to the projects and the research questions. The articles selected were divided into four categories (i.e., Africa, Asia, Latin America and General) and given to four researchers for further examination of the full texts. During this stage, more articles were added by cross-referencing, but a few were also discarded because they were not relevant. A template was created for a uniform description of the papers. The papers were analyzed

quantitatively, applying text mining techniques and tools (Leximancer, 2014) and complemented by qualitative summaries of papers.

As the qualitative and quantitative analyses did not identify the most recent techno-pedagogical innovations such as MOOCs, networked learning, learning analytics, mobile learning, serious gaming and open linked data (refer to Horizon reports: Johnson, Adams Becker, Estrada, & Freeman, 2014a, 2014b; Johnson, Adams Becker, Estrada, Freeman, Kampylis, Vuorikari, & Punie, 2014c; Innovating pedagogies: Sharples, McAndrew, Weller, Ferguson, FitzGerald, Hirst, & Gaved, 2013; Kennisnet trends in education 2014-2015; Mapping and analyzing prospective technologies: Aceto, Borotis, Devine, & Fischer, 2014), we asked a number of prominent experts to reflect on the most recent developments related to these technologies and how they could be used for the transformation of education in developing countries. The following technologies and their effect on education in the developing countries were discussed: OER and MOOCs, social networking, learning analytics, mobile and seamless learning, serious games and open linked data.

Online Group Concept Mapping study and face-to-face workshop

Group concept mapping and a face-to-face workshop were implemented to provide additional insight into the issues, challenges and trends of using ICT in education in developing countries.

Group Concept Mapping (GCM) applies a structured participative approach to facilitate groups of experts to identify and arrive at a consensus about a particular issue. The analysis depicts, in the form of thematic clusters, the experts' common understanding of the issue under consideration. It uses a structured facilitative multi-step approach including a number of simple and intuitive activities such as idea generation, sorting of ideas and rating of ideas.

The group concept mapping and face-to-face workshop were initially considered separate events. The face-to-face workshop was supposed to generate and discuss ideas, which should then be fed into the Group Concept Mapping (GCM) process. To make the workshop more effective, efficient and appealing, the GCM was conducted prior to the face-to-face workshop. GCM implements the same activities that were supposed to feature in the workshop: generating ideas and structuring them through grouping and prioritizing. GCM facilitated these activities online to collect and analyze the data. The results were then presented to the participants for interpretation. Online GCM gives participants more time for idea generation and structuring (i.e., 10 days for each). In addition it prevents some known negative effects related to the process of face-to-face idea generation and structuring (e.g., brainstorming productivity loss and group thinking). The analysis, which features some advanced statistics such as multidimensional scaling (MDS) and hierarchical cluster analysis (HCA), presents the shared vision of the group on using ICT objectively for education in developing countries. The outcomes of the GCM study are typically visualized in such a way as to facilitate their interpretation. More information on the GCM study is presented in Chapter 3.

The presentation of the results from the GCM study was used as a trigger for small group discussions aimed at gradually refining the scope and themes of the research agenda. On Day 1 the participants were asked to share their thoughts on innovative uses of ICT for education in developing countries in a plenary session. The themes that were discussed included: pedagogical issues related to the implementation of ICT for learning and teaching purposes, teacher training, policy issues, social justice, digital divide and infrastructure. The participants were also challenged to anticipate possible uses of advanced technologies such as learning analytics, cognitive tutors and learning networks. Some preliminary findings of the GCM study were then presented (refer to Chapter 3.). Prior to the workshop, participants also received some documents with results from the GCM - Appendix A (i.e., ideas grouped into clusters) and Appendix B (i.e., rating of the ideas on importance and feasibility). After presentation, the participants were divided into small groups for further interpretation of the data. They were primed

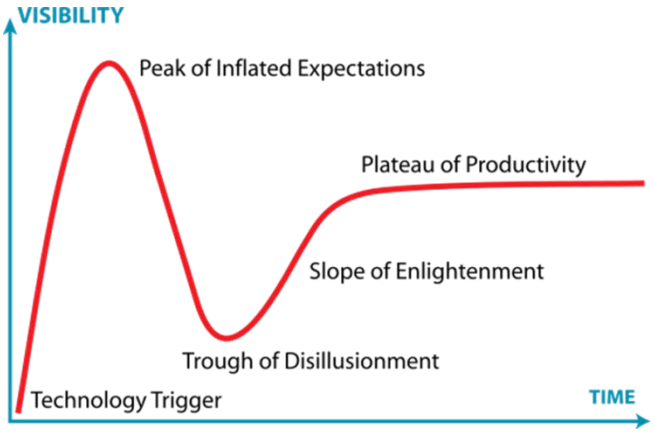
to look for more general categories that subsume sets of similar clusters of ideas. The groups had a similar vision regarding how to further structure the data. The following, more general categories of clusters, were defined: pedagogical affordances of technology, sustainable development with technologies, access, equity and inclusion, professional development / capacity building, barriers for adoption, teacher concerns and research method (refer to Appendix C). On Day 2, again in groups that were composed differently, the participants were asked to formulate more concrete themes or questions for the research agenda on innovative uses of ICT for education in developing countries (refer to Appendix D).

Summary of the findings

The GCM study identified 16 areas of research interest: international cooperation, learning platforms, research approaches, new job possibilities, integration of technology in the classroom, ICT-enabled pedagogy, teacher competences, teacher concerns, implementation of technology, context-based goals and solutions, accessibility, infrastructure, marginalizing vs inclusion, ICT policy, diffusion of technology, and collaboration for cost-effectiveness. There is a considerable conceptual overlap between the topics identified in the GCM study and those in reports on trends in learning technologies and innovating pedagogies (Horizon reports: Johnson, Adams Becker, Estrada, & Freeman, 2014a, 2014b; Johnson, Adams Becker, Estrada, Freeman, Kampylis, Vuorikari, & Punie, 2014c; Innovating pedagogies: Sharples, McAndrew, Weller, Ferguson, FitzGerald, Hirst, & Gaved, 2013; Kennisnet trends in education 2014-2015; Mapping and analyzing prospective technologies: Aceto, Borotis, Devine, & Fischer, 2014).

Pedagogies, technologies and context are inherently interlinked, to a greater extent than the reports on trends for learning technologies. Advanced learning technologies such as Open Educational Resources (OER), Massive Open Online Courses (MOOC), mobile learning, learning analytics, networked learning and serious gaming were not depicted in a separate cluster dedicated to technology, but were instead integrated in different contexts (i.e., clusters). The role of context is mentioned either explicitly or inferred implicitly across all clusters identified in the GCM study. This was also found in the desk research where the local context of the technology implementation was identified an important factor for the adoption and adaptation of the advanced learning technologies and methods in education. The workshop participants were aware that reuse of open educational resources, methods and tools did not mean reuse exactly as is (see the Reusability Paradox - i.e., the pedagogical effectiveness of a learning object and its potential for reuse are completely at odds with one another – Willey, 2015), but they knew that it was also about revise, remix and redistribute (see also the Remix Hypothesis – Wiley, 2015). To adapting more effectively open education resources, methods and tools to local context the educators from developing countries could benefit from the availability of open instructional design tools (e.g., CompendiumLD, Learning Designer and Cloudworks – see for more information Conole & Wils, 2013).

The literature review and GCM have already detected some signs of technology leapfrogging (i.e., adoption of advanced or state-of-the-art technology in an application area where immediate prior technology has not been adopted) in terms of both technology and pedagogy. This is also in line with reports on advanced learning technologies. It seems that for OERs, MOOCs and mobile learning the stages of technology trigger, peak of inflated expectations, and even disillusionment have already passed (see below the Hype Cycle; Gartner, 2002).



Research can start at the stage of slope of enlightenment but will require some time before arriving at the plateau of productivity. Relatively little was said in the GCM study with respect to serious gaming and networked learning, but the literature review and the expert reflection on the issues indicate that these research topics could also be positioned at the starting line of slope of enlightenment. Data-driven pedagogies, represented in this project by open linked data and learning analytics, can join the others at the starting line of slope of enlightenment if open linked data is considered part of OERs and learning analytics offers open source software for researching issues in OERs, MOOCs and serious gaming.

The learning technologies mentioned are closely related. For example, MOOCs could be considered a further development of OER, and data-driven learning technologies such as open linked data and learning analytics are also linked to OERs, MOOCs, serious gaming and networked learning. Mobile technologies are considered a hub for access to other techno-pedagogical innovations: OER, MOOCs, serious gaming and networked learning.

According to the participants in the study, cloud technologies could be a solution to infrastructure and access issues. Examples include free general purpose and specific educational applications from commercial vendors like Google, Apple and Samsung and social network sites like YouTube, LinkedIn and Twitter. Teachers could join professional social network LinkedIn groups or become members of international communities of practice like Schoolnet eTwinning.

Towards a Research Agenda

Based upon the combination of the desk research and GCM study, the Call for Research Proposals should stimulate and support proposals that together:

- exhibit a combination of advanced technologies with evidence-based learning and teaching methods,
- apply a range of research approaches (i.e., from design-based research to longitudinal studies),
- target different educational levels, and
- take into account the local context.

A second strand of research relates to teachers and teacher training and specifically research on improving teachers' skills, motivation and attitudes for using ICT in their professional practice.