Impact of Professional Development on Technology Innovation Implementation by Ugandan Teachers: A Mixed Methods Study

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Abstract
This mixed methods study examines the impact teacher professional development has on the levels of concern of nine Ugandan teachers as they begin to use computers in their school environment. These teachers completed the Stages of Concern Questionnaire before and immediately following training on the basics of how to use a computer for educational purposes. Additionally, qualitative data in the form of interviews and written responses were collected and analyzed to look at what aspects of the training were considered to be most beneficial to the participants. The results of the quantitative data suggest the teachers' level of concern in three of the seven levels decreased after training was provided. The results of the qualitative data show the teachers would like more time to experiment with the new information they learned through the professional development and want input into what they will be learning.
Keywords: Uganda, teacher, professional development, technology, education.

Влияние профессионального развития на внедрение инновационных технологий учителями Уганды: смешанный метод исследования

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Аннотация
В этом смешанном методе исследования рассматривается уровень обеспокоенности 9 школьных учителей из Уганды относительно их уровня подготовки к использованию компьютеров в их преподавательской деятельности. Данные были собраны при помощи опросников, проводимых до и после обучения участников исследования способом использования компьютера в образовательных целях, а также интервью с целью сбора мнений участников исследования о том, какие виды деятельности, которые были использованы при их подготовке, были наиболее эффективными для повышения их уровня подготовки к использованию ком-

пьютеров в преподавательской деятельности. Результаты количественных данных свидетель-
ствуют о том, что уровень обеспокоенности учителей относительно их уровня подготовки к
использованию компьютеров в их преподавательской деятельности снизился после обучения
относительно трех из семи уровней. Результаты качественных данных показывают, что учи-
телям хотелось бы иметь больше времени для работы с новой информацией, приобретенной
в результате обучения. Коме того, учителя хотели бы принять участие в разработке програм-
мы их тренинга.
Ключевые слова: Уганда, учитель, профессиональное развитие, технологии, образование.

Introduction

In both advanced and emerging economies technology has been used to address
concerns of education equity and social inclusion. National Governments and Non-
Governmental Organizations (NGO's) have funded educational endeavors in emerging
economies, to advocate for the use of technology in reducing cost of reaching and educating
large populations that may otherwise miss out on the educational experience (Gulati,
2008). However, the global diffusion of information and communications technology
(ICT) has not yielded the envisaged results. In this paper, we argue that one way to realize
the promises of technology in education is through professional development for teachers.

The use of technology has had a profound impact on cultures worldwide, and is often
viewed as a means of improving what already exists. Technological innovations have
not only impacted human lifespan but have affected how people relate to one another,
how cultures have expanded and have enhanced communication processes (Bray, 2007).
In education particularly, technologies can provide benefits such as cost-effectiveness,
convenience, self-pacing, learner-control, interactivity, and can improve, enhance or
perhaps revolutionize teaching and learning (Derouin, Fritzsche, & Salas, 2005).

However, technology cannot provide benefits in education without the user. In the
context of this paper, the user we are concerned about is the teacher. Bringing about the
benefits of technology touted in the literature depends on a variety of things, one which
is the professionalism and expertise of teachers as it relates to content, pedagogy, and
appropriate use of technology (Bowe & Pierson, 2008, Mishra & Koehler, 2006; Pierson,
2001). In other words, teachers must also be convinced that technology will bring
about benefits such as increasing student learning (Bowe & Pierson, 2008). One way to
accomplish this is through Teacher Professional Development.

Teacher professional development

Teacher Professional Development (TPD) has been referred to by names such as in-
service training, seminar, conference, or training. It also takes on many different forms
such as lecture, hands-on, collaboration, or multimedia, yet their purposes are always
to improve the quality of teaching. TPD is used to mentor and guide new and tenured
teachers through best practice approaches and provide support for the overwhelming
job of being an educator. Continued education is the only way school systems have to
improve the performance of educators (Mizell, 2010).

Introduction of an innovation, whether it be curricular, teaching styles, technology
or another improvement, must be done through a well-designed training plan (Lei &
Morrow, 2010) developed with consideration of the teachers' attitudes, beliefs, and
perceptions in mind (Scott & Sutton, 2009). This is because teachers are very emotionally
invested in their teaching practices and altering their pedagogy is a difficult exercise (Scott
& Sutton). Researchers examining the impact of teacher beliefs on technology integration
found that the need to provide training for pre-service and in-service teachers is vital if
they are to find new ways present educational ideas in regards to accepting and using
technology effectively in the classroom (Palak & Walls, 2009; Yu-Mei, 2002).

School and teacher improvement reform is often initiated at the governmental level, but not always undertaken at the school site level (Zimmerman, 2011). Initiatives to reform educational practices are meant to improve the quality of instruction, yet many teachers in areas such as sub-Saharan Africa do not have the opportunity to learn how to change their pedagogical practices due to lack of training or professional development opportunities (TTISSA, 2007).

With the documented need of professional development (Mizell, 2010), coupled with government initiatives for child-centered, improved educational practices, it is imperative that teachers are engaged in meaningful professional development. There is limited availability of trainers and resources for some areas which adds to the need of appropriately designed professional development. This type of TPD is necessary for teachers to be able to comfortably implement innovations into their pedagogical methods.

TPD in Uganda

Studies consistently show that training opportunities assist teachers in implementation of innovations (Rakes & Casey, 2002). Despite widespread belief that professional development is essential for teachers to acquire relevant skills using best practice approaches, not all teachers gain additional knowledge once they leave the university setting. Access to professional development is essential for pedagogical growth and continued learning for today's teachers (Mukeredzi, 2013). However, teachers in sub-Saharan countries like Uganda are not being given appropriate TPD opportunities facilitated by quality designers or presenters (Dembélé & Lefoka, 2007).

Implementation of innovations such as new practices or technology can be challenging to a teacher's beliefs, attitudes, and perceptions, but the provision of professional development by knowledgeable educators has been shown to alleviate some of the obstacles to the successful application of these innovations (Scott & Sutton, 2009). Ugandan teachers are not receiving new information, such as changing educational mandates and best practices concerning education. This is not due to a lack of desire for continued education by teachers or lack of progress from the government, but rather due to a lack of resources to access schools and teachers (Altinyelken, 2010).

Duncan-Howell (2010) examined current professional learning options for teachers and found several characteristics that need to be present to conduct a successful learning opportunity whether it is face-to-face or facilitated by technological tools. First, input about the topic of the learning should include both teachers and other stakeholders. Often, this is determined solely by administrators or other stakeholders leading to potentially irrelevant topics. Ideally, content should be «authentic and directly related to teacher's concern» (p. 325). Additionally, the delivery method should adhere to conditions related to the teachers' needs, as well as their learning styles. When professional development is provided, it is often based upon what is available and not on best practice. This is largely due to the distance between schools and areas of teachers making it difficult to provide the necessary people and resources for training (Muskin, 2015, p. 99).

Background and context

Uganda is located in East Africa, bordered by Kenya in the east, South Sudan in the north, the Democratic Republic of the Congo in the west, Rwanda in the southwest and by Tanzania in the south. The country is home to approximately 34 million people; of those people, almost half are under the age of 15 (Dobronogov, May, Ritter, Lofgren, & Flores-Martinez, 2011). In 1997 Uganda instituted a Universal Primary Education Program, which provides optional free primary education for all Ugandan children. The implementation of this program led to over 90% of school-aged children enrolling in a primary school by 2010 (United Nations, 2013).

Efforts have been made for increased use of educational ICT in Ugandan schools through initiatives such as New Partnership for Africa's Development (NEPAD), but have yet to fully infuse the educational system due to logistics and infrastructure weaknesses (Evoh, 2005). Other initiatives have been implemented with the intent of distributing and promoting the use of computers (Cossa & Conje, 2004), not only for use in schools, but also for sharing of information that could help cure or prevent the further spread of illness, finding better and more effective ways for production, and ultimately allowing Africa to find solutions on their own. (Odedra, Bennett, Goodman, & Lawrie, 1993).

The school where this study took place is located in Nyenga, located approximately 80 kilometers east of Kampala, the capital of Uganda. The school is often without electricity and had no computers before the donation of three laptops for TPD. There are approximately 175 students in nursery school to Primary 7 (P7) enrolled in the private school with ten teachers and one administrator.

Motivation for the study

The researcher became involved with this school at the request of the director to provide annual TPD. Previous TPD at this site provided by the researcher and other trainers brought in by the director included literacy, math, classroom management, and project-based learning. The current study arose from a prior TPD visit by the researcher in which the teachers gave input into what types of TPD they would like to have provided to them. Research has shown that to conduct a successful learning opportunity teachers need to have input into what types of TPD they are offered (Duncan-Howell, 2010). The teachers at Nyenga requested getting access to computers and learning how to use them. However, with the majority of teachers' self-reporting they had limited or no prior use of computers, the researcher wanted to ensure the teachers received instruction on not only how to use the devices, but also how to integrate them into their pedagogy (Mishra & Koelher, 2006). This lead to a four week TPD on how to use a computer in the classroom and the current study.

Theoretical orientation

Two theories guide this study: Diffusion of Innovations Theory (DOI) (Rogers, 1995) and Concern of Teachers (Fuller, 1969). DOI examines conditions that increase or decrease the probability that an individual would adopt an innovation. This theory explains how an idea is adopted over time, gains momentum, and then spreads through society or an organization such as a school. Members of a system progress through five stages as they decide on whether or not to adopt an innovation. Rogers also identifies five adopter categories which include Innovators who are usually the first set of people to adopt the innovation, Early Adopters who are usually considered leaders, but need a bit more information before adopting a new idea, Early Adopters who tend to adopt before the average person, Late Majority who are skeptical of change, but will try the new innovation once a majority of people have already tried it, and the Laggards who are very resistant to change and are difficult to bring aboard in regards to new ideas and change.

Frances Fuller (1969) developed a compatible theory of concerns about change or innovation integration specifically in pre-service teachers. Fuller theorized that teacher concerns regarding change are centered around three components; self, task, and impact. This theory was the catalyst to Hall, Wallace, & Dosset's (1973) study of these concerns also being present in in-service teachers regarding the implementation of innovations which led to the development of the Concerns Based Adoption Model (CBAM). The concerns theory suggests there is a set of characteristics exposed with the introduction of an innovation. These concerns are grouped into seven stages of concern in which teachers tend to progress through when they are asked to include a new skill, task, or tool (Figure 1).
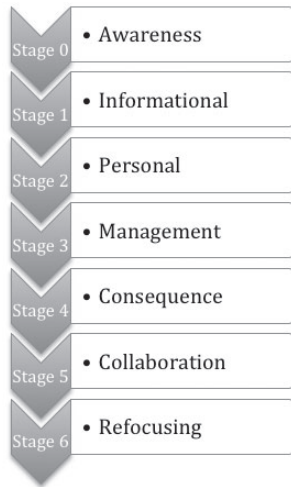
Fig. 1. Stages of Concern. This figure illustrates the seven possible concerns as related to an innovation as described by Hall, Wallace Jr., and Dosset (1973).

Method

This mixed methods study addresses which aspects of professional development have an impact on technology innovation implementation on teachers in Nyenga, Uganda. A mixed methods design (Figure 2) was used in which interviews were embedded within a quantitative design. The quantitative data was used to test Fuller's (1969) theory that predicts training will have a positive influence on the perceptions and attitudes of teachers on technology integration. The interviews were embedded in the larger design after the pre- and post- questionnaire for the purpose of determining which aspects of the professional development have an impact on innovation implementation. Qualitative data explores change in teacher concerns about new programs and practices for teachers at Nyenga School.
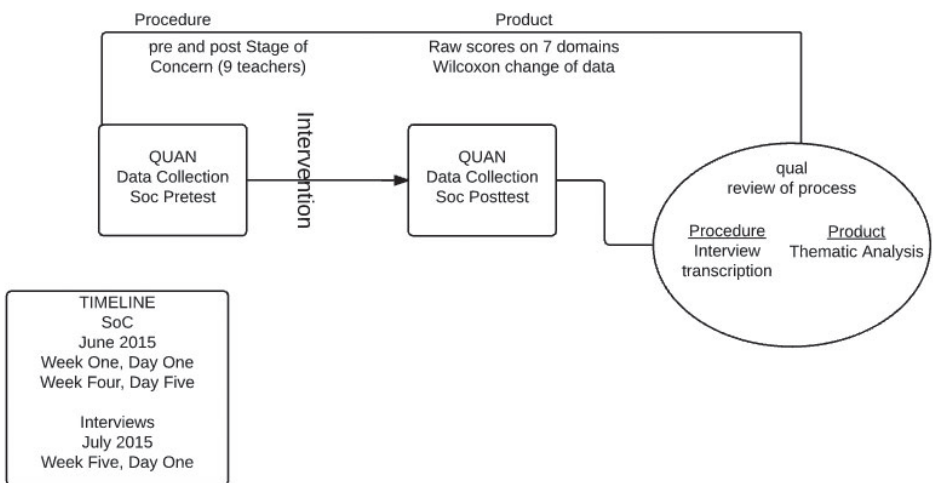

Fig. 2. Embedded Design Diagram. This figure is based on embedded design model by Creswell & Clark (2007).

The research questions for this study are as follow:

1. Is there a difference in teachers' attitudes towards innovation implementation before and after professional development is provided?

2. What aspects of professional development have an impact on the teachers' perceptions, attitudes, and beliefs about implementing an innovation?

Participants

Participants in this study include a sample of teachers from Uganda (Table 1). The researchers collected data from nine in-service teachers from a school located in Nyenga, Uganda which includes a nursery school and grades P1 through P7, ages 4-13. Five of the nine participants identified themselves as "non-users" in the use of computers. Three indicated they were "intermediate" users and one stated they were a "past user." All but one participant stated they had never received any formal training such as workshops or courses regarding this innovation in the past.

Table 1. *Participant Demographics*

Categories	Results		
Number of Years Involved with Innovation	Never	1 year	2 years
	78	11	11
Received Training on Innovation	Yes	No	
	0	100	
Gender	Female	Male	
	44	56	
Age	20-30 years	30-40 years	
	78	22	

Notes. N=9, numbers presented as percentage.

Materials

Integral to our study is the argument that teachers play a crucial role in the adoption and promotion of an innovation. As such, our unit of analysis is teachers. To examine the concerns that teachers have about the use of technology, we used the Stages of Concern Questionnaire (SoC). The SOC is one of three components of the Concerns Based Adoption Model (CBAM) which was developed at the University of Texas Research and Development Center for Teacher Education and empirically researched in the 1970s and 1980s (Anderson, 1997). CBAM and by extension SOC are concerned with educational change, and recognize that change is a process not a single event. Established by Hall, George and Rutherford (1977), this instrument was used because of its focus on teacher's concerns about the implementation of innovations. The SoC measures seven stages of concern: Stage 0-Awareness, Stage 1-Informational, Stage 2-Personal, Stage 3-Management, Stage 4-Consequence, Stage 5-Collaboration, Stage 6-Refocusing. Each participant answered 35 questions based on an eight-point Likert scale where 0 is "not true of me now," and 7 is "very true of me." The higher the number, the higher level of concern the participant exhibits. Each stage is represented by five questions scattered in random order among the other questions (Appendix A). Raw scores for each of the stages are calculated by summing the scores from each scaled group. In addition to the 35 Likert-type questions, there are four demographic questions with one being open-ended.

The developers of the instrument calculated the Internal reliability using Cronbach's alpha with coefficients ranging from .64 to .83. According to Hall, George, and Rutherford

(1977), only the statements, or items that correlated highly with responses to other items measuring the same Stage of Concern than with responses to items for other stages were included. Various studies have been conducted using the instrument and affirming its validity. The developers also conducted a validity study through two analyses from 363 teachers who completed a pilot questionnaire. The data was used to compute a correlation, and a matrix was developed (Hall, George, & Rutherford, 1977). The second source of data collection includes the completion of two written questions at the end of two training sessions and interviews at the conclusion of the four-week training.

Research design, procedures, and statistical analyses

The study was conducted through a two-phase mixed methods embedded design. A mixed methods study includes both quantitative and qualitative methods of data collection and analyses. In addition to using multiple methods, the researcher integrated the results to draw upon the strengths of each method. This design was selected to include data to answer the secondary research question within this predominantly quantitative study. The qualitative strand is used to describe or explain the results of the quantitative strand.

Quantitative

Before the initial training, participants completed the SoC questionnaire. Raw scores for each domain were calculated for each participant. After four weeks of training were finished, participants completed the same SoC questionnaire. Again, raw scores were calculated from the post-test data. Due to the small sample size, a nonparametric test was needed to analyze the data collected from the pre- and post-tests. If the sample size were large enough to invoke the Central Limit Theorem the appropriate parametric test to compare two sets of data, which can be represented in pairs, like a pre- and post-test, would be a matched-paired t-test or dependent t-test. However, since there was a smaller sample size that cannot be assumed to be normally distributed, a comparable nonparametric test, such as the Wilcoxon Signed-Ranks test was used. The assumptions for a Wilcoxon Signed-Ranks test are that the data is paired and comes from the same population, each pair is chosen independently, and the data are measured at least on an ordinal scale are met and ensure justification of the use of this test.

Qualitative

After two training sessions, participants answered a written two question survey, and after completion of the training and the pre- and post-questionnaires, the participants were interviewed with questions developed from the results of the quantitative data analyses (Appendix B). The written survey questions included the questions, "What did you learn today?" and "What would you like to learn?" The qualitative data was coded and analyzed to develop themes. Themes were quantified as to the frequency of occurrence and ranked according to their frequency. The theme rankings were reviewed to determine which aspects of the professional development training had an influence on the change, if any, in the seven domains of the concerns assessment.

Results

In this section, we first present the analysis of the quantitative data and then move to presenting the qualitative data.

Quantitative

The pre- and post-scores from all stages were analyzed using seven Wilcoxon Signed-Ranks Tests (Table 2). The results for Stage 2, 3, and 5 are statistically significant.

Table 2. *Wilcoxon Signed-Ranks Data from Teacher Stages of Concern Pre- and Post- Tests*

Stage	Before Sum of Rank	After Sum of Rank	Z Score	Significance
0	34.5	3.5	-1.424	.154
1	37	8	-1.724	.085
2	40.5	4.5	-2.134	.033
3	43.5	1.5	-2.499	.012
4	31	5	-1.820	.069
5	26.5	1.5	-2.120	.034
6	13	23	-.703	.482

Qualitative

The interview data along with the written replies to the two questions were coded using Strauss and Corbin's (1990) open coding guidelines. The guidelines explain "the process of breaking down, examining, comparing, conceptualizing, and categorizing data" (p. 61). Through this process three themes emerged (Figure 2). These themes include increased training time, increased practice opportunities, and discussion about the programs.

Time

Most participants stated they did not feel enough time was given to them to learn additional information regarding the technology and how to use it in their school setting. This aligns with Desimone's (2009) suggestion that for effective TPD to occur, there needs to be at least 20 hours of training given over a semester. The TPD provided in this study only lasted one hour per day for 3 days per week over a four-week span.

One difficulty the researcher faced was the large differences in prior computer use and knowledge by the participants. While some participants had no experience with computers, other participants had used them for, "social media, typing and printing, storing information, and games." The participants who had no experience with computes required training on how to open, turn on, and log into the computers in addition to basic typing instruction. The participants who already knew the basics of the computers wanted to learn about how to use specific programs. This variation of needs split the TPD time between two sets of participants. One group learned about the basics of the computer and computer use. For examples, this group required instruction on how to open the laptop computer, turn the device on, log onto the computer, and beginning typing skills. The other group learned skills such as how to input data into an Excel spreadsheet, input basic formulas, and how to work with images in a document.

Practice Opportunities

The secondary theme identified was a desire for the participants to have opportunities to practice newly learned skills. Structured time during the trainings was provided, but the participants requested additional time which would be provided in a non-structured format. One participant stated, "You did not give us enough time to use what we learned" and requested that the researcher allow them the opportunity to practice what they had learned in the trainings during their lunch and planning breaks. The participant stated this would give them the opportunity to try out individual ideas and figure out ways to use it for their specific classroom needs. Another participant asked "How to memorize all the keys with their functions without continuous practice." The researcher provided an additional hour each day during weeks two through four during the participants' lunch break. Some participants would skip lunch to practice on the computers giving them an extra hour every day.

Programs

Participants also stated what they wanted to learn included how to save information, keyboarding skills, and how to become more proficient in general computer use (Figure 3). One participant asked to learn how to use Microsoft Excel to create charts, while another requested instruction on how to create certificates using Microsoft Word. Keyboarding skills was an area where several of the participants requested more training. After one TPD training session a participant stated, "Today's lesson has not been so successful to me because typing has defeated me." After the same lesson on typing in word, another participant said, "I still wonder how to look for alphabet letters and how to put in the word." Once each participant shared what they wanted to learn, the trainer attempted to address each during the four week TPD. This flexible TPD model was used to meet the learners at their individual level of knowledge and needs.

Time	Practice Opportunities	Programs
"Want to learn more" "Not enough time" "If we have time can we learn Powerpoint?" "You did not give us enough time."	"Can we use the computers during our lunch to practice?" "Will you be here tomorrow so we can practice?" "I would like to practice."	"I want to learn how to make a chart in Excel." "How would I make a certificate?" "Can I make a picture with sound?"

Fig. 3. Themes. This figure illustrates quotes from the participants used to identify themes.

Discussion

The results of the quantitative data suggest the teachers' level of concern in three of the seven levels decreased after training was provided. The three stages where the concern decreased include Personal, Management, and Collaboration. There was one stage, Stage 6, Refocusing, in which the teachers' scores actually statistically significantly increased which indicates their level of concern went up after the TPD. This stage is where the teachers would consider making changes to the computer or consider replacing them with a more powerful device. The teachers level of knowledge about the use of computers was still limited after the four weeks of TPD were offered. They likely realized their lack of ability to upgrade or alter the computers after they became more familiar with the innovation. While the other three stages, Unconcerned, Informational, and Consequence, did not show a statistically significant decrease in concern, all post-scores did decrease suggesting a decrease in concern for each stage.

Personal Stage

The decrease of concern in the Personal Stage indicates the teachers are less concerned with the individual demands or their role with the computer. This stage was addressed during the TPD throughout the four weeks. The trainer discussed various ways the teachers could use the computers depending on their classroom needs. For example, for the teachers who teach 4-5 year olds, instruction was provided on how to develop resources to provide the students with lessons on the identification of the letter of the alphabet and their sounds. The teachers for the older students requested learning how to keep data such as grades using a spreadsheet. Developing an understanding of how computers can address needs specific to their own classrooms and students allowed the teachers to see the benefits of computer use.

Management Stage

The decrease in the Management Stage suggests the teachers are less concerned with the organization and scheduling of the computers. The trainer addressed the tasks of using the computers at the beginning and end of the four week TPD. Knowing how to maintain the upkeep of the computers is important especially in the context of this study where there are few people who can assist when problems arise or there is no access to replace the computers if they are broken. Additionally, there is sporadic availability of electricity so the challenge of keeping the computers charged had to be addressed.

Collaboration Stage

The last stage in which there was a significantly different decrease in scores, Collaboration, suggests the teachers are less concerned with working with their peers while using the computers. The teachers were asked to work collaboratively throughout the four week TPD. They were given tasks to complete together and often problem-solved with each other.

Based on Jack Mezirow's Transformative Learning Theory (1981) adults learn through both instrumental and communicative learning. Instrumental learning focuses on task-oriented learning practices, whereas communicative learning focuses on how the learner's needs, desires, and feelings are communicated. This theory was elaborated upon by Knowles (1984) who explained adults learn best experimentally, through problem-solving, with the knowledge of why they are learning what they are learning, and if they see an immediate benefit to their current position. Based on the results of the interview data, the participants felt more experimental opportunities would be beneficial to reducing their level of concern so they would be able to develop individual skills needed to immediately implement their newly learned abilities into their specific educational setting. The statements of the need for more practice time coincide with principles provided by Knowles. George, Hall, and Stiegelbauer (2006) explain individuals usually progress through the stages of concern and that "earlier concerns must first be resolved (lower in intensity) before later concerns can emerge (increase in intensity)" (p. 8), but this process is "highly personal and requires time as well as timely intervention for both cognitive and affective factors" (p. 9). While our sample of teachers who were most concerned with Stage 1-Informational did not resolve their concerns of that stage, their level of concern did significantly decrease; they did not progress toward a later, higher level stage. A decrease in concern in other stages were observed. With more "time, successful experience, and the acquisition of new knowledge and skills" (p. 9) it is likely the participants' concerns about implementing the innovation are likely to continue to decrease.

Limitations

This study was limited to a small sample of teachers in a rural school in Uganda. If the setting was changed, different results might be seen. Having had little to no access to computers, the teachers in the study were unfamiliar with their use. Whereas teachers in more urban schools have more opportunities to access computers and are likely to have more experience using them. The limited knowledge of the teachers in the current study of basic computer use (i.e. turning the computers on, typing, mouse use) limited the TPD as to how much training of how to use computers for educational purposes could be covered in four weeks. Much of the time was spent on teaching basic functionality of computers giving the teachers an understanding of how to operate the devices, but not as much practice in how to use them in the classroom.

Conclusion and future work

There are numerous methods for interrogating the adoption and diffusion of innovations in the educational sector. Regardless of the method chosen however, emphasis is often on recognizing the agency of individuals involved in the process. In our study, we used the Stages of Concerns questionnaire to examine and argue for the importance of Teacher Professional Development as a means of facilitating adoption of innovations. It is imperative to address the concerns that the teachers have, if educational innovations are to have the desired impact, not just in Nyenga, Uganda, but globally.

The present study was based on one school; as such further study are necessary to examine the phenomenon in different contexts. Future research will look at an alternate setting with a larger sample size. Consideration will be taken to examine how cultural and contextual differences in adults may alter the theory of adult learning. Additionally, we will use a comparative method to carry out this study in a different country because learner motivation may be varied depending on cultural values, pedagogy, and understanding of the educational process.

Statements on open data, ethics and conflict of interest

a) Researchers will attempt to make data available through an institution or open repository.

b) All research was conducted with International Review Board Approval. Identity of the participants is not disclosed.

c) There is no conflict of interest.

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Appendix A

Statements on the Stages of Concern Questionnaire Grouped by Stage (Hall, George & Rutherford., 1977)	
Stage 0 – Awareness	
Item #	Statement
3	I don't even know what is.
12	I am not concerned about this innovation.
21	I am completely occupied with other things.
23	Although I don't know about this innovation, I am concerned about things in the area.
30	At this time, I am not interested in learning about this innovation.
Stage 1 – Informational	
6	I have a very limited knowledge about the innovation.
14	I would like to discuss the possibility of using the innovation.
15	I would like to know what resources are available if we decide to adopt this innovation.
26	I would like to know what the use of the innovation will require in the immediate future.
35	I would like to know how this innovation is better than what we have now.
Stage 2 – Personal	
7	I would like to know the effect of reorganization on my professional status.
13	I would like to know who will make the decisions in the new system.
17	I would like to know how my teaching or administration is supposed to change.
28	I would like to have more information on time and energy commitments required by this innovation.
33	I would like to know how my role will change when I am using the innovation.
Stage 3 – Management	
4	I am concerned about not having enough time to organize myself each day.
8	I am concerned about conflict between my interests and my responsibilities.
16	I am concerned about my inability to manage all the innovation requires.
25	I am concerned about time spent working with nonacademic problems related to this innovation.
34	Coordination of tasks and people is taking too much of my time.
Stage 4 – Consequence	
1	I am concerned about students' attitudes toward this innovation.
11	I am concerned about how the innovation affects students.
19	I am concerned about evaluating my impact on students.
24	I would like to excite my students about their part in this approach.
32	I would like to use feedback from students to change the program.
Stage 5 – Collaboration	
5	I would like to help other faculty in their use of the innovation.
10	I would like to develop working relationships with both our faculty and outside faculty using this innovation.

18	I would like to familiarize other departments or persons with the progress of this new approach.
27	I would like to coordinate my effort with others to maximize the innovation's effects.
29	I would like to know what other faculty are doing in this area.
Stage 6 – Refocusing	
2	I now know of some other approaches that might work better.
9	I am concerned about revising my use of the innovation.
20	I would like to revise the innovation's instructional approach.
22	I would like to modify our use of the innovation based on the experiences of our students.
31	I would like to determine how to supplement, enhance, or replace the innovation.

Appendix B

Interview Questions
1. What did you learn during the teacher professional development?
2. What did we not cover that you would have like to have learned?
3. How could the materials have been presented differently to help you better understand how to use computers in your teaching?
4. What did you like most about the teacher professional development?
5. What did you like least about the teacher professional development?
6. How do you see yourself using computers in your classroom?

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