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Professional Development on Digital Literacy and Transformative Teaching in a Low-Income Country: A Case Study of Rural Kenya

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ABSTRACT

In recent years, the government of Kenya has implemented programs with the hope of moving the country to middle-income status. The government has implemented the Digital Literacy Programme, distributing tablets to schools across the country, and also a new curriculum, promoting innovative teaching that includes digital literacy, learner-centered teaching, and relevance to students' lives. Our purpose in this research was to explore culturally sustaining teaching methods in line with the Kenyan government's push for innovative teaching and digital literacy attainment for all students. We used case study methods to describe Kenyan teachers' perceptions of innovative teaching and digital literacy while participating in the Inquiry Initiative, a three-day professional development series. Participants included preschool, primary, and secondary teachers from Trans Nzoia County. Data sources were pre- and post-surveys, participant-generated artifacts, and interviews. Our participants perceived the following needs: new literacies for learners, creativity for learners, collaboration and group work, and creativity to overcome technological challenges. Overall, participants embraced learner-centered teaching theoretically but found that the lack of technological resources created barriers to teaching digital literacy in a learner-centered fashion. We found that teachers reported mostly using technology for teaching preparation and record keeping rather than engaging students in digital literacy practices. To solve technological challenges, teachers described having students work in groups and using smartphones. Future research could share more creative solutions to technical challenges in low-income countries.

> If you want to go fast, go alone. If you want to go far, go together. (Kenyan proverb)

Among the central issues in the literacy field today are the effects of a quickly changing world. Researchers have suggested that students should develop new literacies and new ways of thinking for our digital, global society (Kajee, 2018; Kimani & Onyancha, 2015; Leu, Kinzer, Coiro, Castek, & Henry, 2019), and the Kenyan government has suggested the same (Kenya Institute of Curriculum Development [KICD], 2019). The Kenyan government has prioritized becoming a middle-income country and believes that digital literacy is an important component of growing the nation's economy and increasing citizens' well-being. As such, the Kenyan government has charged schools with teaching computer skills and digital literacy to accelerate economic development and innovate pedagogy (DigiSchool, 2018; Makura, 2019).

Although literacy researchers and Kenyan government officials agree that new literacies are needed, literacy practices are not the same around

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the world. From a sociocultural view, literacy practices do not develop in isolation but rather are co-constructed as people communicate with other people (Gee, 2000). Literacy involves social and cultural norms dependent on the context of the communication. Following this line of reasoning, literacy practices in Kenya may look different from literacy practices in another country, and what digital literacy looks like in Kenya may be different from what it looks like in the United States, Europe, or Australia (Coiro, 2021), where much of the research has been conducted (Ndimande, 2018). There is a need to understand the nuanced digital literacy needs of Kenyan students and share successful practices for integration of technology from teachers' perspectives. In this article, we present a case study of Kenyan teachers engaged in a professional development (PD) series on learner-centered digital literacy instruction.

Review of Research on Teaching Styles and Digital Literacy Instruction in Kenya

In recent years, the government of Kenya has implemented the Basic Education Curriculum Framework, with calls for transformative teaching that nurtures the potential of every learner and promotes seven core competencies: citizenship, digital literacy, creativity, critical thinking, self-efficacy, collaboration, and communication (KICD, 2019). The framework calls for teaching to be learner centered, meaning "to think of teaching with *learning* in the forefront and with the idea that we should consider teaching primarily in terms of its *impact on learner learning*" (KICD, 2019, p. 16). The curriculum is grounded in sociocultural and constructivist theories in which learning is seen as a social process of constructing knowledge instead of acquisition (e.g., Dewey, 1902/1966; Hattie, 2012; Vygotsky, 1978).

Teaching Styles

The push for learner-centered teaching is in line with initiatives in other countries in sub-Saharan Africa (Adedeji & Olaniyan, 2011; Tabulawa, 2013). However, in a meta-analysis of studies conducted in sub-Saharan Africa, Schweisfurth (2011) concluded that "the history of the implementation of LCE [learner-centered education] in different contexts is riddled with stories of failures grand and small" (p. 425). In a study conducted in coastal Kenya, Jukes et al. (2017) found that teachers relied on teaching from textbooks with "lecture and whole-class oral pedagogies" (p. 451). Ngware, Mutisya, and Oketch's (2012) mixed-methods study of schools in Kenya found that teaching styles varied across English instruction and that engaging students in recitation, in which students were active participants but not constructing knowledge, was the most common teaching activity. The researchers found that other, more learner-centered practices, such as discussions in which students co-constructed knowledge, were theoretically helpful for student learning but comprised less than 4% of total teaching activities in the English lessons observed. Ngware and colleagues summarized their findings as follows: "This implies a heavily teacher-centred and reproductive style that may not develop critical thinking among learners" (p. 47).

Part of the failure to enact learner-centered teaching in Kenya stems from an ideology that teachers should be in control of the learning (Anderson et al., 2015; Mutai, 2012). Previous research has found that Kenyan teachers are cautious about relinquishing control to students but willing to change when they see the benefits. For example, in a multiple-case study, Jwan and Kisaka (2017) found that educators in two Kenyan schools were willing to embrace distributed power, even though initially one principal felt it would not be appropriate for her school. In an intervention study with 12 teachers, Anderson and colleagues (2015) found a willingness of teachers to embrace learner-centered teaching after participating in PD in which innovative teaching was modeled. The study documented "changes in loci of control whereby teachers changed or surrendered their traditional powers in response to active emancipated student learning" (p. 607). The findings pointed to a change in the students, as they were empowered through the intervention to acquire content knowledge outside of the classroom. They then brought their out-of-classroom learning, curiosity, and questions into the classroom, inciting the teachers to become responsive to the change in their students. Based on this conclusion, research is also needed on how students' out-of-classroom learning through the internet might cause innovation in literacy instruction as internet access continues to improve in Kenya. This study offers a foundational step for future research in this direction.

Digital Literacy Calls and Challenges

In addition to promoting learner-centered teaching, the Basic Education Curriculum Framework calls for digital literacy for every Kenyan (KICD, 2019). In 2013, the Kenyan government implemented the Digital Literacy Programme, with the goal of each grade 1 student having a tablet loaded with the national curriculum content (DigiSchool, 2018; Makura, 2019). There have been over 1 million tablets delivered to date. The hope was to radically change how learning takes place in schools. At the time of the study, the government was still delivering tablets, and some tablets that had been distributed were not being used. A KICD report stated, "This was interpreted as either unwillingness by teachers to integrate ICT [information and communication technology] in the learning

process or a lack of capacity to do it" (as cited in Wanzala & Nyamai, 2018, para 13). In addition to the challenge of accessing technology, research in Kenya (e.g., Heinrich, Darling-Aduana, & Martin, 2020; Kerkhoff, Spires, & Wanyonyi, 2020) has shown that even when the schools have technology, there are still challenges that mirror those of other developing countries.

Challenges to integrating technology in schools in low-income countries have been well documented. Infrastructure problems consist of electrical and internet outages (Muriithi, Horner, & Pemberton, 2016; Richardson, 2011; Stols et al., 2015). School-based challenges include a high ratio of students in a class to computers (e.g., 150:10) and teachers' lack of knowledge on how to integrate technology with learning (Buabeng-Andoh, 2012; Piper, Oyanga, Mejia, & Pouezevara, 2017; Tondeur, Krug, Bill, Smulders, & Zhu, 2015). Another barrier to integrating technology is lack of technical support to deliver training or to fix devices when needed (Muriithi et al., 2016; Ogembo, Ngugi, & Pelowski, 2012). Moreover, an extra challenge in the Kenyan context is an already overloaded curriculum (Anyiendah, 2017; Gudu, 2015; Mutai, 2012) that does not include digital literacy integration across it. If students do not develop digital literacy, research in the United States (Leu et al., 2019) and Kenya (Kimani & Onyancha, 2015) has indicated impediments to academic learning in future years. We know from research that many students need intentional digital literacy instruction to skillfully navigate digital texts (Coiro, Coscarelli, Maykel, & Forzani, 2015; Livingstone, Nandi, Banaji, & Stoilova, 2017).

Digital Literacy Instruction

Digital literacy involves consuming, creating, and communicating digital products (Spires & Bartlett, 2012; Spires, Paul, & Kerkhoff, 2018). Digital literacy includes the ability to consume texts and acquire knowledge through online reading and inquiry (Kimani & Onyancha, 2015; Leu et al., 2019). Moving beyond acquisition-focused literacy practices, digital literacy also includes the ability to create digital texts by choosing the appropriate mode(s) and to communicate one's ideas using the affordances of digital platforms (Coiro, 2021; Leu et al., 2019), as well as to participate, collaborate, and connect with people across borders (Kerkhoff & Cloud, 2020; Kim, 2016; Law, Woo, de la Torre, & Wong, 2018). Learners creating and communicating digital texts, rather than merely consuming, is in line with the constructivist orientation of curriculum in Kenya.

Another affordance of creating and communicating digital texts is multimodality. Multimodal compositions can include text and static images or, through the affordance of digital tools, become dynamic with moving images and hyperlinks. As Hull and Nelson (2005) asserted, "multimodality can afford, not just a new way to make meaning, but a different kind of meaning" (p. 225). Through a review of research, Smith, Pacheco, and Khorosheva (2021) found that using multimodal composition to teach literacy can be an effective learner-centered and culturally sustaining teaching practice for students for whom English is a new language, which is particularly relevant in Kenya because most students learn English in school as a third language after their ethnic language and Kiswahili. However, in a study in Kenya, "teachers' responses reveal[ed] that the multi-media approach is not popular as only a small number use this with their pupils" (Dhillon & Wanjiru, 2013, p. 20). Multimodality provides opportunities to communicate using language and images through hybridity and to play with language through remix (Kim, 2016).

In addition, creating digital multimodal compositions in school has been found to be motivating for students (Alvermann, 2002; Heinrich et al., 2020). One reason is because digital platforms provide students opportunities to share multimodal compositions with authentic audiences. Students can apply their digital literacy in storytelling and activist spaces online, making digital literacy an important part of civic and community life, in addition to career preparation (Lee, Meloche, Grant, Neuman, & Tecce DeCarlo, 2019; Lewis Ellison, 2017; Nixon, 2013). Nixon (2013) described collaborative digital storytelling as a meaningful practice to explore issues of identity, such as race and gender, and to bridge storytellers' home literacies to school literacies. An important instructional practice in multimodal composition, such as digital storytelling, is to provide opportunities for learner choice, such as choice of mode, digital tool, and story to tell. Making such decisions is both an essential digital literacy skill and empowering for learners (Lewis Ellison, 2017).

Theoretical Framework

In addition to the sociocultural view of literacy and learning, we grounded this research in culturally sustaining pedagogy (Alim & Paris, 2017; Paris, 2012) and decolonizing curriculum (Subedi, 2013). When enacting culturally sustaining pedagogy, teachers value and recognize the diverse cultural ways of knowing, doing, and communicating that students bring to the classroom, and promote students' development of their cultural literacy practices. Culturally sustaining pedagogy is complementary to decolonizing curriculum because they are both informed by critical (i.e., concerned with power) and resource (i.e., opposed to deficit) frames. A current problem in education is that much of the research (Andreotti, 2010; Ndimande, 2018) and practice (Delpit, 2005; Subedi, 2013) stems from Western European culture. Research that seeks to decenter Western European culture and to bring in traditionally marginalized voices is called decolonization (Assié-Lumumba, 2017), and through this

research project, we hope to contribute to decolonizing efforts in the field.

Unfortunately, education in Kenya, as in other low-income countries, suffers effects of European colonization (Anderson et al., 2015; Commeyras & Inyega, 2007; Gudu, 2015) and modern globalization (Wa-Mungai, 2007). Although the diverse Kenyan cultures and the colonizers' British culture are different, Anderson and colleagues (2015) described the methods currently used in Kenya as "traditional British-modeled curriculum and pedagogy" (p. 600), making home and school different cultures for many students. The cultural differences can be exacerbated by rurality and economic status (Heinrich et al., 2020). Assié-Lumumba (2017), a Nigerian scholar, stated,

> Contemporary African education has suffered from several fundamental problems. One of them is the forced juxtaposition of the European and the African systems of education on a hierarchical basis, with the European system on the top and the only one considered legitimate. While it was denied agency, the African system was not successfully eradicated by colonial policy. Individuals and groups are forced to resolve the tension between the two without the benefit of consistent, systemic, and sustained policy that attempts to create a constructive dialogue between them. (p. 16)

Legitimizing indigenous ways of knowing, being, and doing in educational institutions can, in turn, empower teachers and learners.

The Basic Education Curriculum Framework and Ministry of Education plans in Kenya encourage innovation (KICD, 2019; Ministry of Education, 2018). The term *innovation* typically refers to positive change but also has strong connotations of neoliberalism (Bang, 2020; Bang, Faber, Gurneau, Marin, & Soto, 2016). In addition, the word can hold connotations of invention or newness. However, dismantling and unlearning can also create powerful positive changes (Tierney, 2018). It is our assertion that dismantling colonial teaching, generating teaching methods, resuscitating indigenous and cultural ways (Wa-Mungai, 2007) of teaching, and creating hybrid practices are all possibilities in the spirit of what innovation and innovating can be. In order not to conjure the neoliberal connotation, we use the terms *transformative* and *transforming* instead.

Indigenous and hybrid practices hold potential to bridge the home–school cultural divide, transforming students' learning and lives. Therefore, our purpose in this research was to explore culturally sustaining teaching methods in line with the Kenyan government's push for learner-centered teaching and digital literacy attainment for all students. However, we are aware of the limitations of reaching this goal as researchers from a U.S. university. In addition, we understand that we are outsiders to the research participants. The first author is of Western European heritage, and the second author is Ugandan American. In doing this cross-cultural research, we looked to Shope (2006), who asserted that although one may not be able to resolve all of the dilemmas inherent in cross-cultural research, that does not mean one should not try. We took Tierney's (2018) advice that "cross-cultural engagements should proceed in a manner that is respectful of the histories, ways of knowing, needs, hopes, and values of all" (p. 397).

Research Questions

Two research questions guided the study:

1. What are the Kenyan teachers' perceptions of digital literacy?
2. What digital literacy teaching strategies do Kenyan teachers' perceive (a) as culturally sustaining for learners, (b) as learner centered, and (c) as likely to overcome technological resource challenges?

Method

This was a collective case study (Stake, 2000). Participants were teachers recruited during a PD series in summer 2019. With the Kenyan government's initiatives for ICTs and learner-centered methods, there are (albeit limited) resources and support for teachers to utilize the affordances of technology to create new and culturally sustaining literacy instructional methods in their classrooms.

Context

The Inquiry Initiative is a PD series focused on an inquiry-based learning approach to literacy, with emphasis on digital literacy instruction. At a conference in 2015, the first author met Dr. Peter Wanyonyi, the founder of Hope Education Centre and the president of the board of governors of three public schools in Trans Nzoia County, Kenya. Dr. Wanyonyi asked the first author to collaborate as he worked to continuously improve education in his community. Since 2015, the partnership has included PD sessions for preschool, primary, and secondary school teachers in Trans Nzoia County; securement and distribution of computers to schools in Trans Nzoia to enhance digital literacy and inquiry possibilities; presentations at U.S. institutions; and research on Kenyan teachers' perceptions of digital literacy and inquiry (see Kerkhoff et al., 2020).

In 2019, Dr. Wanyonyi invited both of us to facilitate PD for teachers focused on two Kenyan government priorities: learner-centered teaching and full utilization of government-distributed tablets in early literacy instruction (KICD, 2019). Dr. Wanyonyi convened a group of teacher leaders to help design and market the PD.

Sixty-three schools across Trans Nzoia County, a primarily rural area, were invited to send two teachers to attend any or all of the sessions provided over three days in June. Figure 1 shows the teacher leaders welcoming participants to the PD.

Evidence-based principles for PD (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009) and cross-cultural collaboration (Tierney, 2018) were followed, including multiyear engagement, recognition of local teachers' professional knowledge, and shared leadership. The PD theme and agenda were co-constructed by Dr. Wanyonyi (in consultation with the Kenyan teacher leaders) and the two of us (in consultation with the PD team). Because of unpredictable electrical outages and a lack of electrical outlets to keep multiple older laptops running, relying on the internet and laptops had proven difficult the previous year. In addition, the teacher leaders specifically asked for PD this year on (a) how to utilize government-issued tablets for instruction and (b) digital literacy in early childhood, as many teachers taught learners ages 3–8. With these considerations, we decided to facilitate digital storytelling as the theme for the PD. The agenda (see Appendix A) included whole-group interactive sessions in which new concepts, namely, learner-centered digital literacy instruction and digital storytelling as culturally sustaining pedagogy, were introduced and learner-centered pedagogy modeled. U.S. literacy professors and Kenyan teacher leaders facilitated the whole-group sessions. Each whole-group session was followed by small-group circles differentiated by grade levels, where participants discussed the concepts presented, making connections or adaptations to their contexts. Next, everyone enjoyed lunch together, which fostered relationship building and sharing of cultural knowledge. Breakout sessions in the afternoon provided choices for participants to explore and capitalized on the PD team's areas of expertise, including using Google Play on government-issued tablets, learner-centered slide deck design, literacy strategies for emerging multilingual learners, culturally sustaining early literacy strategies, and learner-centered apps for differentiated instruction. Both of us participated in all aspects of the PD.

A major portion of the PD time was designated to Design Studio (Spires et al., 2009), where participants engaged in digital storytelling. Participants worked in groups of five or six during Design Studio to apply their cultural knowledge of traditional storytelling and their new knowledge of digital literacy to create an original multimodal story (see Figure 2). As the teams designed, we modeled learner-centered pedagogical moves, scaffolding, and formative assessment. The Design Studio structure built on the PD from the year before, which used the New Literacies Institute model by Spires and colleagues (2009), a hands-on PD with a focus on teachers experiencing inquiry-based learning. Previously, participants conducted project-based inquiry (see Kerkhoff et al., 2020) by gathering, analyzing, and synthesizing print and digital sources to acquire knowledge on an environmental cause and create an infographic that shared information on sustainability in Kenya. For this study, participants engaged in learner-led, hands-on creation of digital stories based on a traditional Kenyan tale using their personal smartphones (if available), one tablet, and one laptop per group. Participants chose whether to use a tablet or laptop for the story creation. This structure modeled the strategy of working in groups to overcome low technology/learner ratios.

The process of creating digital stories promoted learner-centered teaching, culturally sustaining pedagogy, and the application of digital literacies. Participants

FIGURE 1
Teacher Leaders Greeting Participants at the Inquiry Initiative Professional Development

Note. The color figure can be viewed in the online version of this article at http://ila.onlinelibrary.wiley.com.

FIGURE 2
Groups of Teachers Working on Digital Stories

Note. The color figure can be viewed in the online version of this article at http://ila.onlinelibrary.wiley.com.

mixed traditional storytelling with their current practice of using slides to communicate in education settings. Within each group, at least one member had used PowerPoint in his or her teaching. For many participants, the shift from the use of slides to convey content information to using slides for multimodal creative writing was new. Combining the cultural artifact of the story and the digital mode of slides created a hybrid practice and a hybrid product. Remixing traditional storytelling and the school-valued mode of slides provided space for hybrid literacies (Knobel & Lankshear, 2008; see Figure 3 for an example). Participants presented their stories on the last day, and they were shared on the Inquiry Initiative website.

Building relationships is an important part of the initiative. Before the PD series, the two of us and members of the team toured schools, met teachers, and talked with local government officials to gain a better understanding of the current education context. Principals, board members, community leaders, and family were invited to listen to the presentations and join in the celebration on the last day. At the end of each day, the teachers provided feedback to us for our study. These informal and formal meetings provided time to build relationships and to see a fuller picture of the assets and needs of the community relating to literacy education.

Participants

Participants included 91 preschool, primary, and secondary school teachers from Trans Nzoia County in Kenya. Many participants were not able to attend all three days because of family obligations or because they took turns teaching classes while others participated. Based on an informal poll, 80% of the schools had devices (either computers or tablets), and 70% had internet access. However, as Muriithi and colleagues (2016) reminded us about the Kenyan context, "simple access may not translate to ready access at any one time one needs to use the resource" due to sharing limited devices and "constant internet down times" (p. 89). Approximately 15% of the schools represented at the PD had tablets from either the government's initiative or a nongovernmental organization donation. Only 3% of the schools represented had used tablets with learners. Two schools had eight tablets each, not a 1:1 ratio for the first graders, which was the goal of the Digital Literacy Programme. A typical ratio at schools that had devices (either computers or tablets) was 1:60. Some teachers had never used a laptop, tablet, or computer before the PD. Three teachers brought their school-issued laptop with them.

Participants represented a range of grade levels, from kindergarten 3 to grade 12 (i.e., ages 3–18), and diverse content areas. Many participants taught multiple content

FIGURE 3
Participant Digital Story Example

Note. The color figure can be viewed in the online version of this article at http://ila.onlinelibrary.wiley.com.

areas, such as science, English, and Kiswahili. Teachers in Trans Nzoia County have varied educational backgrounds, ranging from a grade 3 certificate to a master's degree. Preschool and primary teachers' educational backgrounds often ranged from high school to teachers college, and secondary teachers' backgrounds ranged from teachers college to master's degrees. Thirty-four participants consented to reporting their demographics collected via the pre-survey (see Table 1). We purposefully chose six participants for interviews from the pre-survey data to represent a range of grade levels and content areas for a maximum variation sample.

Data Collection

Data sources were pre- and post-surveys, field notes, participant-generated artifacts, focus group interviews, one-on-one interviews, and follow-up interviews. Table 2 displays the data sources in relation to the research questions.

TABLE 1
Participant Demographics

Demographic	Number of respondents	Percentage of respondents
Age		
20 and under	1	3
21–30	11	32
31–40	10	30
41–50	8	24
51–60	3	9
61 and over	1	3
Gender		
Male	21	38
Female	13	62
Highest level of education		
Grade 3 or equivalent certificate	7	23
Grade 5 diploma	8	27
Bachelor's degree	12	40
Master's degree	3	10
No response	4	
Graduated from teachers college		
Yes	21	78
No	6	22
No response	7	

Surveys

The first survey was collected on paper as participants arrived to the PD and comprised (a) demographic questions, (b) closed-ended questions about participants' own digital literacy practices and their knowledge of teaching methods related to digital literacy adapted from the Digitally Literate survey (O'Byrne, Mora, Hagerman, & Wu, 2018), and (c) open-ended questions about participants' goals for the PD. Thirty-four participants consented to use of their pre-survey for research. The responses informed the direction of the PD and provided information for this research. Surveys were again collected at the end of the PD (n = 40) with Likert-type scaled items to measure the effectiveness of the PD and closed-ended questions to help answer the research questions. Post-surveys were anonymous to encourage honest responses.

Field Notes and Participant Artifacts

The research team visited three schools before the PD, during which the two of us took field notes that included researcher observations, summaries and quotes from conversations, and photographs of the schools and materials. Artifacts developed during the PD were collected from all participants (n = 91) as products of learning. The first set of artifacts were participants' answers to questions during small-group discussions, collected on sticky notes. During this time, participants also completed a teacher-to-learner-centered continuum (Guthrie, 2011). Results are displayed in pie charts in the Findings section. During Design Studio, heterogeneous groups created digital stories based on a cultural, familial, or folk story. We collected the digital stories created in PowerPoint during Design Studio and video recorded the presentations on the last day. The final set of artifacts were created at the end of days 1 and 2 when participants were given opportunities to reflect and provide feedback to the team. These artifacts were collected on sticky notes, or a photo was taken of a whiteboard; text was then transferred to spreadsheets for analysis.

Interviews

Focus group conversations were organized by grade level taught and included all PD participants. Using the local community structure of baraza, participants sat in a circle, and each individual was given an opportunity to speak (Jwan & Kisaka, 2017; Naanyu et al., 2011). For the one-on-one interviews, six teachers who represented a range of content areas and grade levels within the larger group were interviewed using a semistructured interview protocol focused on digital literacy. Interviews provided an opportunity for participants to share in more depth than the focus group sessions and to share critiques, as the one-on-one nature is a more socially acceptable space for critique in this cultural context. Interviews were audio

TABLE 2
Data Sources

Data source	Collected from	Collection procedure	Relation to research question(s)[a]	Data analysis
Field notes of observations	Sample of two primary schools' classes and one secondary school's classes	Before PD	To contextualize data when answering both research questions	
Researcher-generated pre-survey	All participants	During PD	Research question 1	• Qualitative analysis of responses to open-ended questions • Frequency data and descriptive statistics of responses to closed-ended questions
One-on-one interview transcripts	6 participants maximum variation sample	During PD	Both research questions	• Qualitative thematic analysis
PD artifacts	All participants	During PD	Both research questions	• Frequency data based on the researcher-generated rubric
Researcher-generated post-survey	All participants	During PD	Research question 2	• Qualitative analysis of responses to open-ended questions • Frequency data and descriptive statistics of responses to closed-ended questions
Video call	Participants who were available for a follow-up call	After PD	Member checking of findings	

Note. PD = professional development.
[a]Research questions: 1. What are the Kenyan teachers' perceptions of digital literacy? 2. What digital literacy teaching strategies do Kenyan teachers' perceive (a) as culturally sustaining for learners, (b) as learner centered, and (c) as likely to overcome technological resource challenges?

recorded and transcribed. Protocols for focus groups and interviews are provided in Appendix B. Follow-up interviews were conducted via social media and video calls to provide member checking of the data and analysis.

Data Analysis

Surveys

From the pre- and post-surveys, we analyzed closed-ended survey responses and selections on the Likert-type scaled items by frequency and descriptive statistics. The statistics provided contextualization and corroboration for the qualitative data.

Interviews

We first analyzed the interview transcripts using thematic analysis (Braun & Clarke, 2006) to look for patterns to develop themes of teachers' perspectives on integrating digital literacy and learning-centered teaching into their classrooms in ways that are culturally sustaining in their context. For the first round of coding, we individually analyzed interview transcripts through direct interpretation in each individual instance. We then met and discussed aggregation of instances across participants to develop a codebook, including the codes authentic learning, hands-on learning, and learners need practice. We then used this codebook on HyperRESEARCH, a qualitative analysis software program, to code across participants (Stake, 2000).

Artifacts, Open-Ended Survey Responses, and Focus Groups

Graduate research assistants coded participant artifacts, open-ended survey responses, and focus group transcripts according to our codebook. We tested inter-rater reliability on the coding of the artifacts, open-ended survey responses, and focus group data at this stage. This resulted in over 80% coded the same, an acceptable level (Armstrong, Gosling, Weinman, & Marteau, 1997).

We met again to collaboratively look for patterns across participants and sources to answer our research questions. We grouped related codes together to develop themes. For example, active learning, authentic learning, interaction, learning by doing, learners need practice, participate fully, and hands-on were grouped together to form the theme active learning. Collectively across participants and sources, we organized the data into four overarching themes: perception of the need for (1) new literacies for learners, (2) creativity for learners, (3) collaboration and group work, and (4) creativity to overcome technological challenges. To increase trustworthiness, we then reviewed the data once more, looking for rival explanations (Yin, 2018). Finding little to no disconfirming evidence, the three themes remained and are described in detail in the Findings section. Disconfirming evidence is provided when present.

Findings

Through qualitative data analysis, we generated four themes to answer the research questions on teachers' perceptions of digital literacy and teaching digital literacy in their context. Participants saw digital literacy as important for 21st-century careers and related to creativity and collaboration. Each of the four themes is named in Kiswahili and English to honor the language and culture of our participants, to decenter English (if only briefly), and to better communicate the findings cross-culturally.

Ufahamu Mpya wa Wanafunzi: *New Literacies for Learners*

The findings of the study show that digital literacy is considered a relatively "new idea in Kenya," in the words of a high school science teacher. According to three interviewees, digital literacy is an emerging component in the types of careers they hope their students will have one day. The middle-grades English and science teacher stated,

> Most of the jobs nowadays, they want you to be perfect in ICT, and if you have that, you are good at computers, doing that work, you can get a job easily compared to a person who is not literate in ICT.

She listed typing, printing, email, and internet research as important career skills and added PowerPoint for teaching careers. However, a math teacher during the interview shared a different perspective, stating that many desirable careers did not require digital literacy, providing the example of teachers because "most primary schools don't have computers."

Participants' perspectives of digital literacy were made more complex through engagement in digital literacies during the PD. In addition to workplace digital literacy, participants felt that creativity (representing 15% of the total codes) and collaboration (representing 22% of the total codes) were important for their students to develop and that integrating technology with instruction provided opportunities for digital literacy practices that foregrounded both creativity and collaboration. The theme describing creativity for learners is described next.

Ubunifu kwa Wanafunzi: *Creativity for Learners*

In the focus groups after the first author's presentation on digital literacy, each grade-level group expressed the connection between digital literacy and opportunities for learners to express and develop creativity. One elementary teacher had received training from the local curriculum

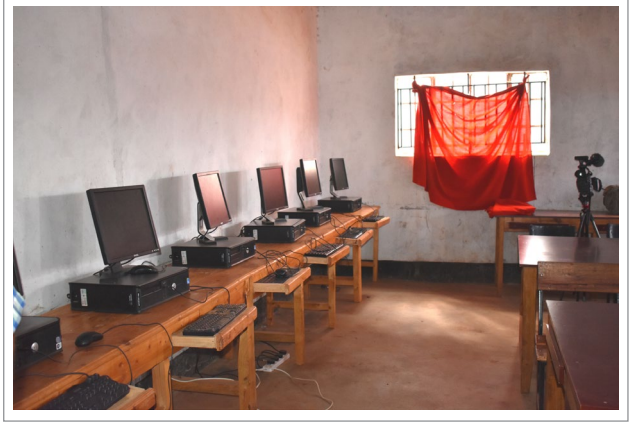
support officer on the new Basic Education Curriculum Framework that promotes creativity, imagination, and problem solving. He stated his enthusiasm to implement these concepts through digital literacy instruction in the interview. In this way, he could transform his practice by asking students to utilize devices and to create digital texts.

After being introduced to digital storytelling in the main PD session, the grades 1–4 focus group shared their perceptions that by "having children to come up with stories on their own," digital storytelling could promote learners' "creativity and critical thinking." At the end of the PD, we asked teachers if they believed that digital storytelling would be a culturally relevant way to teach digital literacy. An overwhelming 91% of survey participants believed that digital storytelling would qualify as a culturally relevant teaching method (see Figure 4). One participant enthusiastically stated on the survey, "Awareness on digital storytelling should be created among Kenya learners." In addition, when asked during the PD, "What did you learn that you will use in your classroom?" 10 out of 36 responses explicitly stated digital storytelling.

In addition to digital storytelling, a physics teacher stated in the interview that she believed that the curriculum should provide space for learners to practice creative problem solving. She spoke of change from learning being about knowledge acquisition to being about developing the digital literacy skills needed to find information online and construct new knowledge. She imagined

> a system that is more focused on skills being imparted on the learners and not just giving the information on what existed. They can innovate and come up with the new ideas on their own. So, the teacher now gives the next direction and not just giving them the information.

FIGURE 4
Computer Studies Classroom With Six Computers at the Observation Site



Note. The color figure can be viewed in the online version of this article at http://ila.onlinelibrary.wiley.com.

In this way, developing students' digital literacy skills would enable them to be lifelong problem solvers, able to find and create knowledge relevant to the problem at hand.

Another participant described the Science and Engineering Fair that her students had competed in for several years. She described the event as "all about the creativity and innovation among learners, promoting recycling materials and the environment and also reducing pollution." She works with her students to collaborate as a team to identify a problem, read about the underlying scientific concepts, design an innovation, and prepare an oral and written presentation. Here, she describes an innovation her students created last year:

> For example, we look for ways of using plastic instead of it being thrown in the rivers, and we come up with a product that can recycle the plastic. Last year, we were collecting all the plastic bottles and everything. When you melt them when they're still hot, you pour on an iron sheet. Then when they cool down, they make a plastic tile, which you can use for roofing. We have clay tiles, but now we can make plastic tile, and it is waterproof. Water cannot seep into your house. We have solved that problem for the nation.

This participant believes that this type of hands-on problem-based learning unleashes the potential of some of her students who may not always excel at traditional book learning:

> Some of them have a lot of potential that they have locked in them. So, through the science and engineering process, they unleash, because there is developing the project, writing it down, then presenting to judges. One is talented in the manipulation tests. The other one is talented in talking. So, as one is manipulating, the other one is talking about the product. That one helps them to realize their different abilities also.

As this participant had her students engage in reading about national problems and then creating and communicating transformative solutions, she had them working in small groups, which leads to the next theme.

Ushirikiano na Kazi ya Vikundi: *Collaboration and Group Work*

Through participation in groups to design digital stories, participants noted how writing could happen collaboratively with peers. Some groups delegated tasks, having two members draw the storyboard, others searching for pictures on smartphones, and another creating the slides. Other groups worked on each stage collectively, taking turns on the laptop when a particular skill was needed. An elementary teacher described how peer learning was a paradigm shift for both teachers and learners that is emphasized in the new Basic Education Curriculum Framework (KICD, 2019) and the training he had received (the same training as mentioned in the *Ubunifu kwa Wanafunzi*: Creativity for Learners section) that emphasized collaborative learning: "You must teach them on how to learn from others and to learn from themselves.

When they see how others are learning, they also participate." He explained how previously he had been trained to not allow students to help one another because it was considered cheating but that the paradigm shift viewed helping one another as collaborative learning.

In the one-on-one interviews, a middle-grades English and science teacher stated that it is typical for schools to have 80 students in a class and only five computers at the school. She proposed stations (e.g., what we modeled in PD breakout sessions) and teamwork (modeled in Design Studio) as a strategy to overcome the challenge of few computers:

> They could work in groups on the computer as we did. We can have 10 people working on one computer. We are working together as a team, so using it in a classroom, I can put learners in groups, and that will encourage unity, which will bring togetherness. The learners will work together as a team.

She went on to say how working in groups relates to the national symbol of harambee, where everyone brings what they have and comes together:

> This one will bring ideas on what we are to write. The other one is going to do this. You are going to write something before we type. Yeah. And everyone needs to be involved for that work to be complete.

She imagined that her stations would involve some groups on computers and other groups working on writing with pen and paper.

Her thinking of collaboration was akin to resource-based thinking. She viewed collaboration as a way for all students to contribute from their interests and strengths. In talking about her students, a different participant stated that she "want[s] to focus more on their [learners'] interests and their strengths to boost their academic life." The focus on all learners was a frequent code in the study.

This participant also stated that it is typical in her community for everyone to do their share and that not one person would necessarily be the leader. Another interviewee corroborated this idea:

> Teamwork is really important. Most of the time, no one is going to be the leader. No, we come together, we share an idea, we can do something together. It makes everybody participate and makes everybody feel appreciated. Everybody is allowed to participate. It really helps a lot.

In the reflection activities, one secondary teacher shared that learner-centered teaching that involves collaboration enables "learners with different learning abilities to be incorporated successfully," and a primary school teacher said that he would share with teachers at his school that "team/group work leads to success." Overall, participants felt that collaboration among students could be successful in their teaching contexts, and they appreciated experiencing group work during the PD in a context similar to their own contexts. Participants believed that creativity and collaboration were complementary concepts and were important not only for students but also for teachers, which leads to the next theme.

Ubunifu wa Kushinda Changamoto za Teknolojia: *Creativity to Overcome Technological Challenges*

Participants described using technology to support their teacher duties or to show students teacher-curated digital content. All six interview participants reported using software for teacher record keeping and the internet to search for curricular content. Only one interview participant reported having students actively using computers; this physics teacher asked students to conduct an internet inquiry to collect and study information. Using technology as a teacher resource was also seen in the Digitally Literate survey (see Table 3 for results of the survey). Of note is that 65% reported using technology for teaching, and 53% reported using the internet at school, with the rest choosing no or not responding.

During our field observations of three local schools, the first primary school did not have internet or devices. The second primary school had eight tablets locked in the head teacher's office and had not used the tablets with learners. The secondary school had six desktop computers and an LDC projector in the computer lab (see Figure 5). There were no students in the lab during our observation. When asked how many students take a computer class, the teacher reported that she has 60–100 students enrolled in each of her four computer classes, so she does not use the computers when she is teaching theory. When asked if this was typical, a school leader replied, "All learners [at the secondary level] have to take an examination on computer studies, a paper examination. Teachers use paper to teach technology" (field notes, June 4, 2019).

Because of the challenges, teachers reported needing to be creative to integrate technology into their literacy classes. Two creative solutions were having students work in groups and using personal smartphones, as such phones are more plentiful in Kenya than computers (Muigai & Mantz, 2019). An early childhood teacher imagined showing videos of animals on her phone so students could see and hear what different animals sound like. In the interview, an elementary teacher described how she used her personal smartphone in her classroom:

> I use my phone for grade 1. After downloading a video, like David and Goliath, then I put learners in groups because I have 15 learners. I show five, and then I show the other two groups. We have textbooks also. So, when two groups are looking at the pictures in the book, then the other group watches the video.

In addition to using her phone, this teacher presented the creative solution of using stations and groups to overcome the challenge of a lack of devices. We modeled during the

TABLE 3
Results From the Digitally Literate Survey

Question from the survey	Frequency of responses
Do you consider yourself someone who is comfortable with various modes of technology?	
Yes	24
No	2
Where do you usually acquire your main course information?	
Textbooks	30
Personal knowledge	22
Internet	19
Via social media/WhatsApp	13
Newspapers	12
In which of the following places do you use the internet?	
Home	20
School	18
Internet café	16
Community center/ nongovernmental organization	7
Pub	1
I do not use the internet.	2
List the most common websites that you ask learners to routinely visit.	
Google	4
Digital Schools	2
e-Learning	2
YouTube	2
Familydoctor.org	1
Wikipedia	1
Learn.e-limu.org	1
Pinterest	1
Weebly (taught in the 2018 PD)	1
None	1

PD how to manage stations and how to work in groups so groups of learners could share available devices.

Discussion

Our purpose in this study was to explore participant perceptions of digital literacy and transformative literacy teaching. Findings revealed the need for learners to engage in new literacies, creativity, and collaboration, as well as the need for creativity to overcome resource challenges. Overall, teachers held a theoretical value of teaching digital literacies to their students in a learner-centered fashion, where all learners used devices to construct digital texts, but perceived a lack of resources as a barrier to teaching digital literacy in this way.

Our case adds evidence of positive perceptions about learner-centered teaching to Anderson et al.'s (2015) and Jwan and Kisaka's (2017) cases in Kenya. Guthrie (2011) proposed that learner-centered teaching reforms have failed in many low-income countries because this teaching style is individualistic and hence not relevant within cultures that value collectivism. In addition, Tabulawa (2013) highlighted the decades of systematic attempts to reform education in sub-Saharan Africa and the eminent failures of these reforms, most of which lacked the necessary cultural impetus that values collectivism over individualism. However, relating the findings to the cultural symbol of harambee in Kenya provides a new lens from which to view learner-centered digital literacy instruction in this particular Kenyan context.

Literacies and the Cultural Lens of Harambee

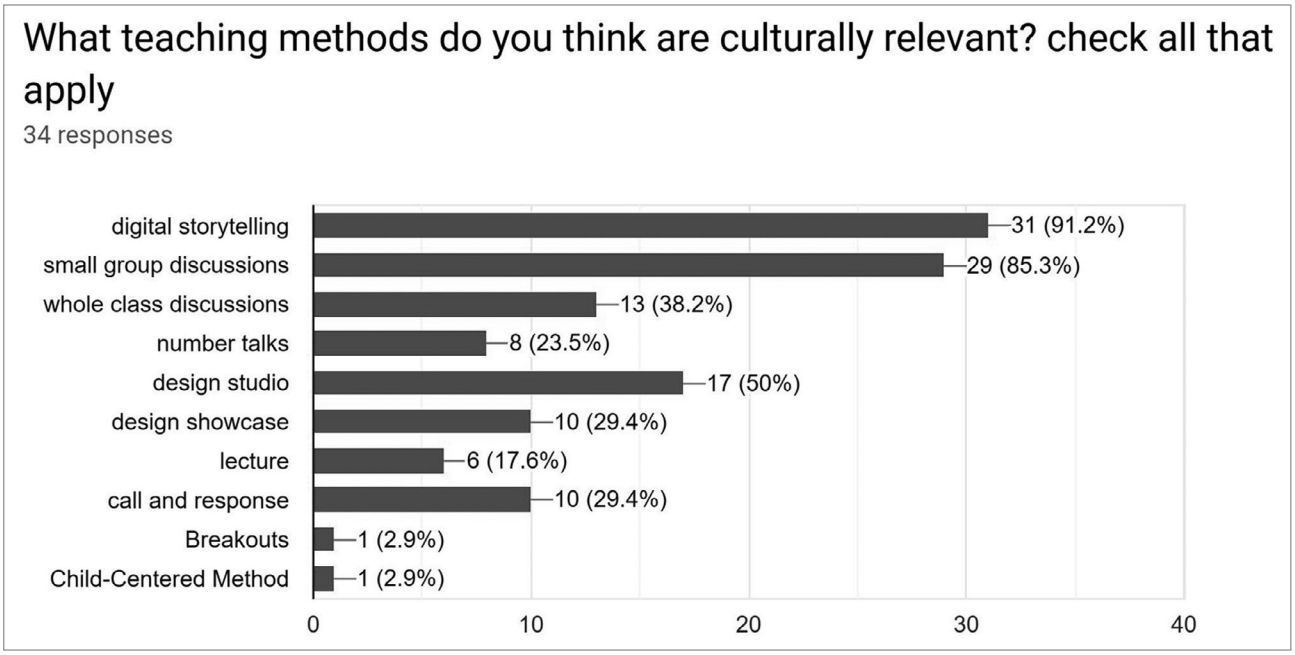
Relating learning-centered teaching of digital literacy to the Kenyan cultural symbol of harambee provides a strengths-based perspective of both the context and the students. Harambee represents teamwork and community. A participant stated in the interview,

> Harambee is a big value that we have. We have a saying: "My child is not my child. My child is of the community." So, when we educate a child in our community, the responsibility is not for that family. It is for everybody.

The symbol of harambee means that the community works as a team in education, conceptualizing the sharing of the responsibility of education between parents and teachers because harambee could help break down barriers between home and school (Njeru, 2015). Additionally, breaking down home–school barriers could lead to other transformations in teaching. For example, out-of-classroom learning opportunities afforded by the internet hold potential for reforming digital literacy instruction in classrooms by reframing the focus from knowledge acquisition to construction and creation.

Harambee could also apply within schools in that students could work as a team to learn. Rather than education being the sole responsibility of the teacher, the responsibility shifts from one individual to the class collectively. Research on using group work for literacy instruction in Kenyan schools has emerged in the last decade. Abuga, Maina, and Meitamei's (2019) quantitative research in 19 preschools in Kenya found that group work was used frequently in reading instruction by almost half of the teachers surveyed (n = 45.37% strongly agreed or agreed) and

FIGURE 5
Frequency Results From the Post-Survey



that use of group work had a statistically significant positive correlation with students' reading ability. In their results, the researchers stated, "Teachers' high frequency of use of group work activities associated with better reading skills among pre-primary children" (p. 252). Additionally, Dhillon and Wanjiru (2013) found that working in groups created space for primary students to utilize their full repertoire of linguistic resources, which is especially important in Kenya where the language of instruction is often English instead of the students' first language. The value of teamwork and community relates to the study's theme of the desire for more collaborative learning in the participants' practices, and with the emerging positive results from literacy research on group work in Kenya, collaborative learning holds promise both as a culturally sustaining teaching practice and as meeting the government's push for innovative learner-centered teaching.

Harambee also represents coming together, as a participant explained:

> Say we want to build up a school, so we shall bring everybody onboard. Then, everybody will contribute a little money. If you do not have money, you can come with a chicken, you can come with eggs or corn. Then, we bring them together, and people will buy it like an auction, and money is raised. That is what we do to raise that building. We call it harambee.

In this way, every person brings assets to the group. This relates to the educational innovation of using heterogeneous group work during instruction, previously advocated for in East African contexts by Altinyelken (2010). *Heterogeneous group work* here refers to mixed-ability pairs or groups of students collaborating together on a common assignment, allowing all students to use their strengths to collectively help one another during the learning process. Highlighting each learner's strengths may seem individualistic; however, through the cultural lens of harambee, each individual's strength is seen as an asset for the good of the group.

Limitations

In this article, we presented qualitative findings from a diverse group of educators in a rural county in Kenya and quantitative results from a small sample within the group. As the first limitation of our study, the results of the study cannot be generalized to the whole of Kenya. Future research could determine the transferability of the findings to other parts of Kenya and rural schools in developing countries more broadly. Second, our roles as participants and team leaders during the PD may have influenced participants' responses during focus groups and interviews, as they may have wanted to please us or to save us from embarrassment in their responses. Third, the study took place during a short time frame during PD, and data sources were mostly self-reports. As such, the data revealed participants' perceptions and aspirations and, although positive, did not provide evidence of practice or implementation. Further research using prolonged engagement in schools could provide evidence on actual practice.

Implications for Future PD and Research

Before participating in the Inquiry Initiative, some teachers had never touched a computer before. Our community partner shared,

> In June 2018, about 60 teachers came to attend the training, and it became an eye-opener to the teachers. At this 2019 Inquiry Initiative, some of these teachers returned having not touched a computer since last June. Other teachers were new, having never touched a computer before.

In contrast, other teachers attended wielding their own smartphone and laptop with exceptional skill. Currently, there is little opportunity in the county for the teachers with skills to teach others. Whereas teachers at the same school may informally collaborate and share expertise, teachers attending the Inquiry Initiative in 2018 and 2019 were happy for the opportunity to network across the county. We hope to formalize this network to make the work sustainable. In 2019, we and the preschool teachers created an Early Childhood Education Professional Association for the county (see Kerkhoff et al., 2020). The association has continued meeting monthly and has grown in membership. In the future, we hope to create a similar network for the primary and secondary teachers. To meet the need presently, we created the Inquiry Initiative Facebook group with over 240 members to share and collaborate across space, time, and borders.

As for research, the findings of the study contribute to the field of literacy education by adding the context of digital literacy professional learning during one-on-one initiatives in low-resource areas with the case of a rural county in Kenya. Our study adds evidence to Masingila et al.'s (2019) assertion that the number of teachers implementing ICTs is few, and of those who are, most are using ICTs to aid with administrative tasks or instructional delivery rather than asking learners to engage with ICTs directly. Research has suggested that teacher-to-teacher learning can enhance one-on-one implementations (Oliver, 2010), but there has been no research on such networks in rural Kenya. Future research on professional learning about digital literacy in low-resource areas could investigate teacher networks as sites of learning or sites of resistance.

In addition to teachers learning from peers, students can also learn from peers through collaboration. A practical application of this study is that computer labs in low-resource areas could be set up to allow for collaboration. For example, in one school we visited, the six computers that the school owned were placed side by side along one wall. When thinking about collaboration as a strategy to overcome resource challenges, computers would instead be spread out and placed in a way that allows for five to 10 students to view one screen. Future research could examine culturally sustaining norms for collaboration in Kenyan contexts, effective group work strategies for digital literacy learning, and whether increased internet access results in transformation in Kenyan literacy instruction.

Working in groups and using smartphones in school were solutions teachers created to solve technical challenges in this study. However, challenges to internet access and electricity remain common, as is the case in other developing countries (Livingstone et al., 2017). Teacher and learner creativity could possibly be instrumental in supporting daily gadget charging, storage, and usage. Future research could share more creative solutions to technical challenges, too.

As we continue with future PD and research on literacy instruction in Kenya, we continue to draw from postcolonial theory with the goal of amplifying local knowledge and cultural relevance. We agree with Lattimer (2015), who when working in Kenya asserted, "The student-centered approach that prioritized local relevance and critical thinking was seen as fitting within a larger narrative of resistance to colonialism" (p. 66). It is possible that the experiential nature of the PD with teachers exploring side by side in their local context (Lucas & Villegas, 2011), as well as the smaller group discussions in which teachers related the new strategies to their existing pedagogies (Jukes et al., 2017), provided space for transformative and culturally relevant practices to emerge. Our study shows that there is optimism that such PD opportunities can transform teaching and learning in Kenya in organic and sustainable ways.

Conclusion

Through our researcher-led PD series, we explored culturally sustaining teaching in line with the Kenyan government's initiatives for innovating teaching and digital literacy implementation. The teachers in our study faced many challenges when trying to meet the ambitious pursuit of digital literacy for all. Our study evidences the creativity and resourcefulness of teachers as they imagine new practices that hold potential for overcoming challenges. Our study also evidences how teachers can meaningfully involve their students in creative problem solving using limited resources. Such creativity is at the forefront of supporting learner-centered and culturally sustaining pedagogies necessary for decolonizing Kenyan literacy education curriculum.

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APPENDIX A

Professional Development Agenda

Wednesday	
9:00	Greeting of participants (pre-survey 9:00–9:30, buffer zone for people arriving)
9: 30	Who are we, and why are we here? • Welcome by Dr. Peter Wanyonyi, president of the Board of Governors and founder of Hope Education Centre in Kenya • Introductions of Kenyan team members • Introductions of international team members • Icebreaker to allow participants to introduce themselves to one another and the research team
11:00	Tea
11:30	Keynote on digital literacy by an expert from the United States
12:30	Baraza focus groups: What insights or questions do you have about digital literacy with your standard or form?
1:00	Lunch break
2:00	Breakout sessions: Choose one session to attend: • Using Google Play on tablets, by an expert from The Gambia • Integrating technology for learner-centered literacy instruction, by an expert from the United States • Integrating technology for learner-centered math instruction, by an expert from the United States • Content area literacy strategies, by an expert from the United States • Early childhood literacy instruction, by an expert from the United States • Health literacy, by an expert from Uganda
3:00	Keynote by a teacher leader from Kenya
4:00	Design Studio: Choose your cultural story to share.
5:00	Wrap-up +/Δ
Thursday	
9:00	Review the +/Δ from yesterday with Dr. Peter Wanyonyi (9:00–9:30, buffer zone for people arriving)
9:30	Design Studio: Storyboard your digital story and create images and audio.
10:00	Keynote on Digital Literacy Programme tablets by an expert from The Gambia
11:00	Tea
11:30	Keynote on learner-centered inquiry, by an expert from Uganda
12:30	Baraza focus groups: What insights or questions do you have about learner-centered teaching with your standard or form?
1:00	Lunch break

(*continued*)

Professional Development Agenda (*continued*)

Thursday	
2:00	Breakout sessions: Choose a second session to attend.
3:00	Breakout sessions: Choose a third session to attend.
4:00	Keynote by a teacher leader from Kenya
5:00	Wrap-up +/Δ
Friday	
9:00	Review the +/Δ from yesterday with Dr. Peter Wanyonyi (9:00–9:30, buffer zone for people arriving)
9:30	Keynote by a teacher leader from Kenya
10:30	Keynote on internet safety by an expert from the United States
11:00	Tea
11:30	Design Studio: Create your digital story.
1:00	Lunch break
2:00	Design Studio showcase
3:30	Culminating activity (and post-survey): Dr. Shea Kerkhoff, Dr. Timothy Makubuya, and Dr. Peter Wanyonyi
4:00	Certificate ceremony and group photo
5:00	Reception

Note. + refers to positives from the day, and Δ refers to what should be changed for the next day.

APPENDIX B

Research Protocols

Recruitment Protocol

Good morning. My name is Shea Kerkhoff, and I am a professor at the University of Missouri–St. Louis in the College of Education. Dr. Peter Wanyonyi, the founder of Hope Education Centre where we are meeting and president of the Board of Governors of the community school, has allowed for me to come before you to see if you would be interested in participating in a research study we are conducting on learner-centered teaching and digital literacy.

You will be asked to interview with a research team member for about 20 minutes during the professional development session, to allow us to observe your professional development time, to participate in two focus group discussions, and to share products related to the professional development with the research team over the course of the next 3 days.

You do not have to participate in the research to be in the PD. Being in the PD does not require you to participate in research. If you are interested, I have consent forms here for you to come up and look over, and I would be happy to answer any questions you may have regarding the research.

Focus Group Protocol

Participants will be broken into groups by grade level taught:

- Kindergarten and nursery
- Lower primary (standards 1–4)
- Upper primary (standards 5–8)
- Secondary (forms 1–4)

Thank you for agreeing to be part of a group discussion about your goals for the professional development session and your context for implementing the training related to literacy, learner-centered teaching, and technology. Participation in this focus group is voluntary and not part of your

responsibilities as a classroom teacher or as a participant in the professional development session. You may choose to stop the group discussion at any time. Would you mind if I audio recorded the focus group? It will help me to stay focused on our conversation, and it will ensure that I have an accurate record of what we discussed. At any point, if you would like me to turn off the audio recorder, just let me know. Any personal identifiers will be removed during transcription. Are you ready to begin?

1. What insights or questions do you have about digital literacy with your standard or form?
2. What insights or questions do you have about learner-centered teaching with your standard or form?

Interview Protocol

Thank you for agreeing to be interviewed about your goals and instructional processes related to literacy, learner-centered teaching, and technology. Participation in this interview is voluntary and not part of your responsibilities as a classroom teacher or as a participant in the professional development session. You may choose to stop the interview at any time. Would you mind if I audio recorded the interview? It will help me to stay focused on our conversation, and it will ensure that I have an accurate record of what we discussed. At any point, if you would like me to turn off the audio recorder, just let me know. Any personal identifiers will be removed during transcription. Are you ready to begin?

1. What does a person need to be literate in your culture?
   - What literacy is needed to participate in the democratic process?
   - What literacy is needed for good jobs?
   - What literacy is needed to participate in community?
2. Tell me about learner-centered teaching in Kenya.
3. Tell me about how technology is being used in schools.
4. How is/did the PD going/go?
   - What from the PD did you think is relevant to your students and teaching context?
   - What from the PD do you think will be feasible in your context? What do you think you can implement in your classroom? (probe for self-efficacy)
   - What from the PD will not work for you? Why?
   - What do you think will be a stretch (or challenge) for you as a teacher?
   - What challenges do you expect to encounter, and how will you overcome them?
5. How could we improve the PD for next time?
   - What do you wish to learn more about?
6. Is there anything else you would like to share?
7. Any needed probes for examples and clarifications