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**SUMMARY KEYWORDS**

technology, teachers, secondary schools, integrating, selected, integration, constituencies, university, high schools, lessons, kenya, teaching, prepare, availability, questionnaire, school, country, talk, ict, observed

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So I was a Fulbright scholar at Kenyatta University in 1998. And then after that, we established a linkage between Syracuse University and Kenyatta University. And we did a number of things, but one of them is that we had a grant project that was funded by the United States Agency for International Development, USA ID, from 2011 to 2014, that was focused on building capacity in teacher education. And we looked at what were the faculty they're interested in working on, and they had three main things and one of them was technology in integration. They wanted to be able to better integrate technology in their own teaching, and prepare secondary teachers to also do the same in their teaching. And through that project, we had a number of research projects, and one of them focused in on the current use at that time, which was in 2012.

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When we collected the data of secondary teachers integration and use of technology in secondary schools in Kenya. So Kenya at that time, prior to their last term constitutions was organised by provinces. And so we wanted to have representation from across the country. And so we there were eight. There were eight provinces at that time, and we selected high schools and from teachers from a list that included schools across the country. Let me just say that in 2011, the Kenyan government established the national ICT innovation and integration centre. And as part of that, there was money given from the Kenyan government, two high schools across the country that were selected not even there were there was a plan to to ramp up and so eventually all would get, but high schools were selected that would get technology money to buy technology, as well as they were to teachers that were called champion technology champions, who were trained in the use of technology and specifically on integrating technology into classroom teaching and learning.

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And so there were teachers that were chosen from each of the constituencies across the country. At the time when we collected the data, there were 210 constituencies in Kenya and there was a teacher from each of those who was selected to be trained to be a champion technology teacher. Since that time with the new constitution in 2010 80, more constituencies have been added. But those champions then worked with the secondary schools that had been selected in their constituency to help them in determining what technology to purchase. They were the ones who actually had to prove what what technology that high school would get the secondary school, and then they worked with the teachers so they provided some training for those. So the nine three c had a list of all teachers and all school who had been Given technology and who had been who had received training. And so it was from that list that we chose then secondary schools from across the country, and across the different counties to then have these teachers fill out questionnaires, as well as observed from some lessons.

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The most 90% of the secondary schools in Kenya are public, and why 10% are private. So we chose to focus on the public secondary schools, as they were the ones that are receiving the money from the government as well as that's where 90% of the students were also going. So we chose schools from across the country and we selected at least six teachers who use ICT in their teaching in each school and had them complete a questionnaire so we had 384 teachers across 22 different subjects, the secondary subjects that are taught in the curriculum who completed the questionnaire. And then from those teachers who completed the questionnaire, we selected a subset again across all of them have to observe the lesson. Because not only did we want the teachers perspective on, first of all, what technology were they using? And did they have access to it? What were their perspectives about it, but we also learned to see how they were integrating. So we observed lessons 50 lessons from across choosing from all the teachers who had completed the survey. So we had a representation of all the schools and again, from a variety of subject areas. So the major findings were that the teachers were comfortable in using computers and using the internet. They were also comfortable using laptops and projectors. And they use them I mean, they had been prepared and had used them in their classrooms. Most of them use PowerPoint. Some of them included video clips. Some of them use DVDs that were developed through the curriculum unit in the school in the country at that time. We asked them, you know how they would have taught the same lesson prior to using technology or they they talked about, you know, using physical or AIDS and things. What we found is that many of them were using technology in preparing their lesson. And they were using technology to show concepts that were difficult to visualise.

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Oftentimes, things that might be difficult for somebody to draw or for students to, to visualise in some way. Those are the things that they use the technology for. But we found that they weren't really integrating it, they were implementing it. There's some literature that talks about the difference between implementing and integrating. And I'm just going to talk about that a little bit. The distinctions between technology implementation and technology integration is That technology implementation refers to digital competencies in skills and using technology resources, so that they're able to they're familiar, they're competent, they're able to make use of the resources. But really technology integration refute refers to using technology as a tool, or a medium that allows people to acquire new skills, new knowledge, or understanding of a concept or phenomenon. So what we observed in our lessons, as well as from the questionnaires, is that many teachers a high percentage, more than 75% we're using and we're implementing technology, but not integrating technology. So some of the things that we found from the conclusions are it really depended upon the availability of the ICT, whether the software, the hardware, some cases, the availability of electricity, there are some schools in Kenya that and we had some situations where the electricity went off in some rural school may not have electricity. So that's because that can be an issue depends on the training and the support that they receive, as well as their perception of the technology and how it affects teaching and learning.

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One of the big conclusions reached from our study is that this really needs to be integrated into the preparation programmes at universities, so that in teachers preparation, they are learning how to integrate technology for teaching and learning. And of course, that has implications for the teacher educators, the professors who are teaching, they need to be skilled at technology integration, and how to use and how to then prepare teachers to use. So it has kind of a whole ripple effect, that it really starts at the university, in having the recent the lecturers at the university prepared to do this, and then being able to have to have a requirement perhaps, to have that in teacher programmes. And then given that there are many teachers who are already teaching, having arms in our case we were talking about the Ministry of Education and they're in service work for teachers. That that needs to be part of their work with teachers is really teaching them about how to integrate technology. And then of course, that has implications for making sure that they have the availability and access to that