

INNOVATIVE TECHNOLOGIES AS SOCIAL PEDAGOGY: TRANSFORMING INFORMAL EDUCATIONAL PRACTICES IN THE UNITED STATES

LA TECNOLOGÍA COMO INCLUSIÓN EDUCATIVA DE LA DIVERSIDAD CULTURAL: TRANSFORMANDO PRÁCTICAS INFORMALES DE EDUCACIÓN EN LOS ESTADOS UNIDOS

A TECNOLOGIA COMO INCLUSÃO EDUCATIVA DA DIVERSIDADE CULTURAL: TRANSFORMANDO PRATICAS INFORMAIS DE EDUCAÇÃO NOS ESTADOS UNIDOS

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ABSTRACT: This study analyzes the impact of digital technology in order to enhance the academic achievement of marginalized children by exposing them to the latest technological advances. The use of digital autonarratives as social transformative pedagogy is analyzed, specifically in the case of a project called La Clase Mágica (LCM), conducted in an educational institution in Texas (USA) with a high percent of Hispanic student population. La Clase Mágica is an extracurricular technology-based project designed to promote the academic achievement of bilingual Latin elementary-aged students, particularly in the areas of bilingualism, biliteracy, and technology. Up to twenty Bilingual Teacher Candidates (BTCs) were involved in this program and each BTC was assigned to a young elementary student, establishing adult-child pairs called amigo/as and amiguitos/as. Data collection and analysis were conducted within a period of 18 months using a qualitative methodology based in digital auto-narratives, digital field notes and in-class discussions which were transcribed in order to identify emerging themes, patterns and relationships as well as the preferred type of digital artifacts used. Findings reveal that prospective teachers need to take in technology as a pedagogical tool in order to develop a practical understanding of technology integration. The outcomes offer an additional understanding of the direction for teacher preparation programs in order to be more efficient for BTCs, allowing them to become technologically qualified and effective teachers, prepared to meet the needs of culturally and linguistically diverse learners.

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<p>PALABRAS CLAVES: auto-narrativas digitales cuento digital BTCs clase mágica pedagogía narrativa alfabetización digital</p>	<p>RESUMEN: Este estudio analiza el impacto del uso de tecnología digital para reforzar los logros académicos de niños marginados exponiéndolos a determinados avances tecnológicos. Se analiza el uso de auto-narrativas digitales como pedagogía de transformación social, concretamente el impacto de la Clase Mágica (LCM) en un Centro escolar de Tejas (EEUU), con una alta población estudiantil de hispanos. La Clase Mágica es un proyecto extraescolar basado en la tecnología, diseñado para fomentar el logro académico de los estudiantes bilingües latinos que asisten a escuelas primarias, en particular en las áreas de bilingüismo, lectoescritura bilingüe y tecnología. En la experiencia participaron 20 Candidatos a Maestros Bilingües (Bilingual Teacher Candidate, BTCs) quienes establecieron una relación con otros tantos alumnos de primaria, constituyéndose parejas de adulto-niño que se denominaron amigo/as y amiguitos/as. A lo largo de un periodo de 18 meses se aplicó una metodología cualitativa para la recogida y análisis de los datos, basada en auto-narrativas digitales, apuntes digitales de campo y transcripciones de las discusiones en las clases, para identificar temas, patrones y relaciones destacados, así como el tipo de tecnología utilizada. Los hallazgos de la investigación indican una necesidad por parte de los futuros maestros de involucrarse en un aprendizaje mediado por la tecnología con el fin de desarrollar un entendimiento práctico sobre la integración de la tecnología. Los resultados de esta investigación ofrecen un entendimiento adicional acerca de la dirección que deben tomar los programas de formación de maestros para servir mejor a los candidatos a maestros bilingües en su experiencia educativa con el fin de convertirse en maestros tecnológicamente competentes y preparados para cumplir con las necesidades de una población escolar lingüística y culturalmente diversa.</p>
<p>PALAVRAS-CHAVE: auto narrativas digitais contos digitais BTCs aula mágica pedagogia narrativa alfabetização digital</p>	<p>RESUMO: Este estudo analisa o impacto do uso da tecnologia digital para reforçar as conquistas acadêmicas das crianças marginalizadas expondo-as a determinados avanços tecnológicos. Analisa-se o uso da auto narrativa digital como pedagogia de transformação social, concretamente o impacto da Aula Mágica (LCM) em um centro escolar do Texas (EUA), com uma alta população estudiantil de hispânicos. A Aula Mágica é um projeto extraescolar baseado na tecnologia, desenhado para fomentar a conquista acadêmica dos estudantes bilíngues latinos que frequentam as escolas primárias, em particular na área de bilinguismo, lectoescritura bilingüe e tecnologia. Nesta experiência, participaram 20 Candidatos a professores bilingües (Bilingual Teacher Candidate, BTCs) onde estabeleceram uma relação com vários outros alunos do primário, constituindo-se pares de adulto/criança que se denominaram amigos/as e amiguinhos/as. Ao longo de um período de 18 meses, aplicou-se uma metodologia qualitativa para a coleta e análise de dados baseada nas auto narrativas digitais, anotações digitais de campo e transcrições das discussões na salas de aula, para identificar temas, padrões e relações destacadas, bem como o tipo de tecnologia utilizada. O resultado desta investigação indica uma necessidade adicional a respeito da direção que devem tomar os programas de formação dos professores para poder servir melhor aos candidatos a professores bilingües na sua experiência educativa com o fim de converter-se em professores tecnológicamente competentes e preparados para cumprir com as necessidades de uma população escolar linguística e culturalmente diversa.</p>

1. Introduction

There is a growing recognition of the significance of technology in our social world as new faster and smarter technologies such as iPods and iPhones play a major role in daily social interactions. The ramifications of such technology use can be seen on the dispositions and attitudes of young learners (Zevenbergen, 2007). With these current and ongoing changes in technology, many students are now learning through mediating technological tools. These differences may lead to differences in thinking and learning. We agree with others, that students of the digital generation, also known as digital natives (Prensky, 2001) learn differently than students who did not grow up with the same technology (Zevenbergen, 2007).

A global issue however, is the lack of teaching methods and approaches that have kept pace with the needs of these digital natives (Buckingham,

2006; Ben-Jacob, Levin, & Ben-Jacob, 2000; Gordon, 2003). Complicating the issue for teachers are demographic shifts that reflect the burgeoning U.S. Latin@ student population. Today, Latino children make up one-fifth (22%) of children under the age of 18, and by 2030, they are projected to make up nearly a third (31%) of the total U.S. child population (Mather, Foxen, 2010; Crouch, 2012). The presence of digitally literate teachers in 21st century classrooms however, is often dependent on their technological pedagogy development while in teacher preparation programs. We acknowledge this professional development is not always available—therefore higher education institutions should provide these opportunities while in teacher-preparation programs. In this qualitative study, we highlight the need for technology-focused teacher education for Bilingual Teacher Candidates (BTCs) (Alanís, 2014) in teacher preparation programs.

Our research focused on three questions, (1) How does integrating technology into teacher preparation programs help pre-service teachers utilize the available technologies when delivering content? (2) How will pre-service teachers use this knowledge to reach culturally and linguistically diverse learners? and (3) How does this knowledge impact their view of themselves as teachers? In this research, we illuminate the specific use of digital media and autonarratives as social transformative pedagogy. We highlight how these autonarratives facilitate BTCs' use of technology as pedagogy but also help BTCs identify themselves as digital learners. The process of telling ones' story—and in the case of our participants, the process of defining and redefining self as teacher through the medium of technology—documents the creation of a bilingual 21st century teacher.

For this study we drew from a larger corpus of data related to the impact of *La Clase Mágica* (LCM) located at a large Hispanic serving state institution in central Texas, (Ek, Machado-Casas, Sánchez, & Alanís, 2010). In this qualitative study we detail the impact of the after school technology program for our BTCs' use of digital media as pedagogy. *La Clase Mágica* is an after school technology-based project designed to promote the academic achievement of bilingual Latin@ elementary-aged students, particularly in the areas of bilingualism, biliteracy, and technology (see Vásquez, 2003 for a detailed description of *La Clase Mágica*). *La Clase Mágica* has served as a model for successful afterschool projects that impacts underserved and marginalized students nationally and internationally. Children's bilingual and biliterate skills are developed through the use of technology in meaningful learning activities with undergraduate BTCs.

2. Technology and Teacher Preparation

The integration of technology with pedagogy has had a significant influence on how we view and interact with students in K-12 settings and in teacher preparation programs. The discussion of technology integration is not a new one for educators. Schrum (1999) identified three aspects of pedagogical experience that are crucial for teacher candidates if they are to use technology as part of their daily teacher experience. First, preservice teachers must be exposed to various types of technological tools in their university skill-based courses. Second, they must be allowed to integrate these technology tools into their subject area lessons. Third, they must be placed in a technology-rich field environment where they receive

on-going guidance in a risk-free space as they implement technology-supported lessons.

Along these lines, Russell, Bebell, O'Dwyer, and O'Connor (2003) noted that although new teachers exhibited higher technology skills than veteran teachers, they did not display higher levels of technology use as part of their classroom pedagogy. Their research indicates two reasons for this phenomenon: (1) new teachers focus on learning how to use technology rather than on how to integrate technology in the content areas and (2) the extremely challenging aspect of the first years of teaching. Thus, new teachers typically spend most of their energy developing lessons and focusing on classroom management, leaving little time for technology integration. Pedagogical knowledge and technology integration however, need to complement each other. Therefore, teacher candidates' pedagogical knowledge needs to include extensive practice with technology pedagogy to augment student learning (Chen, 2010; Vásquez, 2008a, 2008b).

2.1. Digital Storytelling

Given that a teachers' identity is connected to classroom pedagogy (Nieto, 2011), we cannot disconnect identity from technological pedagogy as it may serve as a mediating tool required for a 21st Century teacher (Alanís, Machado-Casas, & Ruiz, 2014; Machado-Casas, 2009). According to Clarke (2009) identity involves the "individual and the social, the personal and the political, self and other" (p. 185). Defining teacher identity however, has been challenging, as it is not static but ever changing and evolving. Pre-service teachers must learn to use technology as a personal individualized reflective tool to make connections between themselves and those around them, in and out of the classroom. This skill is one that must be learned early on in their education—while they are developing and exploring what it means to be an effective teacher.

2.2. Developing Technology Pedagogy through Digital Storytelling

Russell, Bebell, O'Dwyer, and O'Connor (2003) suggest that teacher preparation programs focus on specific instructional uses of technology and should design and implement technology-supported projects where pre-service teachers use technology in their own learning. Based on the understanding that pre-service teachers come into the classroom with varying levels of technology experience, it is critical for pre-service teachers to engage in technology-supported projects that

will help them mediate their own learning. These types of projects will help teacher educators gain insight into the theory and practice connections pre-service teachers make when using technology in real-life situations (Franklin, 2007). When these real-life connections are made, social pedagogy is enacted—leading to reflexive ways of exploring self and all its experiences and surroundings (Alanís, Machado-Casas, & Ruiz, 2014). In the following section we discuss an example of how social pedagogy is enacted via the use of digital storytelling.

In this study, we illuminate the specific use of digital media and autonarratives as social transformative pedagogy for 21st Century teachers and how these facilitate BTCs' professional identity development. Benmayor (2008) identifies digital storytelling as a social pedagogy, with a focus on learning as a collaborative process. The process of story development, through the telling and re-telling of ideas, is self-reflexive and a recursive process (Benmayor, 2008). Introducing multiple media into this process allows learners to express their understanding visually as well as verbally. Technology-mediated learning becomes transformative pedagogy (Vásquez, 2008b) "to achieve new ways of enhancing the intellectual capacity of learners" (p. 183) through creative technology-based pedagogy. The process of telling ones' story—and in the case of our participants, the process of defining and redefining self as teacher through the medium of technology—documents the creation of a bilingual 21st century teacher. This is significant because how pre-service teachers view their role in teaching and learning is important for designing effective pedagogical tasks (Dexter & Riedel, 2003; Shellens, van Keer & Valcke, 2005).

2.3. Brief History of La Clase Mágica

With a clear focus of empowering bilingual children, *La Clase Mágica* promotes a College-going culture and helps prepare participants for higher education utilizing pedagogy that integrates technological resources. Over the last two decades *La Clase Mágica* has been implemented in five underserved communities throughout San Diego, California and at two universities in Texas (Collins, Vásquez, & Bliesner, 2011, Gutiérrez & Vossoughi, 2010). With the goal of preparing students for the 21st century, the *Clase Mágica* strives to enhance the academic achievement of underserved children by exposing them to the latest technological advancements (Rodríguez, 2010). Additionally, educators, participating in LCM, have expanded the program to other higher education institutions in Columbia and Spain. These partnerships have shown "promise for adaptation and replication...

they can in fact be utilized as a new form of broad-based social policy" (Vásquez et al, 2010 as cited by Collins, Vásquez, & Bliesner, 2011, p. 325). Each site has made LCM significant for their population based on their resources and areas of need. As an educational program, LCM not only brings together young bilingual children and pre-service teachers it has globally united regions, states, and nations in the common goal of community empowerment for marginalized communities.

Using meaningful learning activities through the medium of technology, LCM brings together young bilingual learners and BTCs. Through an informal educational setting, BTCs engage with young Latin@ learners and their families to promote the academic achievement of bilingual Latin@ children, ages 4-10, in the areas of bilingualism, biliteracy, and technology. Programs such as LCM have become an avenue to increase Latino/a families' access to technological literacy skills (Ek et al., 2010). Yet, for those who do not have access to technology, the increased use of technology in schools can be a mark of segregation and marginalization (Sánchez & Salazar, 2010). As a consequence, lack of technology perpetuates social inequalities in addition to the immense disparities that already exist in U.S. schools (Mossberger, Tolbert, & Stansbury, 2003). Having a teacher that uses technology as a way to engage and teach is critical in bridging technological gaps that exist, particularly among low-income Latino children and families (Gorski, 2003).

In the sections that follow, we provide a brief review of literature on the integration of technology in teacher preparation programs, the use of digital media such as autonarratives (Machado-Casas, 2009) as a social and pedagogical tool, and their significance for the professional identity development of BTCs. We share our findings as they connect to technology focused professional development for BTCs and offer concluding recommendations for teacher preparation programs.

3. Methodology

3.1. Data Collection and Analysis

For this study we used qualitative survey (Knobel & Lankshear, 1999) to examine our case study of one BTC cohort in an informal educational setting—the after-school technology project. Qualitative survey designs maximize data collection within a minimum amount of time and thus allow qualitative data to be efficiently gathered and analyzed (Marsland, Wilson, Abeyasekera, & Kleth, 1999). Our research design reflects that of the UC Links/*Las Redes* project, which Gutiérrez and

Vossoughi (2010) term “a new form of research: the social design experiment that seeks to create and study change” (p. 101). Using field-based observations, in-class discussions, and artifact collection, a team of four researchers gathered data from the initial LCM cohort. At the time of this project, the LCM classroom was in its second year of implementation; in the third semester. Data for this project were collected as part of the larger afterschool technology program.

3.2. Participants

Because the study sought to focus on the relationship between technology and academic preparation, we studied the initial LCM cohort of 20 BTCs as our participants. Participants were overwhelming female, first-generation college students in their early 20's. All were in the third year of their teacher preparation program. All were of Mexican origin with varying levels of Spanish/English bilingualism and technology experience.

As an LCM cohort, the 20 BTCs were enrolled in two undergraduate courses that were connected to the LCM classroom. One course emphasized Latino cultural experiences with children's literature and the use of literature as a pedagogical tool. The other focused on the relationship between children's play and cognitive, social, and affective development in early childhood classrooms. Both of these courses were taught primarily in Spanish with some English by the researchers. During this project, BTCs and their professors attended the LCM program every Tuesday afternoon over a 14-week period. BTCs participated in the LCM classroom three hours a week at the elementary school's computer room—the LCM classroom. All 20 BTCs were provided with tools—netbooks, iPhones, iPods, and iPads to use with their young bilingual learners. LCM, an ongoing collaborative is now in its sixth year. As faculty members, we alternate with other professors who teach the university course that is linked to this purposeful social design experiment and “robust learning ecology” (Gutiérrez & Vossoughi, 2010); we also form part of a larger design and implementation team that meets bi-monthly to review and improve LCM.

Each BTC was assigned to a young elementary student in grades K-5. These pairings remained constant over the study time-frame. Children in the LCM classroom remained each semester except when students moved on to middle school. Each semester new students were recruited to replace those who had moved on to the middle school campus. To develop rapport and *confianza* (trust), adult-child pairs were considered *amigo/as* and *amiguitos/as*. Using Vygotsky's Zone of

Proximal Development, pairings were organized to create a space where learners negotiate meanings with a more experienced peer (Vygotsky, 1978). The LCM classroom became the space to develop children's language and literacy through digital media such as, computer games, digital narratives, and other educational software.

3.3. Data Collection

Data for this project were collected as part of the larger LCM technology program. This included weekly field notes written by the BTCs (in either English or Spanish) when they went to the LCM classroom; demographic and technology surveys from the families of each elementary school student; digital and print artifacts of the multimedia projects produced by the students and family members each semester; as well as reflective memos written by the researchers/professors of the LCM team. For this article, we analyzed the BTCs' fieldnotes, digital autonarratives, and digital multimedia projects. We conducted initial coding across the multiple sources of data and then followed with focused coding (Emerson, Fretz, & Shaw, 2011). Because the goal was to document BTCs' growth in their development as future teachers, data was collected in several different ways and at different times. Data collection occurred over the study time frame of one semester at the school site and included: 1) weekly digital field- notes, 2) weekly in-class discussions, and 3) technology and digital artifacts.

Digital field notes. BTCs were required to document their experiences in the afterschool technology program through weekly digital field-notes. Faculty provided BTCs with specific directions for their field notes. Each week, BTCs were first asked to record their initial observations of the site and participants. Additionally, BTCs were given specific topics of weekly focus these included, children's language and literacy use, children's ease (or lack of) with the task, BTCs' response to the children, children's response to their BTC, and children's response to their weekly activities.

BTCs were asked to complete their field notes within a two-day window following their visit to the site. They then uploaded their weekly field-notes into the program's on-line course platform for faculty review. Through this activity, they were asked to become researchers and observers. Their detailed accounts of interactions with the *amiguitos/as* were modeled after field-notes taken by seasoned ethnographers (Emerson, Fretz, & Shaw, 1995) and revealed BTCs' ideas related to the project, their *amiguito/a*, and individual reactions to weekly assignments.

In-class Discussions. During the semester, BTCs engaged in weekly in-class discussions in the two undergraduate courses assigned to the LCM cohort. These open-ended discussions, led by university faculty, focused on BTCs' experiences, personal struggles, and lessons learned at LCM. They had an average duration of thirty to forty-five minutes and were audio recorded to document development through the program. Once transcribed, BTC responses were coded based on how BTCs were using the technology provided to develop content, their areas of concern or struggle, and how the experience was impacting their professional identity development.

Technology/Digital Artifacts. Based on field-notes and in-class discussions, researchers analyzed the type of media used, purpose, and response by students and BTCs. Drawing on Darder's (1991, 1995) notion of bicultural voice, "*narrativas auto-digitales*" (digital autonarratives)—a technology based method of exploring BTCs' experiences were used to interpret the observations, reflections, and experiences of the BTCs in the program. Autonarratives are based on the premise that human beings come to understand and give meaning to their lives through story (Andrews, Squire, & Tambokou, 2008). Grounded in interpretive hermeneutics and phenomenology, it is a hybrid form of qualitative research that involves the gathering of narratives—focusing on the meanings that people ascribe to their experiences, seeking to provide "insight that (befits) the complexity of human lives" (Josselson, 2006, p.4). BTCs were asked to reflect on their own biliteracy journeys to create collaborative digital auto-narratives entitled *Cómo aprendí a leer y escribir en mi primer y segundo idioma*. Amiguitos/as enrolled in the LCM afterschool technology program became co-authors and co-editors on the assignment, which included a three to five-page paper and a digital narrative. Autonarratives included BTCs' experiences as children and students, their process of developing bilingualism/biliteracy, and their process of becoming teachers. It also included the amiguitos/as' autonarratives which included family background and personal reactions to their personal autonarrative and to their BTC's autonarrative.

3.4. Data Analysis

Based on our LCM cohort, all data (1) digital autonarratives, (2) digital field notes, and (3) transcriptions from in-class discussions were coded and analyzed to identify emerging themes, patterns, and relationships (Emerson, Fretz, & Shaw, 1995). The type of technology utilized by BTCs was also triangulated and coded to provide

information regarding the types of technological tools BTCs preferred to use with culturally and linguistically diverse learners. To ensure interrater reliability, researchers independently analyzed the same set of transcriptions, digital field notes, and use of digital media, and digital autonarratives. Meeting approximately every other week over the course of the semester researchers then collectively identified and coded data for salient themes, patterns, and relationships. These codes helped identify consistent findings related to the three research questions.

Based on our research questions, (1) How does integrating technology into teacher preparation programs help pre-service teachers utilize the available technologies when delivering content? (2) How will pre-service teachers use this knowledge to reach culturally and linguistically diverse learners? and (3) How does this knowledge impact their view of themselves as teachers? we identified three salient themes. These themes included (1) BTCs use of digital media (task cards, digital games) as academic learning tools; (2) the power of digital autonarratives and digital games as pedagogical tools for teachers of diverse learners; and (3) the impact of the project on BTCs' professional identity development. We categorized these three themes using a socio-constructivist role of technology to teach, connect, and transform learning for BTCs. We highlight findings with direct quotes from student field-notes and transcripts from in-class discussions.

4. Conclusions

In our study, the informal nature of the afterschool project provided practical applications for BTCs to engage in meaningful and purposeful uses of technology—technology they will someday use in their own classrooms. Findings reveal the significance of the professional development for helping BTCs' utilize technology as a pedagogical tool that can transform the way they teach diverse learners (Alanís, Machado-Casas, & Ruiz, 2014). Findings also reveal the power of technology to impact BTCs' view of themselves as teachers. In our discussion of findings, we focus on how the use of technology as pedagogy creates multisituational opportunities to teach, connect, and transform learning for young students and their BTCs.

Using Technology as a Pedagogical Tool

Our first theme focuses on addressing the research question, How does integrating technology into teacher preparation programs help pre-service teachers utilize the available technologies

when delivering content? BTCs were asked to explore similarities in the development of their collective identity as teachers and how the use of technology at *La Clase Mágica* enabled them to express and connect with their *amiguitos/as* in innovative ways. The stated goal for the BTCs is to open zones of possibilities (Moll, 1992) while they collaborate with the *amigo/as* on advancing them through pre-arranged set activities. It is a dynamic relationship in which each side offers their cultural and linguistic resources-funds of knowledge to reach the desired goal. BTCs perceived the autonarrative project as an important tool for learning and teaching because it facilitated a social construction of knowledge and afforded customized learning experiences (Alanís, Machado-Casas, & Ruiz, 2014)

This is what Agustina had to say about the experience of creating a digital auto-narrative.

What I liked best was creating my auto-narrative with Nico in Spanish. I loved the way we added phrases that you can only understand in Spanish. I loved it and Nico did too. For me it was so good to practice my Spanish and to have to learn technology words in Spanish.

This example illustrates the typical relationship-building that grows out of meaningful and instructive collaboration between the BTCs and their *amiguito/as*. The digital narrative provides Agustina and her *amiguito* with a unique opportunity to engage in technology-based activities in the child's native language giving him the opportunity to be the expert, to feel comfortable, and connected to the BTC. It also gives the BTC a culturally and linguistically diverse activity that incorporates the child's language, past experiences, and new technology knowledge—a means to bridge the child's funds of knowledge and the acquisition of technology knowledge and skills.

To determine its significance for learning, BTCs were also asked to incorporate iPhone applications based on their students' academic needs with a focus on play. Consequently, Jessica found an application that was playful using music as a tool for learning. Jessica explains her *amiguita's* response to her task,

I chose an iPhone application that incorporated the different grammar components. It introduced each component at the beginning with a catchy tune and song. Kayla was able to go through the application and enjoyed singing and dancing along with the different tunes.

Similar to the autonarratives, Jessica used an iPhone application to advance children's academic knowledge in a meaningful and playful space. Both the autonarratives and the iPhone applications provided BTCs with occasion to use digital media to augment their student's learning.

As children progressed through the tasks, questions arose as did opportunities to problem-solve or co-construct new knowledge in various content areas including technology. One example of this is Vivian's response to her *amiguita's* enjoyment with literature, "Ana seemed to enjoy the story reading and I found an app that might help her a little more next week." Vivian realized that iPhone applications could be used to develop children's literacy and enjoyment of text. Without direction, Vivian took it upon herself to find additional activities for her *amiguita*. That initiative is exactly what we want to see in teachers.

BTCs also discovered how the computer could be used to further vocabulary learning through easy and quick configurations of comprehensible and enhanced input.

I also liked that when the students were reading about the solar system or the sun, difficult words would appear in light blue and if they did not know the word they could click on the word and the definition would appear on a different website showing you several vocabulary words.

The ability to click on words that are beyond a child's level of comprehension allows them to learn at a much quicker pace than stopping to find it in a dictionary or continue reading without a true understanding of the information. Laura's comment sums up the experience,

Pienso que este es un programa en el cual no solo los niños aprenden sino que nosotras también vamos aprendiendo tanto de los niños como de los problemas que se nos va presentando pues esto nos da la experiencia para poder resolver en un futuro conflictos que se nos presenten. A transition is needed between this and next section.

Connecting to Culturally and Linguistically Diverse Learners

Our second theme focuses on our research question, How will pre-service teachers use this knowledge to reach culturally and linguistically diverse learners? The creation of digital autonarratives provided both BTCs and their *amiguitos/as* with a purpose for connecting with each other in authentic situations. One of our BTCs reflects on the process,

... and this is where I had to explain myself and really talk about me as the teacher and how that brought me joy, how this is what I wanted and needed to do. Then she tapped me on the back when she saw I was getting emotional and she said, "You are the best teacher".

The use of autonarratives provided a rare opportunity to "conectar y compartir" with their *amiguitos/as* via their own life experiences. As identified in the literature (Benmayor, 2008), BTCs and their *amiguitos/as* engaged in meaningful organic dialogue which allowed them to mediate their life experiences. This occurred before actually digitalizing it; simultaneously interconnecting the role of the learner and teacher. Helping BTCs understand how their personal experiences led to where they are today also provided a means to understand their *amiguitos/as* journey is often very similar to their own (Vasquez, 2008b).

Their unique experiences made each BTC different yet similar in the ways they and their *amiguitos/as* explored who they are and where they come from. They experienced the co-construction of knowledge, the interconnectedness of the teacher and learner, and the environment of trust that was created between the pairing all through the medium of technology. Maribel, best captures the connection she felt with her *amiguita* Lucia:

La autonarrativa me ha dado la oportunidad de usar la tecnología para conocer a Lucia más. Ella trajo fotos de su casa y su familia y yo de la mía. Esto nos ha ayudado a hablar acerca de donde vinimos y de que va primero y porque en la narrativa. Hemos hablado mucho de cómo va a ser la autonarrativa y ahora siento que ella me conoce más y yo a ella.

In this case, the use of technology allowed Maribel and her *amiguita* to explore each other's narratives-increasing opportunities for focused dialogue and inquiry between the pairings. These relationships build the self-efficacy of BTCs as they develop their identities as educators who can make significant contributions to young lives (Benmayor, 2008).

Becoming a 21st Century Learner and Teacher

Our final question focused on how this technology knowledge would impact BTCs' view of themselves as teachers. We have noticed that as our BTCs progress through their preparation program they begin to see glimpses of themselves as professionals who impact and often change the lives of young learners. Paola, for example had this to say about her experience:

I have done fieldwork hours before ... But LCM is different, for the first time-I felt like "me the teacher". I not only got to interact with Susana but I also got to get to teaching-and in different ways. Like about myself, technology, literacy through books and apps, and even music. I really felt that I was "teaching". And although I was not in front of a classroom I was teaching Susana about so much. But I also realized that I was teaching her and she was learning because I knew her. So it is true. A teacher needs to know her students to be able to connect with them and for them to connect with you and what you are teaching.

This experience allowed Paola to feel like she was "teaching" for the first time. More importantly, technology became a mediating tool that helped her realize the significance of students' funds of knowledge in the learning process. It becomes an exploratory experience that allows for the exploration of hands-on practice in a risk-free space and allows for the fluidity between the role of the teacher and the role of the learner. Identifying themselves as teachers provides BTCs a sense of responsibility and an opportunity to see themselves as effective teachers as they acquire knowledge of their obligations within the teaching realm (Hammerness et al., 2005).

The ability to explore their role with young children illuminates how technology is more than an apparatus but can be used for teaching and learning in meaningful settings. Agustina reflects on her role as a "maestra" in using technology as a pedagogical tool:

No soy una persona que creció con la tecnología. Todo lo contrario so llegue a utilizarla hasta muchos años después. Por eso es la idea de las auto-narrativas la verdad que me forzó a ver la educación de una manera menos tradicional y mas divertida, y tal vez hasta mas valiosa. Creo que estar en la clase mágica y especialmente hacer esta actividad, me ha convertido en una maestra moderna y menos anticuada que puede llegar a tener resultados de sus estudiantes sin tener que ser tan formal o repetitiva.

Agustina's experience with education is one that is shared by many-one filled with traditional pedagogical practices that involve a top down approach to education (Nieto, 2003). Often the message our BTCs receive is that the role of the 21st century teacher is to be engaging and innovative in the practices they engage in with 21st century students who use technology on a daily basis. To be effective in our globalized society, however, a teacher must shift the perspective of technology from an add-on to curriculum to a pedagogical tool that can promote increased academic results,

stronger teacher-student interactions, and relevant student practices. For Agustina creating a virtual autonarrative provided an authentic connection between what she learned from texts and actual classroom practice. It was a way of viewing technology as a powerful pedagogical tool that can transform the classroom experience for diverse learners.

New technological tools help pre-service teachers construct knowledge by designing relevant and meaningful pedagogical tasks for children (Shellens, van Keer & Valcke, 2005). Creating their own virtual autonarrative and using digital games moves the BTC beyond the student mentor capacity to the teacher capacity and allows for the understanding that you have to know the children academically, socially, personally, to engage them on different levels (Alanís, Machado-Casas, & Ruiz, 2014). Perhaps this can best be summarized by one of our BTCs-Adriana:

When you are in charge of one child for the whole time, you become like a mentor but really beyond a mentor you become a teacher who needs to know their academic weakness, their strengths, and how to better community with the student. It taught me the things I have to do as a teacher to be able to connect and really teach in a more collaborative way. And I think as I teach I like this best. I think now that I am a teacher I will do this more.

In the process of serving as mentors for young children our BTCs discovered their power to teach with technology in meaningful ways, to connect to young diverse learners, and to transform their role from novice to expert in the process.

Integrating technology into teacher preparation programs helps pre-service teachers utilize the available technologies when delivering content (Chapelle, 2005). Informal learning spaces such as *La Clase Mágica* provide an avenue for teacher preparation programs to reach the optimal potential of their teacher candidates while preparing those for a world that privileges critical and reflective skills related to digital literacies. Knowing how to use technology is no longer an option. Effective teachers use it as a resourceful and pedagogical tool to create meaningful activities that enhance learning. More importantly, they must use this knowledge to reach diverse learners. This research supports the increasing need for more professional development in teacher preparation programs if BTCs are to be linguistically and technologically bilingual and multimodal. In this case, the creative and purposeful use of technology has given BTCs and their *amiguitos/as* deeper and meaningful ways to get to know each

other, learn, and build trust; an important context for authentic teaching and learning.

5. Study Implications and Recommendations for Teacher Preparation

The purpose of this study was to investigate the impact of technology mediated learning for BTCs. The use of innovative technologies provided BTCs with an educational opportunity to see these technologies as pedagogical tools. BTCs were able to make personal connections to young diverse learners in meaningful and transformative ways. BTCs and technology served as mediating tools to support bilingual Latin@ students' biliteracy and technology skills (Rico, Sánchez, & Palleres, Weissling, 2012). In helping *amiguitos/as* proceed through a series of technological activities, BTCs cultivated new ways of understanding one's self, one's language, and one's role in the world. These BTCs' stories, as told in their own voices, help teacher educators gain a stronger understanding of the benefits associated with infusing technology into teacher preparation programs and essentially give us insight into effective practice.

This study focuses on the importance of professional development for BTCs if they are to meet the demands of the 21st century classroom in terms of technological pedagogy and cultural and linguistic global relevance. The increasing availability of new technologies suggests that teacher preparation must be fundamentally different from previous approaches (Schellens et al., 2005). Learning how to teach requires a new way of learning. Like Schrum (1999), we believe multi-dimensional technology use will only be effective if teacher education providers require teacher candidates to use technology in their own learning.

As such, there are recommendations for educators in teacher preparation programs. We recommend the development of a design-based approach to preparing teachers where,

- (1) teacher candidates are placed in locales with culturally and linguistically diverse children where technology is valued as a viable pedagogical tool;
- (2) teacher candidates have access to the latest technologies;
- (3) teacher candidates utilize these technologies in their own learning;
- (4) teacher candidates use these technologies to engage in authentic collaborative learning with diverse learners;
- (5) teacher candidates receive on-going guidance as they implement technology-supported lessons and

- (6) teacher candidates are given opportunities to reflect on how these innovative tools can mediate learning and teaching for diverse learners.

These recommendations focus on a crucial part of preparing BTCs to effectively teach with technology. Practice within authentic spaces gives them the opportunity to transfer what they know

and have learned to their practice as 21st century teachers. Further research into the factors that enable BTCs to engage in this technological pedagogy is needed. A longitudinal study that focuses on BTCs once they enter the classroom would be helpful to provide data on the effectiveness of these recommendations as BTCs move into using technology on a regular basis.

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