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Computer Training of Rural Central American Teachers: Opportunities and Challenges

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Abstract

Quality education training in the Central American region is in great need of improvement to keep up with the educational rigor of other countries. While the use of information communication technology (ICT) can help improve training by giving students and teachers diverse learning opportunities, many rural and subsistence agricultural communities lack both resources and understanding of ICT. The purpose of this study was to describe Central American public school teachers' perceptions of computers in education in their home countries. Sixty-two teachers served as respondents through their participation in the USAID program, Cooperative Association of States for Scholarships (CASS). The CASS program, located at Palo Alto Community College in San Antonio Texas, is a yearlong program consisting of teaching from CASS instructors and practicum with local dual language schools.

The study instrument included three components: (a) computer knowledge growth, (b) home country worksite conditions, and (c) participants' future plans. Respondents showed improved computer skills as a result of CASS training. Data revealed minimal to no ICT resources available in home country communities. Respondents shared their belief that the implementation of ICT is a critical need in their countries' academic efforts. Upon completion of the program, these Central American teachers reported being equipped to function as change agents in their rural and subsistence agricultural communities. A longitudinal study focusing on teacher impact within their local communities is recommended.

Keywords: Computers, ICT, Education, Central American, Rural schools

Introduction

The term “digital divide” is difficult to define. It is not the measure of only one type of information communication technology (ICT), but rather of a combination of many types of technologies and their rates of diffusion among the population (Billion, Lera-Lopez & Marco, 2010). One definition of the term states that the digital divide exists between the “haves” and the “have-nots” of ICT, where there is delay in the diffusion of connectivity to information technology (Ferro, Helbig, & Gil-Garcia, 2011).

Distribution of ICT is greatly affected by economic levels existing in Latin American countries. Hilbert (2009) studied the comparison of household spending rates and the cost/availability of Internet access and found that one way to shorten the digital divide in Latin America is for ICT prices to decrease with the implementation of effective practices, such as computer donation programs, cheaper cell phones, and more public access to Wi-Fi. This same study used an analogy of public transportation to illustrate the future of ICT in low economic regions. Many transportation issues are met by well-established busing systems instead of private vehicles. Similarly, people of developing countries who use ICT in a more public access manner (e.g., perhaps through Internet cafes or public access Wi-Fi) are able to meet their ICT needs instead of paying for personal access to Internet in their homes. An individual’s ICT needs may be met, but not as conveniently as they would be met in developed countries (Hilbert, 2009).

While many consider physical barriers such as access to ICT as the greatest obstacle to overcoming the digital divide, cultural factors affecting ICT perceptions and encouraging ICT literacy are equally

vital to the success of any well-intended government aid project. Warschauer (2002) presented examples that exist where ICT projects eventually failed because of lack of interest and understanding by their receiving communities. ICT project success requires competent leaders, individuals willing to learn more about ICT, and individuals prepared to put ICT into action. For example, set-up costs, time, access to resource material, and administrative policy were found to most likely impede distance education training, which heavily utilizes information and communication technology, for extension agents in Trinidad and Tobago (Dolly & Kisoonsingh, 2006). Additionally, Harder and Lindner (2008) focused on the use of a web-based resource for agricultural extension agents in Texas. The authors concluded that “time for training” was a major factor in adopting the technology, while lack of access to the Internet was less of a factor.

Quality education training in Central American rural schools is in great need of improvement to equal the rigor that other countries have in their educational systems. A similar situation in rural China has been described where teachers in secondary schools specializing in agriculture desired to have higher knowledge and skills and especially lacked experience in educational technology. It was noted that “technology is used [more frequently] to overcome limitations and obstacles in teaching” (Shao & Bruening, 2005, p. 40). Overall, training methods for teachers in Central American schools need to be improved. Often, teachers hastily complete traditional training methods to accumulate certifications that will qualify them to teach a subject. However, traditional teacher training programs are being replaced by innovative, cost effective trends such as classroom-based training, continuing education, group training and networking,

and local level priority training (Navarro & Verdisco, 2000). A rural Chilean project, “Solidarity Project,” is a good example of an innovative training design. Solidarity Project required teachers to participate in a collaboration project to integrate curriculum using ICT in ways that would encourage school children to have more authentic learning experiences and allow the community to benefit from having ICT resources available (Mierzejewski & Quintanilla, 2008).

Study Background

The Cooperative Association of States for Scholarships (CASS), a program funded by the United States Agency for International Development (USAID), brings Central American public school teachers to Palo Alto Community College in San Antonio, Texas for one year of training in education methodologies. The CASS program has been at Palo Alto Community College since 2000; its primary function is to equip participants with teaching techniques so they can become more effective in their classrooms and schools, often in rural and subsistence agricultural locations. Program entrance is highly selective within participant countries; only the most effective teachers are chosen (Alamo Colleges International Programs, 2010).

Participating teachers received 35 hours of weekly academic training for the first five months of the program, with six hours weekly in computer training. After initial training, CASS teachers worked in dual language schools (i.e., Spanish-English schools) in the local community where they practiced what they had learned for four days a week. Participants convened on Fridays for specialized training. The yearlong training is 2,000 hours, including workshops, educational courses, English as a second language, community work,

visitation to cultural sites, and computer training.

Computer training is a particular focus of the CASS program, especially at the beginning, because some teachers have minimal to no computer experience. CASS participants are taught basic fundamentals of computers, such as keyboarding, Microsoft Office Suite programs, digital camera use, blogging, copyright issues, and best practices for purchasing technology online. Program participants were provided approximately \$650 each to purchase ICT equipment (e.g., laptop, projector, digital camera, etc.); instructors helped them select equipment based on price and usability in the participants’ home schools.

Computer use was required throughout the course; participants blogged about their experiences (e.g., traveling, working, living, etc.). Using blogs as a teaching/learning strategy is effective because of its constructional attributes requiring learners to publish their experiences for others to read and make comments about (Ferdig & Trammell, 2004). While reflecting on their experiences in blog form, CASS members reinforced those experiences, received feedback from other members, created online material that could be used for future lessons, and gained more practical ICT skills. One program requirement was to create at least ten lessons using the computer. At the end of the course, CASS members were asked to choose their four optimum lessons, which were referred to as “unforgettable lessons.” These lessons were collected and provided in electronic format to all participants; 68 CASS participants returned to their schools with 272 lessons each.

This paper focused on promoting ICT literacy by considering the training of potential “change agents” (CASS participants). Rogers (1995) defined a change agent as an individual who

influences clients' innovation-decisions in a direction deemed desirable by a change agency. The "change agency" in this case was the Central American countries' Ministries of Education that wanted improved educational systems in rural and subsistence agricultural communities. The "clients" in this case were other teachers and members in communities where CASS participants worked; the "change agents" were CASS participants who learned new educational innovations to encourage positive impact in their communities.

CASS program participants had opportunities to integrate authentic technological learning experiences into their curriculum, similar to those noted in the "Solidarity Project" in Chile (Mierzejewski & Quintanilla, 2008). Makuma's (2009) study of ICT use for training student teachers in Rwanda revealed that "active ICT users" were motivated because they wanted to learn more. In Makuma's study, the active ICT student teachers were molded as potential change agents in a country that supported integration of ICT in education. Makuma concluded that ICT collaboration with other teachers could be an effective means to influence change in the Rwandan educational system (2009). Similar to the student teachers in Rwanda, CASS program participants received ICT training that could mold them into change agents in their own communities. If these CASS graduates were to conduct in-service trainings in their rural schools upon return, they could prove to be effective in raising academic standards among other teachers and students (Anderson, 2002).

Purpose and Methods

The purpose of this study was to describe Central American public school teachers' perceptions of computers in education. A descriptive survey design was used to collect data (Tuckman, 1999).

Sixty-two teachers, mostly from rural agricultural communities in Central America, formed a convenient sample from the population of interest ($N = 68$). Their participation in this USAID program afforded a unique research perspective for the CASS program at Palo Alto Community College in San Antonio, Texas.

A researcher-developed online questionnaire was used to gather data. The questionnaire was reviewed by a panel of experts familiar with the topic to ensure face validity. The questionnaire included six sections: (a) personal information, (b) computer proficiency before the CASS program, (c) computer proficiency one week after starting CASS, (d) computer proficiency six weeks after starting CASS, (e) computer proficiency three months after starting CASS, and (f) community characteristics and future plans. Four sections gathered participants' self-reported knowledge gains from CASS participation. Example questions included (a) "How much time did you use a computer for personal and/or professional use?" (b) "Describe how you felt using a computer," and (c) "What computer programs did you know how to use before entering the CASS program and what programs did you learn while in the program?" Measures of internal consistency (reliability tests) were not conducted because a convenient sample represented the population of interest, no data were summed, and no comparisons of sub-group were made.

Additionally, open-ended questions were used to collect participants' work communities (living conditions) and types of leadership roles they would engage in after the CASS program. Demographic questions included country of origin, age, teaching experience, workplace conditions and economic livelihood of their communities. The questionnaire and instructions were provided in Spanish to ensure successful

navigation of the online survey. A 91% response rate (i.e., 62 out of 68 teachers) was achieved.

Descriptive statistics were used to report the data. A review of individual responses revealed some respondent errors occurred. Eight participants reported knowing more skills after six weeks than after three months, resulting in two areas (i.e., email and word processing) with declines in skill level (Figure 3). Caution is warranted in generalizing these results beyond the respondent group. While it is possible that skill knowledge could be lost by some respondents, it is also possible that some respondents misunderstood these questions as skill requirements, or they simply skipped that part of the instrument.

Results

Demographics

Participants' average age was 36.56 years. Teaching experience averaged 13.70 years. A majority (88%) of CASS participants worked in communities where small-scale subsistence farming was practiced. Countries included El Salvador (32%), Guatemala (29%), Nicaragua (26%), Dominican Republic (10%) and Honduras (3%). Participant comments revealed difficult living conditions in these communities (i.e., lacking electricity and potable water, poor nutrition). Respondents reported that for youth, education was the mechanism to acquiring advanced jobs outside the community. However, in many cases advanced education was not available in their communities and Internet

connectivity was noted as not practical or possible.

Participants' Perceptions of Computer Use

Questions were asked about CASS members' perceptions of using a computer. For each reporting period, respondents were provided choices about using a computer for personal and/or professional use: "very intimidated," "a little intimidated," "I like using a computer, but it is still difficult," "I like using a computer, and understand everything that I have been taught," and "I feel very comfortable using a computer, and I am discovering new programs." Before starting the CASS program, 19% reported feeling "very intimidated" in computer use, while more (27%) felt "very comfortable discovering new applications." Some participants mentioned they did not know how to turn on a computer, while others were proficient in various programs.

Overall, most participants reported high interest for computer use in their work communities, despite the lack of computer access. During the first three months, both trends for "very intimidated" and "a little intimidated" decreased to 0% and 4% respectively, while the "very comfortable and discovering new programs" increased to 55% (Figure 1). The number of participants who answered that they "liked using computers, but still had difficulties," increased after the first week of CASS instruction, but steadily decreased as they became more comfortable with different programs. Participants commented that more time learning equated to less time during which they felt intimidated.

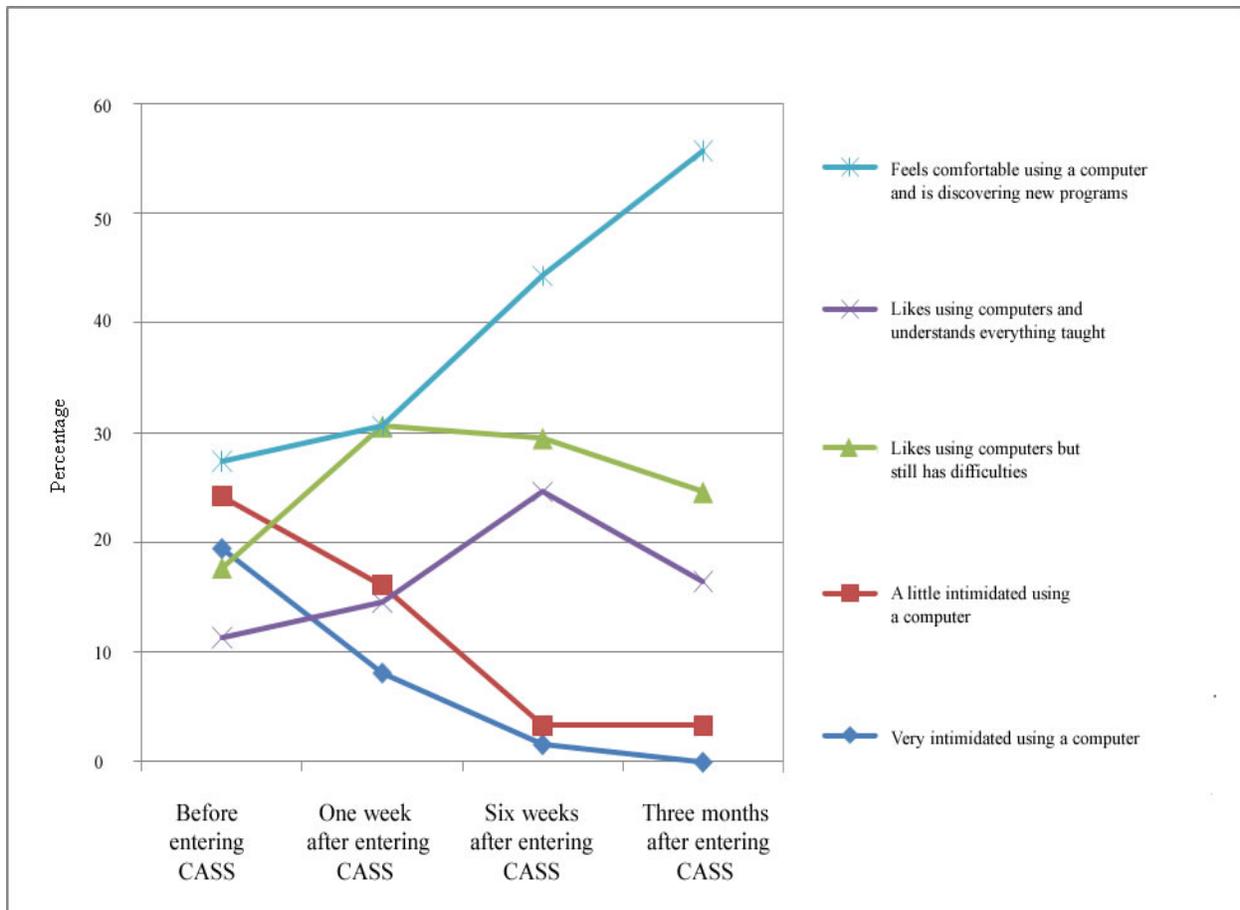


Figure 1. CASS participants' perceptions of using computers.

The CASS computer training sessions were designed using adult learning theory to guide delivery. Blog use provided opportunities for CASS members to record anecdotal entries and digital photography of new cultural experiences. Adult learning theory suggests that learners universally desire to have control over their learning process (Knowles, Holton, & Swanson, 2005). While blogging helps learners take ownership of their learning, CASS training assisted all learners to reach higher levels of computer proficiency. Figure 1 revealed that by the six-week period, many skills were being mastered, resulting in increased self-guided learning.

Time Spent on the Computer

Emphasis was placed on computer training at the beginning of the CASS program because many participants arrived with minimal to no experience and this training had the potential to greatly impact their overall experience within the program. Outside of computer class, some participants had opportunities to practice on computers because CASS funding provided for the purchase of a laptop computer for each participant at the start of the CASS program. Those who used their own computers stated they were more eager to learn computer skills because of access and ownership factors.

Figure 2 revealed two program clusters: four groups who practiced computer skills from “never” to “30–60

minutes per week,” and those who ranged from “one to two” to “more than 5 hours weekly.” The first cluster had a decline after six weeks of training, indicating that as participants progressed through training, there were less people spending little time

on the computer. Most participants in this cluster eventually migrated to the higher clusters. There was a sharp decline in the “more than 5 hours per week” category (Figure 2).

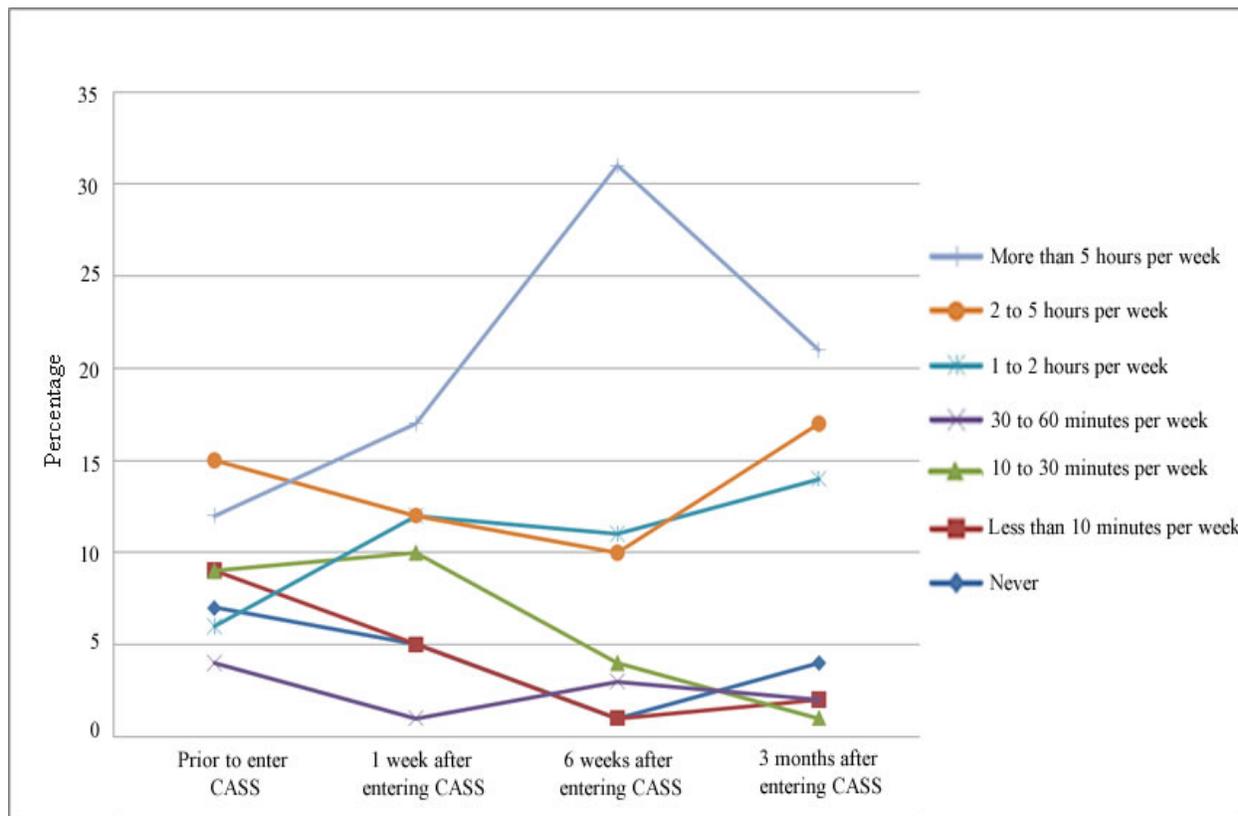


Figure 2. Time spent by CASS participants using computers

Participants’ Computer Knowledge

Overall, CASS participants’ skills increased through training. Two areas incurred declines in skill knowledge (i.e., word processing and email); eight of the 62 respondents reported that they knew more skills at the six-week period, than they did at the three-month period. Despite these possible measurement errors, positive skill knowledge growth was evident; participants’ comments supported this finding.

Participants reported knowledge of various computer programs prior to entering the CASS program (Figure 3). Specific skills before entering CASS were email (73%) and word processing (66%). CASS computer training increased learning about blog sites (3% to 80% skill acquirement), PowerPoint (34% to 74% skill acquirement), and digital photography (26% to 64% skill acquirement) at the three-month period.

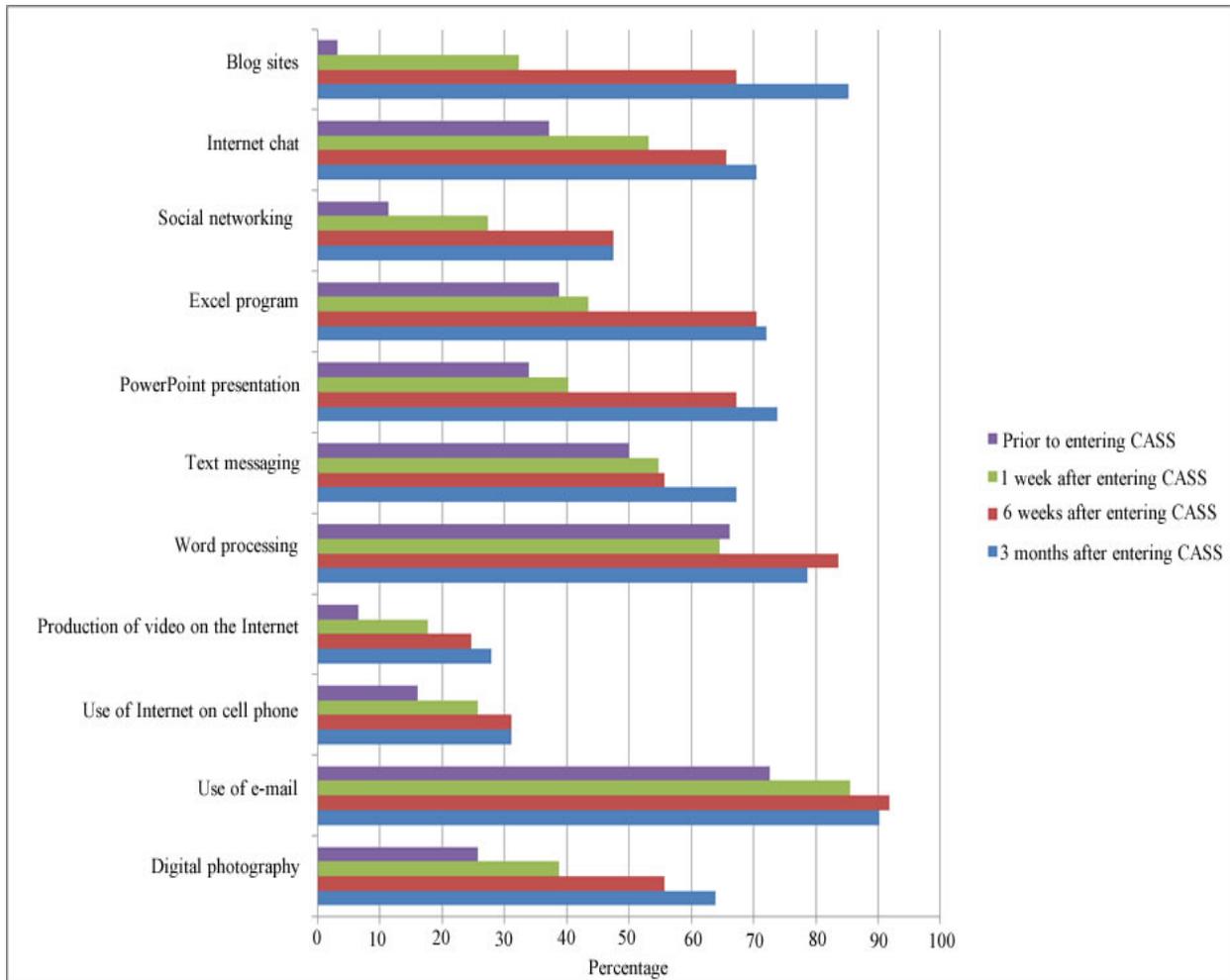


Figure 3. CASS participants' ICT application knowledge.

Participants' use of computers changed throughout the program. At the start of training, many participants were more focused on using their computers for communication purposes with families in their home countries. They expressed confusion with other specific computer programs. However, as training continued, participants expressed an understanding for new and educational uses for computers.

The greatest skill increase occurred in the creation of blogs (Figure 3). Blogging played a key role in participants' levels of increased ICT proficiencies. Participating in cultural and scenic tours was part of the CASS program; while CASS participants visited sites, they took pictures and videos

that they eventually posted to their blogs. Participants updated blogs by adding journal entries, photos, and videos throughout training. Participants commented on how much they enjoyed putting into practice what they were learning, especially through blogging, because of their practical use of integrating new and interesting experiences in a digital format.

Participants' Community Conditions and Needs

More than one-half (63%) of CASS participants mentioned computers and/or technology as one of the more urgent needs in education in their home communities. Seventy-two percent stated that students in

their home communities have a strong desire to learn more about computers. When asked their opinion, 78% of participants completely agreed (scale: *completely disagree* to *completely agree*) that they would be willing to share what they learned

with other teachers and students, while 65% completely agreed that other teachers in their home communities wanted to learn more about using computers in their schools (Figure 4).

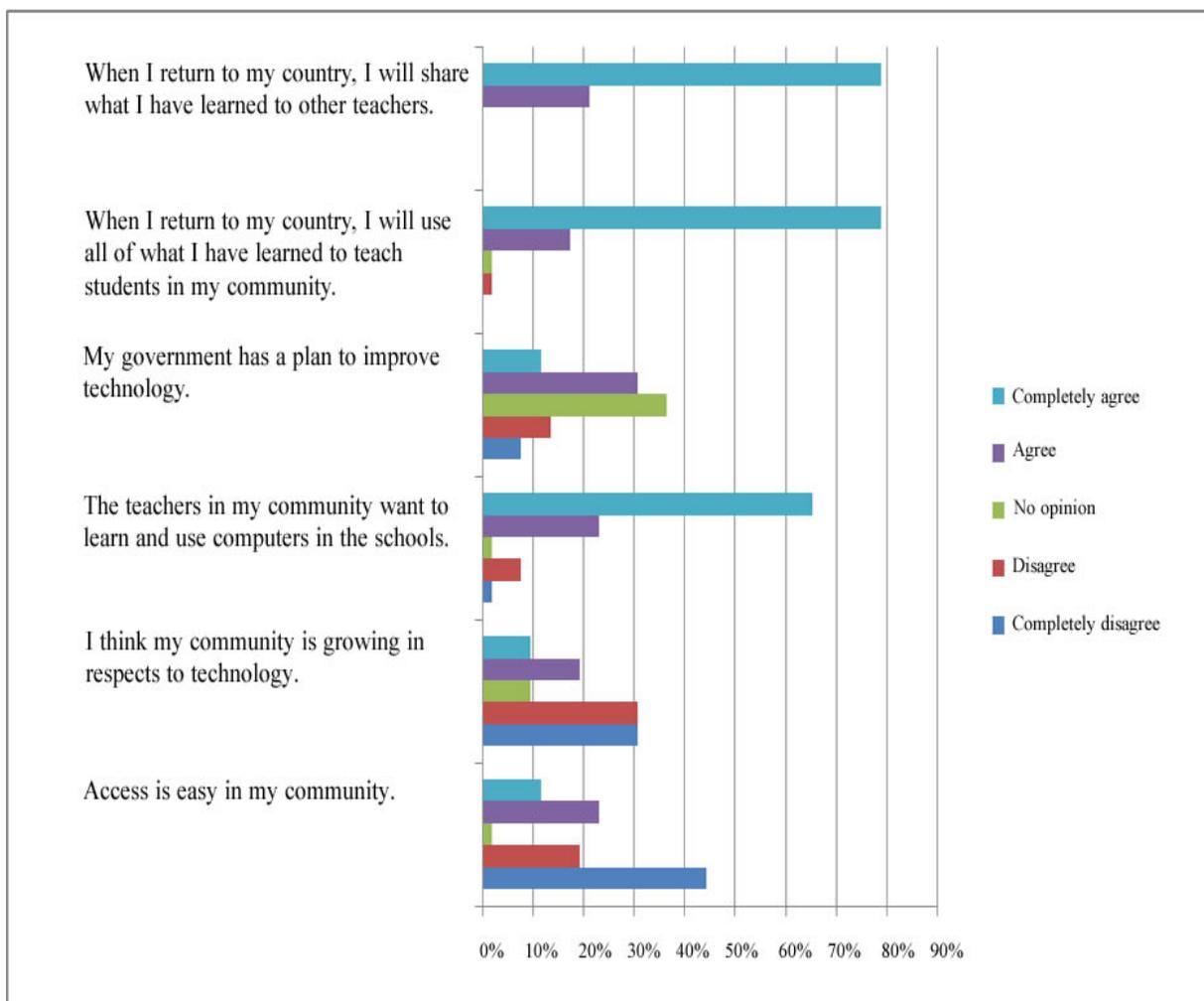


Figure 4. CASS participants’ present and future outlooks of their own work communities.

Participants’ Future

According to their responses, CASS participants revealed a strong willingness to share what they learned with fellow teachers and students in their home communities (Figure 4). Participants reported mixed answers when asked if their governments planned to improve their countries’

information technologies. Similar results were found when asked about plans for their communities; more respondents noted their communities had no plan for technology growth. Many respondents stated that their communities had much more urgent needs.

Conclusions, Implications and Recommendations

The results from this study revealed interesting perceptions of the digital divide. In viewing the digital divide between the “haves” and “have-nots” (Ferro et al., 2011), we found that participants who lacked ICT equipment access could learn and assimilate new computer skills into their own environment after they acquired equipment and training. Indeed, teachers in the CASS program were well suited for learning how to use computers; they left the program with innovative ideas that could be used in their home countries.

Findings revealed that many teachers entered the CASS program with basic computer skills and that CASS training helped accelerate their learning. A possible relationship between CASS program effectiveness and participant ICT growth is noted when viewing similar positive trends in participants’ perceptions (Figure 1) and increasing skills acquired during training (Figure 3).

While it is recognized that individual computer purchases for teachers is not the same as equipping an entire school with computer technology, it was concluded that CASS teachers left the program armed with equipment and training to enrich student learning in their individual classrooms and communities. One year of intense training provided in the CASS program enabled participants to evolve into potential change agents because of increased knowledge of computers and a better understanding of how school needs could be addressed with computer access and use. Knowledge and possession of computer technology helps these individuals to be perceived as innovators in their communities (Rogers, 1995). However, considering the subsistence farming communities’ lack of infrastructure to support ICT implementation, they will

need to be creative in their application and use of the computer technology.

CASS participants were purposefully selected from rural and subsistence agricultural locations where economic resources are scarce. About 76% stated that easy access to the Internet was not available at their worksite. However, many of the educational problems shared between El Salvador, Nicaragua, Guatemala, Dominican Republic and Honduras relate to low math and literacy levels, both of which can be addressed through appropriate computer use. These educational problems combined with lack of Internet connectivity have been addressed in the CASS program; participants made “unforgettable lessons” that each teacher carried back to their home country for offline use.

CASS is an intense training program that requires participants to move to the United States for an extended period. These participants endure separation from family, long hours of training and community service, and new cultural environments as tradeoffs for gains in knowledge and experience. The reward for these sacrifices is the enrichment that occurs in their personal and professional development. Findings from this study provide evidence of the potential for CASS participants to serve as change agents in their work communities. However, documentation of this concept requires further research.

Longitudinal studies are recommended to document the impact of participants on their communities to truly measure CASS program effectiveness. A study of CASS graduates could be conducted using email to inquire as to how they are utilizing what they learned in the program and to document perceived impacts within their schools and communities. Also, a continual flow of communication and follow-up could provide for continual support of the CASS graduates working in

the field and also provide a significant amount of information for CASS instructors to prepare for future students in the program. Such documentation would build upon this study and could open doors to partnerships between governmental and international non-governmental organizations to implement similar ICT programs. Equipping teachers with ICT knowledge and resources has the potential to reduce the digital divide in Central America, especially concerning ICT gaps in rural and subsistence agricultural communities.

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