

Shifting pedagogical space: Egyptian educators use of Moodle

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ABSTRACT

This article focuses on exploring the outcomes of an e-learning initiative in Egypt. Researchers conducted training with 17 Egyptian educators on how to build, maintain, and teach using Moodle, an online content management system. The researchers evaluated the outputs of the training using the Technology Adoption Model (TAM) in an effort to assess perceived usefulness and perceived ease of use of this innovation in this particular context. Analysis revealed that trainees were neutral with regard to the ease of learning and using the new skills around Moodle, but perceived long-term usefulness of the training negatively. The lessons learned from this project and suggestions for e-learning in less developed countries are also explored.

INTRODUCTION

The United Nations Educational, Scientific and Cultural Organization (UNESCO 2008) developed teacher competency standards for information and communication technology (ICT) that aim to improve educational systems through the effective use of ICTs. These standards note that schools should be learning organizations where teachers and administrators “have the ability and inclination to experiment and continuously learn and use ICT to create professional knowledge communities” (UNESCO 2008, p. 12). With regard to using ICTs to improve educational outputs, the standards note that educators “must be able to design ICT-based knowledge communities and use ICT to support the development of students’ knowledge creation skills and their continuous, reflective learning” (UNESCO 2008, p. 12).

Achieving such standards requires a pedagogical shift in systems and classrooms. Thus, there is a need professional development that helps teachers learn the technologies while simultaneously supporting these teachers to use such technologies for teaching and learning. In many more developed countries, providing technology-centered professional development has been a priority of many school districts for decades (Office of Technology Assessment 1995; Trotter 1999; Sales 2009). In less developed countries however, creating, implementing, and sustaining technology-focused professional development is a relatively recent phenomenon (Richardson 2009, 2011). Nevertheless, continued professional development of teachers is viewed as a means to both improve teacher quality and to increase student learning (Berry, Daughtrey, & Wieder 2010; Jung 2005). Thus with regard to professional development around ICTs there is a need to better understand what works and what does not work in various contexts in the less developed world.

This article explores the approaches and outputs of a set of trainings from a USAID funded project in Egypt. A central focus of this project was to infuse ICTs into the education system throughout the country. In the current study, the researchers sought to understand the

experiences and perceptions of Egyptian educators as they engaged in training about online learning and as they attempted to create online courses for other educators in the country. The researchers will present a review of the literature focused on online learning in less developed countries followed by an overview of technology and education in Egypt. The researchers then provide a brief description of this specific technology-training project in Egypt. This is followed by an analysis of that training. Finally, this article concludes with findings and suggestions for moving forward.

LITERATURE REVIEW

Online Learning in Less Developed Nations

The body of literature points to various factors essential for effective technology-focused professional development of teachers. First, teachers are more motivated to attend professional development opportunities and to actively participate if they are able to keep the tools for which they are learning (Richard 2007). These tools might include software or hardware. Second, technology focused professional development should include a teachers' network where expertise and advice from individuals involved in the training can readily be obtained (Berry, Daughtrey, & Wieder 2010; Jung 2005). These networks are useful outlets for fostering organic, personalized, self-help resources. Third, the continued involvement of the trainees in the training process can increase their self-efficacy as they become more confident and effective in facilitating the use of the technology in an authentic learning environment (Richard 2007; Thurlow 1999). Proactively addressing these factors increases the potential that the skills learned in the training will have sustainability, scalability, and spreadability.

The literature also details how technology-related training programs should be flexible and should meet the lifelong professional development needs of those involved (Jung 2005). Olakulehin (2007) noted that ICT tools may provide the only means by which educators can remain current on their own professional development. Through interactive, technology-driven teacher development, teachers are able to build social support systems with colleagues who are learning the same concept at the same time. This enables educators to be collaborative in their teaching approach and to reach higher levels of professional development while working to maximize student achievement (Berry, Daughtrey, & Wieder 2010). Thus relevant professional development often is not only focused on how to use ICT tools, but is also focused on using e-learning tools to provide professional development.

While there is debate about the appropriate focus of professional development in less developed countries, Beckstrom et al (2004) suggest that e-learning programs are indispensable to develop and modernize a nation's education system. E-learning is thought to offer viable solutions to overcrowded classrooms as well as transportation problems (Abdel-Wahab 2008). In development projects, e-learning however is not an isolated, one-time event. Some authors have urged that ICTs increase the demand for continued professional development specifically focused on pedagogy and student learning (Mwalongo 2011). Sustainability of such efforts is often impacted by financial commitments to the initiative (Jung 2005). To help alleviate pressures of Internet connectivity and content availability, Olakulehin (2007) suggests that governments of less developed countries expand policies and programs to guarantee a national Internet broadband connection that includes remote areas. The literature is thus rich with descriptions of unsuccessful efforts that failed to focus on how to maintain sustainability, scale up, or increase spread. In turn, there is a need for more research that analyzes various aspects of technology initiatives in less developed countries in an effort to provide better guidance for future efforts.

State of Technology in Egypt

The education system in Egypt has long been distinguished by large class sizes, centralization, a test-driven curriculum focusing on rote memorization of unimportant material, and poorly trained teachers who earn low wages and have little status (Jarrar & Massialas 1992; Tawila et al 2000). Lacina and Sowa (2005) quote a personal account of education in Egypt that exemplifies the paradigm shift currently taking place in the country:

I understand that sending children to harvest the crops in my country doesn't mean that my country doesn't value education. In fact...in the Egyptian countryside, the children there help their parents in farms and fields but they go to their schools too. In Egypt we appreciate and value education, all Egyptian families believe it is important for their children to be well educated. (p. 68)

It is well accepted that ICTs have become a dominant tool for educational reform in more developed countries. ICTs however have had a slow adoption rate in less developed countries, in particular North Africa (Liverpool 2002). Adoption of the ICTs such as Internet has been a challenge in Africa as a whole for two main reasons. First, much of Africa is predominantly a cash-based economy with little impetus to adopt credit card use (Hassanin 2003). A cashless economy is pivotal to buy goods and services online. Second, Arabic Internet sites are limited both in quantity and quality (Hassanin 2003).

Although a lack of a credit-based economy and a lack of Arabic Internet sites impact the North African country of Egypt, its situation is somewhat different than the African continent as a whole. For example, in Egypt, 100% of private schools and 99.7% of government schools have computers. The computer-to-student ratio is 52:1 in government schools and 47:1 in private institutions (Ministry of Communications and Information Technology 2009). The Ministry of Communications and Information Technology (2009) has maintained free Internet access nationwide since 2002 where more than 15,000 ports serving two million Internet users have been set up. Users pay for only local dial up phone tariffs which is approximately USD \$0.25 per minute (Abdel-Wahab 2008; Hassanin 2003).

The Egyptian Ministry of Education (MOE) has been diligently working with international development agencies on a variety of ICT-focused education projects. The MOE launched the Egypt PC 2010 initiative in December of 2003. The goal of this project was to provide a computer to every home by 2010. Computers were sold at a discounted price and paid for in monthly installments starting at LE 43 (USD \$7.00) per month (Ministry of Communications and Information Technology 2009). Another popular program was the USD \$52 million project funded from the U.S. Agency for International Development (USAID) called the Integrated English Language Program II (IELP-II). The educational objectives of IELP-II included ICT in education components: (1) train teachers in the use of technology; and (2) train teachers via the use of technology (Warschauer 2004).

Part of the IELP-II program included an initiative called Computer in English Language Teaching (CELT). This component focused on taking Egyptian English language teachers to the US for training on educational technology. Unfortunately, after the Egyptian teachers returned from the international sojourn they "unanimously commented that the US trainers knew little about Egyptian conditions and that the software they were exposed to in the USA was not available at their institutions in Egypt" (Warschauer 2004, p. 382). Another initiative that was part of the IELP-II focused on installing two model computer laboratories for ongoing teacher training. However, teachers reported being constantly being locked out of the laboratories and some computers were damaged from power surges (Warschauer 2004). The challenges noted in these recent Egyptian projects mirror studies of other less developed nations.

Leach et al (2004) summed up the future of online teacher development by saying that in contexts such as Africa, where the capability to train large numbers of teachers is not possible, school based and computer supported teacher training may be a pivotal part of the solution. Technology has the potential to make professional development experiences shorter, more collaborative, and up-to-date with the more developed world. The current study is thus timely in that it offers a detailed analysis of a professional development project in Egypt that focused on online learning.

Teaching for Improved Learning Outcomes in Education (TILO) Project

The TILO project was developed to integrate technology into the Egyptian education system while improving student outcomes. The TILO project aimed to create and maintain School Based Reform Schools (SBRs) and TILO Smart Schools (TSS). The TILO project created approximately 190 SBRs and 85 TSS schools. In order to ensure a school is successful, TILO selected schools based on a demand-driven approach. These select schools needed to have the required infrastructure and the school leadership willing to commit to technology integration, pedagogical shifts, curriculum reform, and a desire to aim for higher student outcomes.

One piece of the TILO project centered on professional development across the education system. First, TILO trained teachers and administrators on effective teaching practices including student-centered learning. Second, TILO trained teachers how to integrate technology into the classroom. Through the training, teachers gained confidence in using technology in the classroom as well as promoting critical thinking and problem solving. School administrators, MOE inspectors, and supervisors benefited from the training by gaining an understanding about how a technology supported curriculum can have a positive impact on student learning outcomes. Finally, training was provided about online learning to a small group of educators. Evaluating this final aspect of the project is the focus of the current study. Additional details about this aspect will be provided in the following section.

The final component of the TILO project focused on monitoring and evaluation. The monitoring and evaluation team continually evaluated both student and teacher outcomes related to TILO's efforts. Student learning outcomes were evaluated using critical thinking and problem solving (CAPS) tests while changes in teacher practice over time were measured by the student classroom observation performance evaluation (SCOPE) tool.

Current research on the outcomes of the TILO project is limited since the project concluded in late 2010. However, internal evaluations indicate positive results. By comparing individual test item scores to neighboring schools using pre-post measures with the SCOPE tool, Bosch (2009) found improved teacher and student practices in just seven months. Bosch also reported positive results based on the training TILO provided to principals.

Online Learning Training

Seward Incorporated was subcontracted to provide two, five-day trainings in Cairo, Egypt in the spring of 2010. The training was divided into two sessions held six weeks apart. In Week 1, the training focused on:

- an overview of Moodle, a content management system used to deliver courses online;
- an overview of instructional design principles;
- transforming existing face-to-face training to an online environment;
- in depth analysis of instructional design and e-learning;
- writing objectives and creating assessments;
- planning content;

- managing resources in Moodle;
- preparing media for online delivery; and
- building content in Moodle.

At the end of Week 1, participants divided into four teams based on their interests. The teams were tasked with creating an online course that addressed their specific needs. The groups decided to create courses that broadly focused on: (1) the solar system aimed at middle school students; (2) student-centered learning aimed at the professional development of current elementary and secondary teachers; (3) learning the alphabet aimed at parents of early childhood students; and (3) Powerpoint tutorials aimed at teachers in training. Members of these four teams created a work plan and developed the structure and content of their respective online course.

Week 2 focused on improving the four courses that were developed in between Week 1 and Week 2. Week 2 training focused on:

- revisiting instructional design principles;
- peer review of each online course;
- usability testing of each online course;
- student grading in Moodle; and
- enhancing the courses through the effective use of Moodle tools.

Week 2 culminated in a demonstration to three members of the Ministry of Education in an attempt to determine if online learning and Moodle is an innovation worth adopting in Egyptian schools.

METHODS

Data were gathered using questionnaires completed at the end of each training day. A professional Arabic translator translated the survey responses and a local TILO staff member crosschecked the translations. Using the constant comparative method as described by Merriam (1998) the researchers analyzed survey data looking for themes. The researchers grouped the data into categories based on frequency and uniqueness. Surveys were coded using both axial and selective coding as described by Strauss and Corbin (1990). The emerging and final themes were member checked by an Egyptian trainer who was part of the Cairo-based TILO team. After initial analysis was complete, the researchers used the Technology Adoption Model (TAM) to place the results into a conceptual model described in the results section below.

Participants

The two, one-week trainings included 17 participants where 47% were females and 53% were males. Three of the participants were from Keys for Effective Learning, a Canadian-Egyptian educational consulting company charged with training participants on student centered-learning pedagogy and other topics related to curriculum development. The other 14 participants were from various departments within the MOE. Of the 14 participants, seven were media specialists, four were content specialists, and three were computer programmers.

Instrument

A survey was administered to the trainees at the close of each training day. The daily surveys varied slightly but each focused on successes, challenges, and suggestions to improve the training. At the close of each week, the trainees were asked to develop an individualized learning plan. After Week 1, trainees detailed a plan that included setting goals, detailing current progress, planning for the coming weeks, noting areas of concern, and documenting ways the trainers

could help the trainees in the interim. The Week 2 individualized learning plans focused on the same topics as Week 1 but also included successes of overall training, challenges, successes, descriptions of possible uses of online learning in the context of Egyptian schools, and suggestions for future training.

RESULTS

In this section, we describe the challenges and achievements reported by the Egyptian trainees during the professional development seminars. These data were analyzed around challenges and successes using the constructs of the Technology Acceptance Model (TAM). TAM posits that two beliefs drive the adoption of innovations (Davis 1989; Davis et al 1989). The first is perceived usefulness defined as “the prospective user’s subjective probability that using a specific application will increase his or her job’s performance” (Davis, Bagozzi, & Warshaw 1989, p. 985). The second is perceived ease of use of an innovation. This construct is defined as “the degree to which the prospective user expects the target system to be free of effort” (Davis, Bagozzi, & Warshaw 1989, p. 985). The TAM was used to both conceptually frame this study as well as to systematically categorize the data. After coding, the responses were totaled up to arrive at a total number of responses for the week. It should be noted that the survey questions were open-ended and thus did not specifically ask about each construct. Thus the numbers in the following tables relate to the number of responses that were coded by a given construct rather than by the number of respondents.

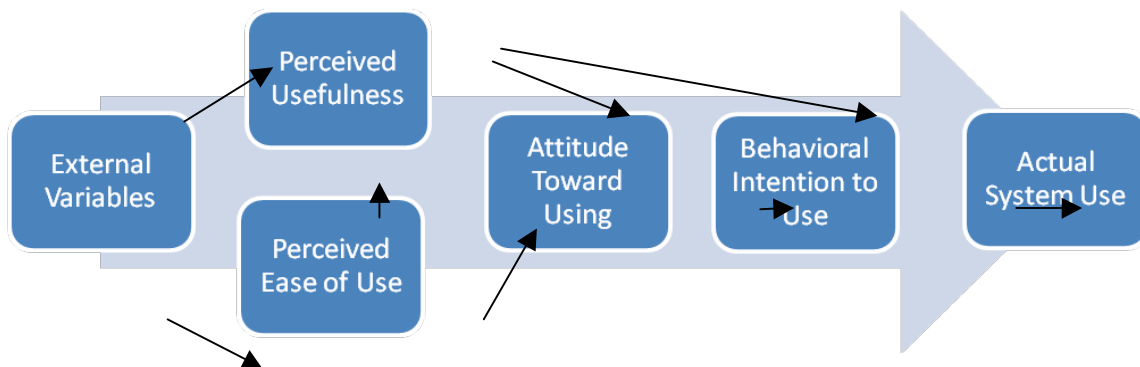


Figure 1. Technology Acceptance Model (TAM) (Adapted from F. D. Davis, R. P. Bagozzi, & P. R. Warshaw 1989).

Perceived Ease of Use and Perceived Usefulness

During the first week of training, each trainee was given the opportunity to comment on the challenges of the day. These challenges were coded then placed into the TAM construct of perceived ease of use or perceived usefulness. As described in Table 1, the majority of comments (25.71%) focused on believing the innovation (i.e., building online courses in Moodle) was relatively easy. The first two days of training covered the theoretical background for creating e-learning curriculum. On day three, the trainees began working with online course development tools. Towards the middle of the week, 22.86% of responses were coded as sustainability where respondents questioned the next steps. With only a couple days dedicated to hands-on practice, 8.57% of the 35 total responses for the week were focused on a desire to work more with Moodle.

A variety of issues tended to affect the ease of use as well. For example, in the first week of training, 17.14% of responses focused on concerns with their personal and physical comfort. In Week 1, the training room was small and warm and did not have the technology needed for the best possible training (e.g., no projection screens, no cameras, poor Internet connectivity, etc.). Another 8.57% of responses focused on the challenge of translations used in the training. Some trainees reported that an English presentation would be preferred rather than an Arabic translation. This would give the Egyptian trainees the ability to translate and make meaning of technical terms that were uncommon in the Arabic language. Nonetheless, in Week 2 the trainers provided copies of the presentation in both English and Arabic.

In Week 2, survey data were collected on only two days. This was done in an effort to maximize the time devoted to training. As described in Table 1, out of the 12 responses, 16.67% indicated that no challenges were experienced. As the environmental issues continued, 75% of the responses focused on the negative aspects of the training space. Finally, one of the responses focused on having too much time devoted to peer evaluation.

Table 1: *Summary of Trainees' Perceived Ease of Use*

Issue	Responses	Percentage of Responses
Week 1 (N=35 total responses)		
None ^a	9	25.71%
Sustainability	8	22.86%
Environmental issues	6	17.14%
Translation issues	3	8.57%
More work with Moodle	3	8.57%
Understanding theory	3	8.57%
Other	3	8.57%
Week 2 (N=12 total responses)		
Environmental issues	9	75.00%
None ^a	2	16.67%
Too much peer evaluation	1	8.33%

^aNone indicates trainee wrote 'Nothing,' 'No,' or 'None'.

Table 2 details the perceived usefulness of the training as reported by the trainees. In the first week of training, the trainees reported that it was useful being able to practice using Moodle. The two US American trainers were highly regarded throughout the initial week including comments that the trainers spoke in manageable sentences and effectively navigated each session of the training. Thus their training style was useful to the trainees. One out of five responses focused on the usefulness of including theoretical components into the training curriculum. With regard to the technical aspects, trainees noted successes creating an online introduction (14.55%) and engaging in group discussions (5.45%).

In the second week of training, 35% of the responses focused on how peer evaluations had increased the usefulness of the training. While 20% of the responses continued to focus on the positive attributes of the presentations as well as the trainers, 25% of responses indicated that they found it useful to independently troubleshoot technology issues within Moodle. Finally, 20% of responses centered on the usefulness of the active learning process used in the training.

Table 2: Summary of Trainees' Perceived Usefulness

Issue	Responses	Percentage of Responses
Week 1 (N=55 total responses)		
Moodle	21	38.18%
Trainers	12	21.82%
Implementing theory	11	20.00%
Online introduction	8	14.55%
Group discussions	3	5.45%
Week 2 (N=20 total responses)		
Peer evaluation	7	35.00%
Troubleshooting	5	25.00%
Trainers	4	20.00%
Active learning	4	20.00%

The final evaluation of the training took place on the last day of Week 2. Five of the trainees had to leave early on the final day, thus only twelve of the trainees completed the final evaluation. As detailed in Table 3, 87.5% of the trainees defined their individual progress as good. In evaluating areas of concern, 42.86% of the trainees expressed concern that the Ministry would not adopt their online course therefore the trainees would not be able to continue implementing their new skills. Concerns about the sustainability of the newly learned technological skills were noted by 28.57% of the respondents. These findings relate directly to the usefulness of the overall training and skills gained.

Table 3: Summary of Trainee's Final Evaluation (N=12)

Topic	Respondents	Percentage of Responses
Current progress		
Good	7	58.3%
None ^a	1	8.3%
Areas of concern		
Lack of Ministry support	3	25.0%
None ^a	2	16.6%
Sustainability	2	16.6%
Ways leaders can help		
Continued support	5	47.7%
None ^a	2	16.6%
Most useful part		
Moodle practice	8	66.7%
Group work	3	25.0%
Theory	1	8.3%
Suggestions		
Ministry adoption	8	66.7%
More training	3	25.0%
More practice	1	8.3%

^aNone indicates trainee wrote 'Nothing,' 'No,' or 'None.'

Through the final evaluation, the researchers sought to ascertain suggestions about how to move the project forward. With regard to usefulness of the training and skills, a majority of responses (66.67%) focused on convincing the Ministry to support the use of Moodle and online courses.

Many trainees expressed the need for TILO to give a presentation to the Ministry for implementation purposes. The trainees feared they wasted their time engaging in the training since they were not be able to immediately use their new skills and abilities in their actual jobs. With regard to ease of use of the training and skills, 25.0% of the respondents wanted more training on Moodle. Additionally 8.3% of respondents indicated the need for more practice with Moodle to ensure a quality end product.

TAM Analysis

After the initial analysis above, a TAM scorecard was constructed to help categorize and rank the impact of the findings. By categorizing all the data into categories, the researchers settled on three variables that encompassed both constructs: external factors, training factors, and end user factors. The rating card is found in Table 4. A rating of -1 indicates that perceived usefulness or perceived ease of use was generally negatively reported, 1 indicates the belief was generally reported positively, and 0 indicates the belief was generally reported as neutral. Analysis using the TAM scorecard indicated that perceived usefulness was not well addressed in the training while perceived ease of use was neutral. Through the analysis, it was found that the training structure, content, and delivery was effective at making the training easy to use, but various issues made the training less useful to the end users. What follows is analysis of the individual variables with examples to support the findings.

Table 4. TAM Rating Card

Variable	Aspect	Perceived Usefulness	Perceived Ease of Use
External Factors	Setting	-1	-1
	Amenities (refreshments and breaks)	-1	1
	Timing between trainings	0	0
	Subtotal	-2	0
Training	Instructional design	0	0
	Lesson planning	0	0
	Appropriate online content	-1	1
	Ongoing technical support	-1	-1
	Time dedicated to training	-1	-1
	Project management	0	0
	Subtotal	-3	-1
End User	Translations	0	-1
	Moodle	1	1
	Theoretical aspects	0	0
	Trainers' competence	1	1
	Subtotal	2	1
Total		-3	0

Note: -1 indicates element was negatively perceived; 0 indicates element was perceived as neutral; 1 indicates element was perceived as positive.

External Factors

The majority of concerns and suggestions focused on the setting of the trainings. As noted earlier, concerns focused on hot, cramped quarters as well as an unreliable Internet connection. Along with the room conditions, another complaint revolved around the lunch provided to the participants each day. The participants indicated a need for more variety versus getting lunch

from the same venter for the entire week. These issues were difficult to ameliorate since they were out of control of the trainers. The setting was a local school in the first week. In the second week, the training was moved to a private technical training college. This move only slightly helped the attitudes of the trainees with regards to setting. Future trainings could proactively address comfort issues (e.g., food diversity and location). Through analyzing the comments, it was found that the trainees were often preoccupied with these issues and thus less engaged in the actual training.

During the second week of training, trainees began to express concerns over the sustainability of the project given limited time imposed by their own work constraints. As the project closed, the trainees were asking whether or not additional training, updates, or ongoing troubleshooting support would be available. These decisions however were made at the ministerial level. All trainees expressed grave concerns about the potential resistance by the Ministry to provide funding or support for Moodle-based courses. The TILo team with the support of the trainers did present the benefits and limitations to Ministry officials at the end of the training. At the time of publication however, the Ministry's decision to sustain these efforts was not made public.

Training Factors

The trainees reported being satisfied with the trainers. Throughout the two weeks, comments emerged such as: "They talked in easy, understandable sentences," "They presented themselves as very organized and dedicated," and "They had great management of sessions and were very friendly." The trainees also expressed a desire to maintain contact with the trainers through blogs and emails so they could get updates and following-up on the progress of this project. While a majority of the trainees wished the trainers would return to provide additional training, two trainees expressed a desire to travel to the US to obtain further training.

The largest success of the two weeks of training was reported as allowing time for the trainees to have guided practice. In the final evaluation, 75% of trainees reported that understanding, practicing, and implementing Moodle was their biggest success. Additionally, being able to practice in groups was noted as a positive aspect of the training by 25% of respondents. On day two of Week 2, half of the trainees mentioned that distributing tasks and working in teams was helpful for them to understand and manage their group project.

During the early stages of the first week, theoretical orientation around instructional design was a main focus. From the various models the trainers presented, the most resilient model was Gagne's Nine Events (Gagne 1985). On the final evaluations, this aspect was noted by 25% of the respondents as being the most useful part of the training. Another popular concept introduced early in the first week was the *E-Learning Instructional Design Model* (Seward Incorporated 2007). Seven of the 12 trainees who completed the final evaluation reported the instructional design model would be valuable for future online course design.

As expressed through individual learning plans written at the end of Week 1, the trainees needed more time to practice using the various tools within Moodle. To better understand Moodle, the trainees wanted a way to troubleshoot issues; be that through emailing the trainers or someone providing online support. Using this data, the trainers incorporated more hands-on practice into Week 2. Hence, by the end of the training, 93.3% of the trainees felt confident with their progress. On the final day of training, only one trainee mentioned a desire for more time on Moodle.

End User Factors

During the first week of training, many trainees had difficulty understanding the importance of using theoretical models. By day three, the trainees were given guided practice to develop their

course. Almost daily, the suggestions on the evaluations included a need for more time dedicated to course development. The final evaluations continued to show a trend of trainees wanting more practice time. Thus by the end of the training, there was still some resistance to using theoretical models when developing Moodle courses. This contradiction with the finding above may be due to previous experiences since only a few trainees had experiences creating and instructing actual classroom lessons.

Other suggestions from the first day included the need for simultaneous English and Arabic presentations. The presentations throughout training were in Arabic however the trainees desired the presentation materials to be in English so that they could understand the Arabic terms by matching them with their English equivalent. This request was addressed in the second week of training when dual language presentation handouts were available.

DISCUSSION

Through this study, the researchers sought to understand the needs of trainees in an attempt to improve the ongoing training but also to understand the training model in general. Based on the research conducted on the online learning aspect of the TILO project, the following suggestions can be made to improve the sustainability, scalability, and spread of such innovations in education projects in less developed nations.

Top-Down Buy-In

Although the Egyptian MOE worked closely with the TILO team to provide Moodle training and to set up the initial support infrastructure, steps were not taken to ensure the sustainability of the project. This caused anxiety for the trainees and ultimately created tension around the uncertainty if Moodle would be adopted. In this project trainees had no direct influence on the decision of the Ministry to adopt Moodle as an e-learning option. Thus spread from the top-down was limited due to a lack of influence of key players.

Few successful e-learning initiatives start at the grassroots level. The reality of e-learning is that it involves the cooperation of people across the entire organization. Human resources are required to set up and maintain the infrastructure, develop the e-learning content, and support the learner. Additionally, the learners often require some sort of incentive to participate in the e-learning. Incentives could include gaining professional development opportunities, free software, or receiving direct payments. In actuality, the only people who have the sway within any organization to mobilize enough staff and provide the necessary incentives for sustainability are the people at the top. Simply put, if the Ministry is not on board, the initiative will eventually fail.

Bottom-Up Enthusiasm

In the current study, we found that even though the Ministry was apprehensive about the Moodle project, the TILO team and the trainees were extremely enthusiastic about the project. This enthusiasm from the trainees however diminished when policies and intentions became less clear and broad adoption and support of the tool became more uncertain. With that said, the training was framed around a student-centered learning approach. This pedagogical focus gave a practical context for the training and thus motivated the trainees to use and potentially adopt aspects of this innovation.

Just because a government puts the infrastructure in place does not guarantee that an e-learning initiative will be successful. The necessary enthusiasm can come from a shared vision of e-learning, it can be generated through efforts of various development agencies that promote e-

learning, or it can be created through reward and recognition systems as the program is designed. Regardless of the source, enthusiasm for the program at all levels must exist if the program is to succeed.

Identify the Goals

There are many reasons why organizations in less developed countries implement e-learning initiatives. Before one can begin designing a solution that will best fit a country's needs, project leaders must first identify goals and standards by which success will be measured. In the project described in this article, the goals of the Moodle training were not agreed up front and committed to by the Ministry. Thus, there was a disjoint between project outcomes and the unknown desires and future goals of the Egyptian Ministry of Education.

There was a clear need for cooperation and commitment across the entire organization in this project. In this case, that commitment was lacking impacting the motivation of the trainees to adopt the innovation. In a hierarchical society such as Egypt, there exists socio-political dimensions that influence the adoption of this innovation. Tensions arouse when the goals of funders, service providers, NGOs, and the Ministry were not aligned at the onset of the project.

Planning

E-learning is not a one-size-fits-all solution. To achieve success, every e-learning implementation needs to be tailored to its specific environment. As exemplified in this project, solutions are organic and often evolve over the life of the project. When planning and designing an e-learning solution, project leaders must take into account the following four factors.

1. The goals of the initiative. If these goals shift, it is imperative that all parties are involved to redesign the goals. In the current study, it was evident that the goals of the Moodle project were evolving for the trainers, TILO staff, and trainees, but the Ministry was not present to help refine these goals. This was evidenced in the final training session when the courses were shown the members of the Ministry of Education and these members were unclear of the uses and capacities of Moodle.
2. The training culture within the organization. The trainers had to quickly understand this new culture and did so by conducting daily questionnaires and engaging in ongoing conversations with both trainees and TILO staff. This was vital to address the specific needs of a given group.
3. The technical abilities of the people involved (both the learners and the instructors) should be taken into account. The abilities, as well as exposure to appropriate pedagogy, of the trainees varied greatly. It would have been beneficial if the trainers could have conducted a thorough needs analysis of the trainees before training preparations began.
4. Trainers and project managers must have an understanding of the hardware, software, and network limitations. Prior to Week 1, the trainers worked with the Ministry and TILO to set up the server. However there were numerous issues with the server settings. The trainers thus had to work with appropriate staff members after hours to sort out these issues. Additionally, in Week 1 the Ministry and TILO selected the training site. These entities were not entirely clear of the technological demands of Moodle. Thus one trainer worked between Week 1 and Week 2 to ensure servers were appropriately configured and to ensure the next training center would be adequate.

Training Content Creators

Long-term sustainability is a primary concern when implementing any form of e-learning. Reliance on expensive external trainers and vendors to produce and maintain the training is not

sustainable. On the other hand, nobody wants to have low-quality e-learning products that deteriorate the success of the initiative. Training in-country, internal staff to produce high quality and instructionally sound e-learning content and training is one of the best investments development projects can make to support the long-term viability of the project. In this project, the trainers addressed this need by training an expert outreach team within TILO as well as multiple members within the Ministry. Putting other issues aside, this aspect greatly increases internal, in-country capacity and thus can impact the sustainability and spread of similar efforts.

Supporting the Learner

The move from stand-up training to e-learning is a major paradigm shift and can be a challenging and stressful experience for learners. This is especially apparent when the learners are not particularly technology savvy. To increase innovation adoption it is necessary to provide multiple ways for the learner to obtain timely support when they have questions. This support can take the form of a telephone help line, an email availability of the trainer(s), or a website that answers common questions.

As was evident in the analysis of this training, consciously and proactively addressing perceived ease of use and perceived usefulness may dramatically increase innovation adoption. Both of these issues directly support the trainees. In the case of Moodle training in Egypt, usefulness was not entirely addressed in a proactive manner. This omission will inevitably impact long-term adoption of this e-learning platform.

CONCLUSION

The number of developing countries around the world eager to adopt technology continues to increase. Therefore, there is a dire need to assist these countries in planning and implementing e-learning innovations. Research such as this adds to the body of literature in a few ways. First, by analyzing successes and challenges experienced by the end users and understanding how adjustments were made to meet these needs, project leaders can improve training mechanisms in less developed countries. Second, given the limited resources in these countries it is important to ensure funds have the biggest impact on the largest number of educators. Getting training right is thus a priority. Finally, development projects must be informed by the trials and tribulations of past projects. Studies such as this offer important findings but also offer a useful structure for other projects to analyze and understand their own progress.

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