Findings and Recommendations on Technology Implementation and Integration in Kenyan Secondary Schools

Kenyatta University and Syracuse University*: Africa-U.S. Higher Education Initiative Partnership

Building Capacity Through Quality Teacher Preparation

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Teaching is a complex practice that requires teachers to draw upon their content knowledge, pedagogical approaches and strategies, and knowledge about learners in order to support learning. Integrating technology into the teaching and learning practice of a classroom is a strategy that many teachers are drawing upon. When integrated effectively, technology can support student learning and lead to deeper conceptual understanding and procedural fluency (Bransford, Brown & Cocking, 2000).

While technology began being introduced in Kenyan classrooms in the 1980s, the use of technology in Kenyan schools received a boost when the Kenyan government, through the Ministry of Information, Communication and Technology, developed a national technology policy that sought to "achieve universal access to [technology]" (Republic of Kenya, 2006, p. 2).

The National ICT Innovation and Integration Centre (NI^3C) was established in Kenya in 2011. As part of this centre, teachers called *champions* have been trained in the use of technology and specifically on integrating technology into classroom teaching and learning.

Since ICT implementation is only at its infancy in Kenya, literature is scant that provides insight into the level of preparedness of graduate teachers in ICT integration. There is need therefore to understand the status of ICT implementation in Kenya and especially whether or not teachers have the necessary knowledge and skills for ICT integration. Such an understanding is useful for the various stakeholders involved in the education sector that include policy makers, curriculum developers, administrators, teachers as well as students.

From Implementation to Integration

The distinction between technology implementation and technology integration is often unclear for educators (Muniandy, Mohammad & Fong, 2007); however, the distinction is important. Technology implementation refers to digital competency and skills in using technology resources, whereas technology integration refers to using technology as a tool or medium to acquire new skills, knowledge, and understanding of a concept or phenomenon. Moving from implementation of technology to meaningful integration is predicated on the availability of technology for teachers to use, support in using it, and curricular connection. Without adequate professional development and training, teachers may lack the skills needed to make this distinction and effectively integrate technology.

Research Study

As part of our partnership project, one of the collaborative research studies we undertook was to address the following research questions: (a) What types of ICTs for education are available in secondary schools in Kenya and what training have teachers had in using ICTs for education?;

(b) What are teachers' perspectives regarding the role of ICT in teaching and learning?; and (c) What factors might influence ICT integration in teaching and learning in public secondary schools in Kenya?

We collected data through questionnaires and classroom observations: (a) 384 questionnaires, from teachers teaching from among 22 subject areas, and (b) classroom observations of 50 classroom lessons across 12 subject areas in Kenya secondary schools.

In selecting schools and teachers, we began with the eight provincial regions of Kenya and selected at least one county from each of these regions, for a total of 16 counties. We then selected three schools from each county with the criteria of having one of the schools be a national school, one of the schools be a county school, and one be a district school. The schools were chosen from a list obtained from the NI^{3}C. All schools on the list were ones where a champion teacher had trained the teachers in technology integration and the Kenyan government had provided technology to the schools. The schools were split almost equally between urban (51%) and rural (49%) schools.

We drew on questionnaires and classroom protocols developed by others (Tanzania Ministry of Education and Vocational Training, 2012; Texas Teacher Technology Competencies Certification [online]; Western Australia Department of Education and Training, 2006) to develop the questionnaire and observation protocol that we used in collecting data. At each school, at least six teachers who use technology in their teaching completed questionnaires. From among the 384 teachers who completed the questionnaire, we observed 50 lessons taught by a subset of this set of teachers.

We analyzed the data by first compiling the data using SPSS software and SurveyMonkey (https://www.surveymonkey.com). We used compiled data from the questionnaires to answer our first research question. We used open coding to establish codes for data that appeared able to help us answer our second and third research questions. We then used axial coding to look for patterns and make sense of the data.

From our data analysis, we have the following findings:

- ***Finding #1: ICT Availability and Training***
  The participants' reported high availability for printers (86%) and LCD projectors (70%), but much less availability for other technological tools. Most teachers have had some basic training on using computers and using word processing, spreadsheets and presentation software. There has been considerably less training on technology integration in teaching and learning activities.

- ***Finding #2: Teachers' Perspectives on the Role of Technology in Teaching and Learning***
  Teachers are comfortable with using computers, word processing, the Internet, multimedia resources (e.g., CDs and DVDs), and many are comfortable with using digital cameras, PowerPoint, and printing. The majority of teachers (71.8%) reported that they used ICT in preparing for the lesson. More than two-thirds of the teachers reported that using technology enhanced their teaching.

- ***Finding #3: Results from Lesson Observations***
  Most participants seemed to have fair to good technological knowledge and all of the participants were able to use the technology that they had chosen for the lesson without difficulties. The most prevalent ways that teachers used technology in the lessons was to present information (observed in 84% of the lessons) and for visualization of a concept (observed in 80% of the lessons). The specific benefits of technology to support the teachers' pedagogy and content in the classes were to illustrate concepts that would have been difficult without technology and to save time.

- ***Finding #4: Implementation Rather Than Integration***
  While our overarching aim was to examine factors influencing how teachers are integrating technology in Kenyan public secondary schools, we found that very few teachers are *integrating* technology. However, we did find that many teachers are *implementing* technology in their teaching. In

other words, we found teachers who have digital competency and skills in using technology resources, but we found few teachers who are using technology as a tool or medium to acquire new skills, knowledge, and understanding of a concept or phenomenon.

- ***Finding #5: Factors Influencing Technology Implementation***
  Factors that appeared to influence technology implementation are (a) the availability of ICT (software and hardware) in schools and for teachers to use in preparing for teaching, (b) the availability of electricity, (c) the training and support that teachers receive, and (d) teacher perception of technology and how it affects teaching and learning.

Moving from implementation of technology to meaningful integration is predicated on the availability of technology for teachers to use, support in using it, and curricular connection. Based on our research, we have the following recommendations:

- ***Recommendation #1:*** Technology tools must be available for teachers and students. These tools must go beyond computers, printers, and LCD projectors, and also include software that may be subject specific.

- ***Recommendation #2:*** Training and support must be available for teachers by trainers who have expertise in subject-specific technology tools in order to allow teachers to integrate technology in teaching and learning.

- ***Recommendation #3:*** Teachers need to be given the opportunity to connect technology to the curriculum they are teaching and seeing technology as a vehicle for engaging students in understanding these curricular ideas in a deeper way.

References

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