Digital storytelling in Bhutan: A qualitative examination of new media tools used to bridge the digital divide in a rural community school

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Abstract

This qualitative study examines the use of digital storytelling as an instructional intervention for bridging the digital divide among public school students in rural Bhutan. Primary participants for the study included elementary school children who had never been previously exposed to computer technology and were recipients of a donated classroom set of laptops. Results demonstrated how technology instruction and infrastructure inherently positions ethical and cultural differences between researchers, education personnel, school children and their families. The use of English became an inadvertent gatekeeper for who was chosen to participate in the classroom laptop program. Another major finding examines how Bhutan’s social awareness for “Gross National Happiness” is inherently juxtaposed in contrast to Western perceptions of modernity and progress. Educators and administrators concerned about initial technology instruction in developing regions should find this study informative.

1. Introduction

Despite the global proliferation of computer technology and the Internet, there still remain many communities who find themselves on the marginalized spectrum of the digital divide. Initial interest for this study began with the donation of eight laptops to a rural community school located alongside the Himalayan mountain range in the country of Bhutan. School personnel requested assistance from the researcher about the basic use of computers for students who had basically no background experience with computer technology. This study examines the implementation of computer technology through digital storytelling as an instructional medium. Previous researchers have encountered how digital storytelling can enhance social learning within rural communities (Reitmaier, Bidwell, & Marsden, 2011). Other advantages of digital storytelling in the classroom include how it encourages creativity among children though social interaction (Carbonaro et al., 2008). School children in Bhutan already participate in storytelling practices with their families and friends. The selection of digital storytelling as a pedagogical intervention builds upon existing prior knowledge and introduces digital storytelling as a practical tool for a school community facing serious economic and technology infrastructure challenges. These two research questions guided the present study: Can technology accessibility enable rural community schools to engage students in new literacy practices such as Digital Storytelling? What are the social implications for technology development in rural community schools in Bhutan?

2. Contextualizing the digital divide

The “digital divide” describes disparities in relation to access and training for technological resources, and also connotes the lapse of upward social mobility when those resources remain disconnected from disenfranchised populations (Kellner, 2000; Monroe, 2004). Norris (2001) associates the theory of technological diffusion to the digital divide by suggesting that those who have the resources, skills and knowledge to adopt these new innovations at an early stage will eventually be ahead of the curve. Technology diffusion will slowly be saturated in these strata of the society. Once saturation is complete, the theory predicts that technology will be economically feasible and

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Attract new users and eventually allow a previously marginalized population to catch up and access emerging technologies. The initial period for adapting to the new technologies has the potential to widen social inequalities, but eventually the temporary gap should close.

In a global context, being able to access computer technology reflects the different status and opportunities for social advancement between industrialized and developing nations. Educators face serious challenges when working with students who have limited access to technological infrastructure. The challenges for technology development for rural areas are particularly severe, but the benefits also merit meeting those challenges. The development of digital networks broadens the access of crucial information for rural communities (Norris, 2001). While these locales may be burdened with economic deficiencies; in a more positive sense, the school and community can be more likely to combine their efforts for serving populations within their boundaries. From a historical perspective, Delgado-Gaitán (1994) conveys how communities who are underrepresented within a wider context have a capacity to organize through a process of critical reflection and come to terms about their goals for access to these valuable resources.

Technology allows for a greater breadth of information resources, but solutions should be mediated through the correct remedy. Ertmer and Ottenbreit-Leftwich (2010) observe how educational technology implementation undergoes a cultural shift among educators who share new responsibilities for the successful application of new technologies. What works best for a particular rural community should be determined through a reciprocal dialog taking into account unique circumstances for engaging new technologies. Besides acknowledging cultural and social differences, for technology enhanced learning to be truly effective, the interplay between the quality of three processes; namely, the nature of the technology itself, the pedagogy used to convey the technology, and the curricular instructional content being delivered all need to be taken into account (Mishra & Koehler, 2006). Hall (2010) observes how technology implementation engages several stages beginning with basic awareness and builds upon practical dimensions of maintenance and administrative policy leading to positive outcomes. However, the participants in the present study had no previous exposure to computer technology and were at an initial level of technology awareness and implementation.

Financial resources limit how target populations in developing regions share access to computer technology. Some proponents have viewed setting up public-use computer kiosks as a solution, but public kiosks as a technology initiative has had limited success (Warschauer, 2003). Alternatively, students can have private ownership of an inexpensive, functional laptop. While some research has questioned the instructional value of classroom laptop usage (Fried, 2008), a classroom laptop does present a viable solution for people in developing countries to connect to a wide array of classroom instructional resources that had been previously unavailable or had limited availability in print. In a recent review of various computing solutions for developing countries, Patra, Pal, Nedevschi, Plauche, and Pawar (2007) found only two such viable and affordable laptops: One Laptop Per Child (OLPC) and Intel Classmate. Other laptop solutions were discontinued, simply too expensive, or never made it out of the initial design phase. The Intel Classmate carries a slightly higher price tag in comparison to the OLPC XO laptop targeted for use by low-income children. Both units average at about $200.00. Most recently, Intel agreed to an initial donation of about 200 Intel Classmate laptops for Bhutan (Dorji, 2010, Oct. 4). Such donations help to create momentum for subsequent purchases of laptops, but the OLPC XO laptop has some competitive advantages.

The OLPC XO laptop presents an ideal educational laptop solution for use in public schools. Besides being inexpensive in comparison to other models, it uses comparatively less power than other laptops, so it can operate in areas with limited electricity. The OLPC XO laptop monitor screen remains visible even in bright sunlight and can be used by children outside the classroom. Besides having long-range wireless Internet capabilities, the laptop also has a mesh-networking feature allowing intra-net connection to other laptops in the vicinity (Pogue, 2007). Some researchers from Brazil have similarly documented how the OLPC XO laptop would be an ideal tool for remote and developing areas (Carrano, Bletsas, Claudio, & Magalhaes, 2007).

3. Bhutan: an overview

Bhutan is located in the Northeastern Himalayas between China and India. About 80% of the total population of 700,000 lives in rural areas and the rest in urban centers. Bhutan is both a geographically and socially isolated country. Rural communities are especially segregated in Bhutan due to the mountainous terrain preventing easy travel between regions. In contrast to urban areas, geographic isolation also excludes rural residents from access to proper health care and educational opportunities for children. Network infrastructure costs have gone down in recent years making it somewhat easier to invest in fiber optics, wireless and satellite antennas for rural areas (Souter & Jensen, 2000). Within the past decade, the United Nations has collaborated with the government of Bhutan to provide Druknet, the nation’s only Internet provider (Pek, 2001, June). Internet service in Bhutan is only available to less than six percent of the total population (Nations Online, 2010), but rural communities outside should be considered as having even less access.

4. Gross National Happiness

Bhutan’s isolation has not been limited to geographical barriers and economic restrictions, but has also been ideologically self-imposed through government policy. It was only until 1999 that the citizens of Bhutan had access to the Internet and cable television. The government of Bhutan has been careful to monitor immigration, tourism and external marketing influences in order to preserve and maintain its national identity. The aversion to technology has been viewed as a preventive measure against the infiltration of what has been historically perceived as negative western influences in relation to materialism. The advent of popular culture is also viewed as detrimental to morality in Bhutanese society. The country’s developmental goal of Gross National Happiness, a policy originally developed in 1972 by Bhutan’s former King Jigme Singye Wangchuk, should be understood as a combination of economic development, environmental conservation and the preservation of national identity and culture that are all structured toward the pursuit of happiness (Brooks, 2008). For Bhutanese people, “happiness” is viewed as an indicator of healthy social development, and government policy prioritizes happiness and the welfare of people (Centre for Bhutan Studies, 2009). Bhutan’s social trajectory for happiness emanates within the historical context of Buddhism that has similarly shaped nearly every facet of life throughout Bhutan. For Bhutanese people, happiness should be sought inward, both socially and personally, and that source of happiness that differentiates from materialistic consumption and the production of a gross national product. Even the recent introduction of Internet and cable television to the country came about as a carefully pondered decision that would enhance, and not detract from, the shared core belief of Gross National Happiness.
5. Methodology

The researcher for the study took into consideration cultural, linguistic and subjective influences during the design of this qualitative study. From a Western perspective, the introduction of new technology ran the risk of being administered through a deficit perspective. From a Bhutanese perspective, the importance of new technology may not be a priority in relation to the concept of happiness.

The study included a constructive dialog between the researchers and participants throughout data-collection and analysis in order to address potentially problematic assumptions. The study consists of observations, interviews, focus group discussions and an intervention. Interviews and focus group discussions were conducted both before and after the intervention. Digital audio recorders were used for the interviews, and photographs of the community, school, students and teachers were also collected.

5.1. Setting & participants

The setting for the study focused on a school within a village located within a valley along the Himalayan mountain range. Most families within this community subsist through potato farming. Children also come to school from other nearby villages and many of them walk through mountain trails for more than an hour. During the harvest season, teachers regularly help students and their families in the nearby fields.

The “Jumping Frog School” derived its name from a copper coin once used in the historical past and from the small frogs living around the campus. The school has an enrollment of about 160 students, and each of the four classrooms shares about 35–40 students apiece. The parched white-washed walls in the school serve to also display student paintings and a listing of various class activities. The school itself can be appropriately described as a community school because of local families responsible for its construction and upkeep. When the local school requires renovation, most of the families also get together and contribute to the renovation work. Despite these efforts, the school still reflects sparse resources. The library has about two-dozen books placed on a shelf, no electricity or functional cafeteria, and only a chalkboard to use for lessons. Even within these challenging conditions, a positive disposition for schoolwork exists between teachers, students and parents.

Ranging from grade one to grade four, the main subjects taught in the school are English, Dzongkha, Mathematics and Science. The school conducts what could be considered as reading competitions in either Dzongkha or English. Every morning, a student is selected to read a speech in either language and the student’s speech is broadcast in front of the entire school assembly.

The multilingual context of this research study resulted in two compelling conditions. First, the participants of the study shared various levels of language proficiency in various languages, mostly Dzongkha and English. Second, the nature of the OLPC technology and associated software is restricted to an English-language interface for basic instructions and usage.

5.1.1. Focal participants

The focal participants for the technology intervention were selected from the general pool of students and included four females and four males from the fourth grade; their ages ranged from 9 to 13 years old. Secondary participants included the two novice teachers, the headmaster, and the parents of the eight focal students. The criteria for selecting focal participants included their basic aptitude in English because the XO laptops and associated software consisted of English-based Linux models. All eight participants were reasonably fluent in English, and also felt comfortable using Dzongkha. Three out of the eight focal participants were better and more confident in responding in English and also displayed a keen interest in reading storybooks and storytelling.

5.2. Data collection procedures

Data collection occurred in two phases during the span of five months. The first phase of data collection began in the winter of 2008. Data collection consisted of gathering initial background information on the community school, introductory interviews with the participants, and a brief intervention orienting the primary participants about technology. The second phase of data collection occurred during the spring of 2009. Five types of documentation informed the study: descriptive, open-ended interviews, informal interviews, focus group discussions, participant observation, and pictorial documentation of digital storytelling activities. Primary and secondary participant interviews comprised about 10 h of recorded data in both Dzongkha and English. The interview questions were initially framed on knowledge, behavior, and perceptions towards computer technology, and the children's basic knowledge and interest in storytelling activities. Interviews served to triangulate classroom and community observations. Community observations comprised about 15 h of video recordings and a journal of field notes.

5.3. Data analysis

Researchers followed an iterative process of data analysis triangulating initial findings from across the different types of data. The students’ storytelling performance and participation were documented by triangulating data from personal description, observations, artifact collection, and interviews with secondary participants who knew the focal students, such as parents and teachers. Interview data was transcribed and coded (see Fig. 1) for patterns and dispositions toward access to technology and implications for social development. Throughout the coding and identification of patterns and trends, Glaser and Strauss’s constant-comparative method (1967) served to categorize data according to predominant codes derived during the process of analysis. These coded narratives were then triangulated through subsequent interviews with primary and secondary participants.

6. Results

The use of digital storytelling to improve access for students with limited knowledge of computer technology resulted in limited success. The pedagogical approach to tap into existing prior knowledge for storytelling did spark a genuine student interest in the use of the
technology. However, other unanticipated limitations impeded the intervention. Basic infrastructure became the most serious problem for setting up a technology initiative in rural Bhutan. The extent to which conservation requirements for the preservation of Black-necked cranes would impede use of a generator to power the laptops caused unanticipated delays. Another major finding included how the English language interface was an unanticipated variable. Limited by the language of the technology, students and teachers shared an embedded sense of historical and colonial perceptions about the English language. The students selected to use the computers demonstrated proficient English skills. This created a limitation for serving another marginalized student population who spoke limited English. A small group of seemingly privileged students shared eight laptops within a school of 160 students. Existing teaching styles precluded innovative and creative activities from students. Students learned through submissive rote memorization and viewed teachers as absolute authorities for knowledge. Students reluctant to explore beyond what their teacher sanctioned them to do impeded their creative engagement of the digital storytelling intervention. As the intervention unfolded, it became clear how social development in this rural area of Bhutan contrasted to Western conventions.

6.1. Initial activity & perceptions

Upon arrival at Jumping Frog School, the eight laptops donated to the school remained unopened in their original packaging. Teachers all appeared reluctant to use computers and awaited instructions on how to work with them. An electric generator to power the laptop batteries helped with the problem of limited electricity. The process for using a gasoline generator had its restrictions because of the noise it would make and how it might disturb the migratory birds in the area. The Phobjikha Valley where this village is located is declared a conservation area due to its importance for being a habitat for Black-necked cranes. Teachers and students voiced concerns about not disturbing the migratory birds that might hear the noisy generator. Precautions included enclosing the generator in a small room so the noise level would be reduced, and only turning on the generator during the day when the birds would be least bothered by the sound. It became evident how the children’s concern for the birds would result in a prominent theme for the organization of their digital stories (see Appendix A).

Before beginning the instructional intervention, students shared early optimistic perceptions about how to use computers. Students had already formed certain ideas about what could be accomplished with computers. One of the students explained how “computers will give us a lot of information about things that are happening.” (KAA) Most of the students conveyed how accessibility to computers would give them more opportunities to communicate with the outside world. Parents’ also shared how their children could enhance their chances for a better future. Parents’ shared how computers would be able to provide their children with a better chance to participate in a professional career, such as engineering or medicine. Because students selected for the intervention represented a small proportion of the school population, the selected students did evoke a sense of privilege by the opportunity. One of the student’s mothers observed how students who were selected for computer instruction would be more motivated to learn and how their selection would make them feel special. Burton (2002) similarly observes how perceptions about new technologies indicate some users understand technologies as a process for uplifting their status as being modern. A teacher echoed the parent’s and the children’s excitement: “They were happy because they think they are the first ones to use computers and even their parents were happy about it.” (KAA).

Even with these optimistic perceptions, students revealed the reality about their limited computer knowledge. One of the students shared “I don’t know anything.” (KAA) Other students’ projected the idea of simply having fun: “We students can play games, write letters and almost everything which we students like to do.” (KAA) Many of the students would also relate their answer in the context of what their

<table>
<thead>
<tr>
<th>Codes</th>
<th>Meaning</th>
<th>Description</th>
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<tbody>
<tr>
<td>KAA</td>
<td>Knowledge, Access, Awareness</td>
<td>Status of the digital divide</td>
</tr>
<tr>
<td>CS</td>
<td>Culture of Storytelling</td>
<td>Exploring use of digital storytelling</td>
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<tr>
<td>CR</td>
<td>Culture of Reading</td>
<td>Exploring use of digital storytelling</td>
</tr>
<tr>
<td>INT</td>
<td>Interest in New Literacies</td>
<td>Exploring use of digital storytelling</td>
</tr>
<tr>
<td>BLD</td>
<td>Bi-Literacy Development</td>
<td>Using computers to improve bi-literacy practices</td>
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Fig. 1. Interview Codes Represent the Following Domains: Participant’s Knowledge, Behavior, Attitude and Training Towards Technology Education.
teachers had previously instructed. For example, when one student was asked if he knew anything about computers, he replied, “My teacher said a computer helps in communication.” (KAA) Basically, most of the students did not really have a practical definition about computers and oftentimes relied on the memorized instruction derived from their teachers.

6.2. Storytelling practice & intervention

People sharing stories with each other reflects an integral component of human social interaction, and combining media and storytelling has historical origins in the early 1980s with the performance theater movement of San Francisco (Tucker, 2006). Digital Storytelling uses multimedia to engage students in reading and writing activities for authentic purposes (Kajder, 2004). Creating a digital story involves making connections to visual imagery, audio, and can also include the insertion of digital text. The combination of various media has the capacity to motivate students in a different manner than interacting with traditional printed text (Coiro, 2003; Reinking, Labbo, & Kieffer, 1999). Most examples of digital storytelling primarily focus on personal narratives, but some research suggests digital storytelling is a useful vehicle for students understanding content-area subject matter (Valkanova & Watts, 2007). Digital storytelling can be beneficial for English language learners to engage academic forms of literacy encountered at school (Rance-Roney, 2010).

The basic process for creating digital stories includes drafting a storyboard sketch (see Fig. 2) about how the story would be told and how various technologies would be organized (Lambert, 2010). The storyboard can be compared to a concept map that previous researchers have found instrumental for enhancing the sequential quality of the story being composed (Liu, Chen, Shih, Huang, & Liu, 2011). Digital stories are typically short narratives presented within about five minutes. Students composing a digital story orchestrate a myriad of elements and planning becomes an essential step in the digital storytelling process. Digital storytelling has a high motivational quality because it has the capacity to engage students in an authentic literacy event. The inclusion of digital storytelling is an optimal low-stakes activity for orienting students who are novices to computer technology.

Storytelling plays an integral role in the Bhutanese culture. From stories of Buddhist fables to legendary folk heroes, most Bhutanese stories are orally transmitted from generation to generation. Students regularly told stories among each other and with their families. Students engage in storytelling topics including folk tales, and they also learn about their traditions during storytelling with their parents and grandparents during meal times. Parents approved of the storytelling component, and one of the parents explained the need to tell stories at home “If we don’t tell stories about our community to our children, then how will our traditions survive? Even when we were young our grandparents used to tell us stories.” (CS).

The digital story intervention was conducted in a span of four weeks during the first data collection phase, and designed to basically familiarize the focal students to the XO laptop through the recording of digital stories. Digital storytelling is the practice of using computer-based tools to share stories. As with traditional storytelling, most digital stories focus on a specific topic and contain a particular point of view. Digital stories can vary in length, but most stories used typically last between two and 10 min. The topics used in digital storytelling are open-ended and reflect the interests of the students. The digital story intervention had an open-ended design allowing students to take the lead in creating their stories.

The intervention activities (see Fig. 3) were divided into four tasks, divided into four weeks, wherein the first task introduced the focal participants to the XO laptop and taught them some basic computer functions, such as turning the computer “on” and “off.” After children became familiar with the laptop, the second week’s task engaged students in writing a short auto-biographical essay and sharing their essay with the class. The third week’s activity involved the focal participants to create a digital story on an open source multimedia tool called Audacity, a software tool for recording and editing sounds (Audacity, 2009). They created a story based on a local animal folktale which spoke about coexisting in harmony. The fourth week’s activities included publicly sharing their digital stories with other students, teachers and their families (see Fig. 4).

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Fig. 2. Teaching Students on how to Create a Storyboard.
6.3. Perceptions & educational implications

The language of the technology came down to basic information being pre-scripted in English. The unexpected emphasis on code-switching between Dzongkha, the National Language and English somewhat helped to diffuse the privilege one language held over another. The criteria for selecting students who spoke better English remained problematic as this marginalized and disempowered those students who spoke limited English. Some research has begun to explore how digital storytelling has the capacity to enhance second-language instruction (Tsou, Wang, & Tzeng, 2006), and more research is needed as the emergence of new technology evolves in tandem with demographic changes with shifts in multilingualism and globalization.

The teachers at the Jumping Frog School taught in both Dzongkha and English and used a lot of code-switching in their lessons, so the digital-storytelling activity also allowed the students to code-switch between Dzongkha and English. They recorded the story in Dzongkha and used the English interface of the XO laptop. Sometimes they would write short dialogs in English and then read it out in Dzongkha. After the intervention, all eight of the primary participants felt they had improved their English. One of the teachers found switching from one
language to another a bit more confusing and said students were comfortable with code-switching. The teacher also felt the eight participants would probably be more fluent in both the languages if they carried on with digital storytelling activities.

All students in the class selected animal stories, and they decided to compose a digital story based on a prominent story theme of the fable of the Black-necked crane in the region. Most students developed an animal character and composed sound effects for their story using the Audacity software.

Teachers explained how earlier perceptions about technology had changed since the introduction of the XO computers. The teacher mentioned how one the students had described how she felt privileged learning how to use computers. During the winter holidays she also taught her brothers and sisters about the lessons she had learned at school. Because only a few students from the school population benefited from the initial intervention, students were encouraged to share what they had learned with their friends and informally share with others about how to use the technology. Researchers hoped the initial experience would serve as a catalyst for increased technology expertise within the community.

School personnel at the Jumping Frog School were limited within two areas of the curriculum, and these limitations illustrated their approach to teaching and their perceptions of English. Teachers still embraced a mostly transmission mode of instruction; whereby, students consistently looked toward the teacher for being a purveyor of knowledge. Transmission models of instruction reflect a cultural tradition in Bhutan derived from both monastic Buddhist education and the British colonial education system from nearby India. Perceptions of English were similarly rooted within the legacy of the British colonial system of education. Students were consistently observed to be comfortable with rote memorization tasks and had a complete deference to authority figures at the school. When students encountered the creative digital-storytelling activity, they were both interested and engaged, but they also had limited practice in what could be considered a constructivist process.

7. Conclusion

As of this writing, the teachers at the Jumping Frog School had built a special room dedicated for a computer lab, and digital storytelling had become an eagerly anticipated component of the school curriculum. The absence of electricity at the Jumping Frog School became a serious impediment during the course of the study. The planned installation of underground cable will resolve the problem of electricity and not disturbing the surrounding animal habitat with noisy generators. The school community still does not have basic Internet access and technology resources remain limited with only eight laptops to be shared among 160 students. The implementation of technology, even with donations and government support, remains as an expensive and limited endeavor. Could the introduction of laptops be a cost-effective intervention or could financial resources be spent in a more positive manner?

The digital storytelling intervention at the Jumping Frog School had begun a process for students and teachers to articulate and document important issues for the community; their wonderfully rich historical traditions, the critical ecological preservation of Black-necked cranes, a digital library used to enhance literacy instruction in multiple languages at the school, English language learning modules allowing all students an opportunity to participate in the culture of power, and many other topics. Students developed a sense of voice, and the digital storytelling activity engaged an effective medium for both carrying their stories and also integrating a practical form of early computer instruction for a population who has had no previous exposure to technology. More research is needed documenting how English is situated within spheres of influence and how the digital divide is addressed among marginalized populations. Both researchers shared the hope for technology empowering rural regions in Bhutan with mutual respect for shared goals for the pursuit of happiness.

Appendix. Supplementary material

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.compedu.2011.06.009.

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