

ABSTRACT

Wafa, NADA. The Implementation of an Inquiry-Based, Technology-Infused Global Education Curriculum in a 1st Grade Classroom. (Under the Direction of Dr. John K. Lee).

This study explores a teacher's implementation of an inquiry-based, technology-infused global education curriculum in a 1st-grade classroom setting. This study was focused on one unit, and conducted over the course of a five-week period, with one lesson taught each week. Data included the curriculum, three interviews, and observations of the implementation. Findings focused on the effectiveness of inquiry-based learning and technology-integration in a global education classroom.

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The Implementation of an Inquiry-Based, Technology-Infused Global Education Curriculum in a
1st Grade Classroom

by
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DEDICATION

This research is dedicated to my family. My parents who have always guided, helped, and were always there for me. My husband who has always supported me as I took one challenge after another and always stood by my side. They are my role models, exemplifying what it means to be an educator, professional, and leader. My brothers who are always there to cheer me on every achievement. My grandparents who share their excitement and happiness with me, and to my entire family for their support and encouragement throughout. My friends who are always there to listen, talk, share ideas, projects, and volunteering opportunities together. And lastly, to Our Three Winners, my dear friends, Yusor Abu-Salha, Deah Barakat, and Razan Abu-Salha, who even though their lives were taken away way too soon, have deeply shown me the importance of being good, standing together in a unified community, living a life of service, and working on truly being the change you would want to see in this world.

BIOGRAPHY

Nada Wafa is currently in her final semester of the New Literacies and Global Learning Master's program at North Carolina State University. She expects to graduate in May of 2019 with a Master's of Science in Education. Nada received her Bachelor of Science in Middle Grades Education, concentration in Language Arts & Social Studies from North Carolina State University in 2011. She then worked at an International School before pursuing her master's degree. Nada is looking forward to the opportunity to continue her studies at North Carolina State University in the Doctoral of Philosophy in Social Studies Education in the Fall of 2019.

Nada is the mother to three wonderful children and a wife to a great husband who is very supportive, committed, and dedicated to keeping our family strong. She is a Youth Coordinator and member at the Islamic Association of Raleigh, as well as an educator and leader in various volunteer opportunities that help enrich our youth learning. She continues to love learning, and enjoys spending her time with her husband, children, and family. She loves traveling, exploring, and learning about new cultures and people all around the world.

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CHAPTER ONE: INTRODUCTION

The need to foster global knowledge, understanding, and build bridges between individuals and the world has been increasing through the years. In schools, global education classes are a way for educators to empower students to think globally and bring about change in society and the world. Over the years in my graduate program, I have been inspired to be part of this change in global education.

Given my experiences, I teamed up with a global education teacher to write a technology-infused, inquiry-based, global education curriculum for K-5. We completed the Kindergarten and 1st grade portions of the curriculum in the summer of 2018 and developed the framework for the 3rd and 6th grade. The following are the topics for each grade level:

Grade	Topics (Tagline)
Kindergarten	Fiction, Nonfiction- Fun: Learning Through Literacy
1 st	Traveling Around the World- Learning All the Way
2 nd	Endangered species: Research & Study
3 rd	Learning, Caring, Protecting: Activists in the Making
4 th	International Geography: Demographic and Culture
5 th	Financial Literacy: Budgets, Stocks, and Business
6 th	World Change: See it, Feel it, Be it

Much can be explored through global education, however when planning a global education curriculum, teachers should select topics in an informed way that will honor children's interest and needs. All children have the right to education and an important factor in that process is the teacher. Burnouf (2004) states that,

education is meant to change people for the better and to create prosperous, productive, and meaningful lives. All nations of the world are related and there is no race or culture that is better than the other. This is all the reason more to teach social studies with a global perspective infused throughout with the themes, elements, and new understandings (p. 10-11).

The school where my partner and I worked on the curriculum is a new charter school that just recently opened its doors for rising kindergarten to sixth grade students. The school follows the Core Knowledge curriculum and includes innovative educational programs to help children develop and apply the skills needed for students to succeed in the 21st century. The school follows four key design elements that provide students with authentic learning, a nurturing environment, opportunities for collaboration, and technology skills. The school's mission is to provide authentic learning to improve the lives of students through a collaborative, nurturing environment, and its aim is to build a foundation for students' success in school, career, and life.

One of the unique aspects of this school is that it offers a kindergarten through sixth grade global education as a course. I have been part of the school as a parent, volunteer, room-parent, substitute, and through this project, as a partner with the global education teacher. During my time in the school, I have observed the global education students thinking creatively, critically, purposefully, as well as problem-solving real-world situations to take further action. The global education class offered at the school is student-centered and revolves around discussions, hands-on projects, inquiry-based learning, and technology integration. Through these experiences, students expand their knowledge and understanding of the world around them, which helps them become more globally competent, informed, and active global citizens.

In this research study, I focused on a 1st grade global education class and one teacher's implementation of a global education curriculum. I observed on the teacher's implementation of the 1st grade curriculum: *Traveling Around the World: Learning All the Way* and measured the teacher's use of technology and her inquiry strategies to support students' learning. The research question for this study is:

How does a 1st grade teacher implement an inquiry-based, technology-infused global education curriculum in the classroom?

Related sub-questions are:

- How does inquiry-based learning relate to global education?
- How is technology integrated in a global education class?
- How does the global education teacher's pedagogy positively influence students' global knowledge?

The primary goals of this research study was to see how a teacher prepared her students for the diversified world we live in and the ways the teacher was able to foster global knowledge and understanding among a group of first grade students.

Conceptual Overview

The global education class at the school where this research was conducted was an active learning environment that focused on the universal values of equality, tolerance, cooperation, and inclusion, as well as learning about global literacy, environmental science, financial literacy, global demographics and geography, cultures, and endangered species. This global education class was carefully designed on this foundation, resulting in student-led discussions, projects, dialogue, and student-driven interest in topics. In general, the class represented a global education approach that included what Merryfield (1998) described as an "extensive use of

interactive strategies like teacher-led discussions, scored group discussions, debates, and role-plays” (p. 382). Teachers in such environments can enhance global education classes by using inquiry-based learning and technology to meet students’ needs and skills for success in a multifaceted world. Merryfield (1998) further argued that instruction in global education through inquiry “is enhanced by continual dialogue among students” (p. 382).

Such experiences with global education are not the norm. The same is also true of technology enabled learning. In early grades, most students are not being exposed to technology in global education. The benefits of such exposure for learning are important. In regards to technology use and learning Lee and Friedman (2009) argue,

as research in social studies in technology continues to advance it must remain focused on relevant and meaningful questions that help the education community meet the needs of children in social studies classrooms. Such research needs to draw on existing understanding about how children learn and how teachers teach (p.14).

Lee & Friedman, (2009) proposed questions that may frame research on technology in social studies include areas of focus such as the following.

- How does technology support the use of specific subject matter in the teaching and learning of social studies?
- How do social studies teachers develop meaningful pedagogical knowledge about how to use technology?
- What are the limits or ranges of technology use in social studies teaching and learning environments? (p.13)

With regard to global education (the second area of focus for this research), Crawford and Kirby (2008) argue that globalization is a reality in education, and “consequently, we, as

educators, have an important responsibility to prepare students to function in and contribute to a global society” (p.56). In today’s world people are becoming more dependent on one another through our technology enabled connection with others in different parts of the world. Therefore, educating our students to become global learners is now a responsibility of educators everywhere. The need to educate our students on how to become global citizens is in higher demand now than ever. Schkar (1993) made this point about education in the United States 25 years ago arguing that, “children in this country must be provided an education that more than adequately prepares them for citizenship in the society and world they will soon inherit” (p. 57). Future generations depend on thinking, working, and moving across diverse environments with a range of people. Students need to develop the skills for intercultural communication, conflict resolution, internalizing and applying cross-cultural understandings, as well as seeking out multiple perspectives.

When teaching global education, teachers may cover a range of topics, building in new knowledge each year. Globally educated people “possess high-tech skills, broad interdisciplinary knowledge about the contemporary world, and adaptability, flexibility, and world-mindedness to participate effectively in the globalized world” (Kirkwood, 2001, p. 14). In order for teachers to help students learn about global education, they need to support students as they use an inquiry approach to learning, and facilitate students’ thinking about different global topics. This also requires advanced knowledge among teachers. Burnouf (2004) goes so far as to say that “teachers must educate themselves first in local, global and national knowledge systems of the world and continue learning about global issues together with their students” (p.10).

Teachers are encouraged to teach through innovative technology to build the skills students need to be better prepared for their future. Gaudelli (2006) also makes the point that the

fundamental elements of life today are rooted in new technologies, and “schools have increasingly come to rely on technology to support instruction and operations” (p. 97). In order to accomplish those goals, teachers are also encouraged to teach through inquiry-based learning. Grant (2013) argues that when teachers use inquiry in the classroom, they have the opportunity to “involve students in powerful learning opportunities and to develop as thoughtful, engaged citizens” (p. 325). Inquiry-based learning using technology that is focused on global knowledge outcomes can be developed through compelling questions that are challenging and address a range of topics that enable students to think critically, creatively, and proactively in their society. In the next chapter, each of the three areas of focus for this research are expanded upon beginning with global learning and continuing with inquiry-based learning and finally technology-integration in the classroom.

CHAPTER TWO: LITERATURE REVIEW

The literature on the implementation of global education curricula that are technology enriched and inquiry-based is limited; however, in separate categories there is extensive research about global education, inquiry-based learning, and technology integration in the classroom. The literature supports the significance of fostering global education in the classroom through social studies education. The following review of scholarship concentrates on the goals of global education, as well as how to foster, reflect, and attain a global perspective. It also reviews inquiry-based learning in global education and social studies. In addition, this review covers technology integration with a global education perspective.

Global Learning

Global education is a creative approach to learning about the world and the changes we can make in society. It relies on active learning environments that are enriched with universal values that create awareness of global topics, and challenge others to think about the global issues. Global education's primary purpose is to change attitudes through inquiry and reflection in order to create a deeper understanding of human actions in the world. Global education can instill, enrich, and empower students and thereby enabling them to become active, competent, appreciative, and responsible global citizens. Teaching global education reinforces the skills and knowledge of understanding how to live together and function in a multicultural, diversified, and interconnected world.

Lapayese (2003) defines global education as a way that "encompasses the strategies, policies and plans that prepare young people and adults for living together in an interdependent world. It is based on the principles of co-operation, non-violence, respect for human rights and cultural diversity, democracy and tolerance" (p. 494). Crawford & Kirby (2008) define global

education as “the study of human conflict and cooperation, the interdependence of human systems, and the fostering of cross-cultural understandings, such as the development of empathy and perspective-taking” (p. 57). Merryfield (2002), a leading scholar in global education, highlights the difference that global educators make in the lives of students, arguing that global education helps students develop

open-mindedness, anticipation of complexity, and resistance to stereotyping. Students acquire skills in cross-cultural communication and experiences in working people of diverse cultures as equals... They learn to view people around the world from both insider and outsider perspectives and understand global inequities and resistance to oppression” (p. 20).

Burnouf (2004), in her work on global education curricula, implies that a “relevant curriculum is needed to help students of differing worldviews to understand and function effectively in the social, cultural and economic worlds and to be able to understand the notion of globalization and the role of global education” (p. 2). Kirkwood (2001) emphasizes the need for accomplished global educators to “possess high-tech skills, broad interdisciplinary knowledge about the contemporary world, and adaptability, flexibility, and world mindedness to participate effectively in a globalized world” (Kirkwood, 2001, p. 11). Global education teachers prepare students to think for themselves, look critically and creatively at societal problems, and engage students through dialogue. Through these strategies, the classroom becomes a more challenging and exciting environment, and this helps students expand their knowledge, competency, and appreciation for the world we live in.

Global learning is an approach to learning the skills and fundamental knowledge of understanding how to live together and function in a multicultural, diversified, and

interconnected world. Dyer, (1995) argues that global education is “a philosophical perspective through which global education is not a new content course, to be added on to the existing system, but rather, a philosophical perspective which can infuse existing content areas such as history, science, and literature” (p.1). Furthermore, Kenneth Tye (2003) views global education as something that,

can make a significant contribution to such a change [of consciousness]. My hope is that American educators will participate in bringing a global perspective to our schools and classrooms and that they will do this, at least in part, by seeking dialogue with global educators around the world (p. 168).

Global education is also important because we live in a period of globalization that impacts the ways that people come together and interact. Friedman (2005) describes global experiences as a condition where “there are almost no barriers to entry, as long as you have a computer, a camera, and a microphone” (p. 514). Although there are many challenges emerging from globalization, in the word of Bella-Rose & Desai (2005) the stakes “could hardly be higher. Today, students’ knowledge of the rest of the world is not a luxury; it has become a necessity” (p. 40). In sum, students live in an interconnected world where their knowledge about the world and the choices they make may affect them and the world around them.

The main goals of global education are to understand the universal values of cooperation, solidarity, tolerance, cultural diversity, democracy, inclusion, justice, non-violence, citizenship, and equality. Through global education, human rights and cultural understanding are emphasized, as well as content in areas as diverse as biological sciences, environmental science, and cross-cultural studies, all of which contain elements that further connect us to our world. Freeman (1993) views global education as,

the concepts, skills, and attitudes in global education rest upon assumptions related to collaboration. In developing understandings of interdependence, conflict, and cooperation, global educators teach about human choices for getting along with each other (p. 34).

Global education also connects the “study of problems and issues that cut across national boundaries, and the interconnectedness of the systems involved-economic, environmental, cultural, political, and technological” (Tye & Tye, 1992, p. 7).

In global education, an individual’s interest is motivated through a subject area, and leads to taking purposeful action in meaningful ways. Crawford and Kirby (2008) state that “because students’ success in a global society is dependent upon their abilities to collaborate with others [social action], be open to differences, and think critically, teaching from a global perspective is critical” (p. 58). Through action, one begins to create change, whether it is in the society in which they live or extending their action to the world. Humans, particularly children, are innately receptive to making a difference in the world. However, that interest deteriorates if it is not nurtured and supported. When we provide children with a real-world problem, we empower them to examine and act to change the world. Their eyes light up, and they start thinking about ways they can change the world for the better. However, if we present the same real-world problem to an adult, many factors may complicate their willingness to engage the problem. Therefore, providing students with the cross-cultural experience “gives students an equal role with other participants, unlike programs that involve contributing money or canned goods for a “feed the children” program, which places the givers in a superior or more powerful role” (Merryfield, 2002, p. 20). Global education inspires students to think outside the box, and create a global perspective. Tye and Tye (1992) state the importance of

cross-cultural understanding, which includes development of the skill of perspective-taking- that is, being able to see life from someone else's point of view. Global perspectives are important at every grade level, in every curricular subject area, and for all children and adults (p. 7).

Global education motivates, encourages, and brings out the best in every student. It helps create a sense of global appreciation and urges them to make a difference in the world.

Inquiry-Based Learning

Inquiry is a process of seeking information by questioning a topic of interest to expand knowledge and gain a deeper understanding. Students are curious about the world around them, and inquiry-based learning is the best tool to guide students through effective and authentic question-driven learning. The Inquiry Design Model (IDM) aims at “organizing the curriculum around the foundations of inquiry: questions, tasks, and sources” (Swan, Lee, & Grant, 2018, p. 137). Using IDM, teachers are able to facilitate students' knowledge development, expand their opportunities to develop literacy skills, and find meaningful ways to express themselves through argumentation. Students are naturally curious and “curiosity drives interest and interest drives knowledge, understanding, and engagement” (Grant, 2013, p. 322). Inquiry education provides students with “opportunities to answer those questions more through disciplinary (civic, economic, geographical, and historical) and multidisciplinary venues” (Grant, 2013, p. 322). Inquiry enables higher-level thinking for students, particularly when teachers provide the appropriate types of sources.

Through inquiry, students are able to act on what they want to know more about. They can expand their learning through research. Through inquiry, students are provided the time to develop answers to open-ended questions and to present their findings and then reflect on their

work. Burnouf (2004) emphasizes that students need to be informed about the content through up to date materials, “then given a chance to reflect on this information” (p. 9). Burnouf (2004) continues that, “it is important that there be a reflection component to encourage further critical and decision-making thinking” (p. 9). Reflection is a matter of thinking about thinking (metacognition) through inquiry-based learning. Thus, in a classroom, where inquiry-based learning is taking place, students’ excitement, enthusiasm, and curiosity can be instilled through their student reflection and engagement. Inquiry-based reflection occurs in various ways, for example, through “discussion boards, e-mails, chats, journals, and any other way that students feel comfortable” (Burnouf, 2004, p. 9). These are all effective methods, particularly when constructive feedback is given. These types of reflected inquiry methods strengthen children’s knowledge, as well as their confidence in the types of decision-making required of inquiry.

Teachers using inquiry-based learning in their classroom empower students to think critically and creatively on their own, resulting in a sense of enthusiasm and excitement in the classroom. One inquiry-based approach for global education is the Kath Murdoch Inquiry Model, which is a model that

serves as a framework for students’ investigation of their chosen global issue...Students are encouraged to delve deeply into their chosen issue, to draw conclusions, and to make decisions regarding how they may be “solutionaries” in ways that are appropriate and meaningful to them” (Crawford, 2013, p. 4). The six-steps are: Tuning in, Finding Out, Sorting Out, Going Further, Making Conclusions, and Taking Action (Crawford, 2013, p. 4).

Using this approach, students are able to select and reflect about their topic and better acknowledge the content through this model.

Grant (2013) reinforces the importance of children's curiosity through inquiry and how it drives knowledge and engagement within their education. For Grant, social studies is mainly about asking questions, investigating about the world, and understanding the reasons behind anything that happens, as explained in the Inquiry Arc,

which is a support for social studies curriculum writers, and it has four dimensions:

Developing questions and planning inquiries, applying disciplinary concepts and tools, evaluating sources and using evidence, and communicating conclusions and taking informed action (Grant, 2013, p. 322).

In this conceiving of inquiry children naturally begin proposing solutions to issues and instructional questions based on their knowledge and experiences. Compelling questions are developed carefully, as they are "provocative, engaging, and worth spending time on" (Grant, 2013, p. 325).

Technology-based learning

Today's classrooms should look nothing like those in the past. Students should be able to learn and learn how to function successfully in contemporary and diversified communities. Technology is an important aspect of the contemporary classroom, and central to such classrooms is "the creative use of technology and new media to promote international knowledge and understanding and expand global citizenship opportunities for young people" (Bell-Rose & Desai, 2005, p. 36). Digital technologies offer many ways to connect students to the world in global education. Infusing technology into global education can help "foster students' understanding of interrelationships of people worldwide, thereby preparing them to participate meaningfully as global citizens" (Crawford & Kirby, 2008, p. 56). Given these realities, educators should consider the effective ways to incorporate technologies into their teaching

content through various sources. Similarly, the integration of multimedia impacts students' ability to engage in inquiry and make connections to their world. However, "giving students access to multiple sources or multimedia learning environments will not guarantee any meaningful learning. This type of knowledge needs to be acquired through participation in highly structured guided activities with clear problem-solving and inquiry goals" (Wiley & Ash, 2005, p. 385).

Teachers can integrate technology into their lessons, but using technology will not necessarily ensure that students are enhancing their learning. Teachers have to focus on the ways these technologies are used to foster learning. In an inquiry-based global education class, there are many technology applications teachers can use to promote students' learning, but each of these must be evaluated given the learning goals of the teacher. For example, teachers may have students engage in an open-ended web search or use multimedia to support their knowledge development as a means to help them connect to others in the world. If the goal is to encourage perspective taking or expand their understanding of diversity, such approaches to using technology would make sense. If there are other more direct learning goals, such as learning about the location of places in the world, the technology (i.e. a web search) may or may not be useful.

Using technology, students can participate in service learning projects, social action projects, communicate with a classroom in another country, participate in virtual field trips, and do video conferencing, among many other activities. These activities can provide a virtual network for students and teachers to cultivate global knowledge. Access to technology, plus the right tools that match the content, provide teachers and students with the opportunity to build a deeper understanding and appreciation of the world. In theory, teachers "should pursue a line of

inquiry that investigates technology integration through the lens of instructional strategies, rather than studying [about] technology integration through innovative technologies” (Bolick, 2009, p. 186).

The reality is that technology does seem to be touching every aspect of our lives. Schools are not immune, and are becoming more and more dependent on the support of technology to support teacher’s instruction. Technology integration stems from educators realizing that effective teaching is rooted in a thoughtful engagement of the whole child. Since students do not formulate knowledge, skills, and attitudes related to technology and diversity, for example, in compartmentalized ways, teachers in preparation need to focus on integrating their knowledge to address the real life complexity of P-12 classrooms. (Gaudelli, 2006, p. 98-99).

By providing teachers with the reliable tools and concepts to teach global education through technology, students stand to be better prepared to become stronger global learners.

Technology use must be guided by sound reasoning and principles. The TPACK model developed by Koehler & Mishra (2009) provides such a framework for teachers to make sense of the interaction of three domains of knowledge: content, pedagogy, and technology. Integrating technology into a curriculum “should be creatively designed or structured for particular subject matter ideas in specific classroom contexts” (Koehler & Mishra, 2009, p. 62). TPACK “requires a forward-looking, creative, and open-minded seeking of technology use, not for its own sake but for the sake of advancing student learning and understanding” (Koehler & Mishra, 2009, p. 66). TPACK provides a meaningful outlook for educators to consider how technology can be incorporated when teaching specific content.

Global learning projects can incorporate many types of technological platforms that can connect classrooms globally. A national education nonprofit organization called Project Tomorrow states that “technology has made it possible for students just like you to share ideas and work on projects with students in other countries” (“Global Project Ideas,” 2007, p. 34).

They argue that through social studies,

it would be interesting to do a project with students from another country just about how our countries differ from each other...one could communicate with students from China and neighboring countries and attempt to analyze and predict Asia’s economic status in the future (“Global Project Ideas,” 2007, p. 36).

When technologies are integrated in global education and social studies, teachers are able to promote cross-cultural experiences, understandings, and awareness for their students. They are able to cover topics such as equity, diversity, and discrimination. There are many types of technological applications teachers can use in the classroom to establish students’ global understanding. Many schools have the tools to create a virtual network for students. For example, they can be a part of global classrooms, international projects, e-pals, question and answer activities through emails, electronic appearances, virtual field trips, and social action projects.

Developing technological fluency and infusing global education in schools through the effective use of various types of technology is essential for contemporary schooling. By incorporating various types of technologies into concepts and frameworks, teachers are able to further expand students’ global knowledge and awareness in a meaningful way, thereby preparing them to think, act, and become global citizens.

CHAPTER THREE: METHODOLOGY

The research conducted here was a case study of how a teacher implements a technology-integrated, inquiry-based, global education curriculum. It also examined the ways the teacher was able to help students develop as global citizens, who will serve their community, nation, and world. A case study is a systematic process of research where the case study investigator plans, designs, prepares, collects, analyzes, and shares data through real-life context. In this form of study, there are “multiple sources of evidence, with data needing to converge in a triangulating fashion” (Yin, 2009, p. 2). As a result, case study evidence can derive from multiple specific sources, such as “documents, archival records, interviews, direct observation, participant-observation, and physical artifacts” (Yin, 2009, p. 98). When conducting case studies, investigators can choose from several methods to conduct research and collect evidence and data. In each method, there are strategies, criteria, and designs to follow. Yin (2009) makes the case that the case study method is more than just the methods used to conduct research but is an approach to conducting research.

Case study as a research strategy comprises an all-encompassing method-with the logic of design incorporating specific approaches to data collection and to data analysis. In this sense, the case study is not either a data collection tactic or merely a design feature alone but a comprehensive research strategy (Yin, 2009, p. 13).

The case study examined in this research consisted of a global education teacher and a 1st grade classroom with 30 students. The case followed the teacher from the initial stages of the curriculum implementation through teaching a complete unit. Three interviews were conducted with the teacher as well as classroom observations of her teaching practice. Curriculum materials

were also analyzed. The interviews were audio recorded and transcribed, and the observations were transcribed. Relevant coding techniques were used with each stage of the data analysis.

Participant and Context

The participant in this study, Ms. Bailey (pseudonym) was a K-6th grade teacher at a charter school in Southeastern United States. Ms. Bailey was in her 2nd year teaching at the charter school and had no previous teaching experience. She earned her degree in History. The duration of the class was 45 minutes of instruction. The school was located in an upper middle-class community. The global education class was taught as a “specials” class, which is an elective class that is taught once or twice a week to a specific group of students at one grade level. Each lesson was taught for one a week, resulting in 4-5 classes per unit study.

Curriculum

In general, the 1st grade curriculum was about *Traveling Around the World*. Students were introduced to world geography and cultural studies through a “monthly adventure” taken to a country in the world. The students had a world map in their classroom, and throughout the school year, the countries visited were marked with a pushpin and a string, illustrating the miles and distance traveled from one country to the other. The eight countries studied throughout the year were: Chad, Pakistan, Italy, Brazil, Canada, Australia, Russia, and China. This research study focused on one unit in the curriculum, Brazil.

Students also learned about the country’s flag and other symbols. As an opening, the teacher reviewed content about the previous country. This set up the exploration of each new country. Students maintained a global education folder that consisted of their work and provided evidence about what they learned about the country. Within the notebook, each country section

had a title page that included the country flag, with lines underneath the image for the students to write and reflect about the country they were learning about.

The curriculum included non-fiction and fiction books which students used to learn about the chosen country. Students' work with these books helped them to develop a deeper connection and understanding of the country and helped to support their literacy development and creativity.

During the unit examined in this research, the teacher highlighted important information about the country and facilitated student learning about various facts and information from numerous sources. Each unit was framed by a compelling question, and each lesson had a supporting question. Students were able to answer the supporting questions by completing formative assessments, such as discussions and other tasks. Units also included summative assessments, such as writing a few sentences to indicate what the students had learned.

The curriculum included multimedia materials that supported visual learning and innovative technologies incorporated in the lessons. An active learning environment was supported by technology and enriched by creating a strong connection among the various countries studied. Technology enhancements included, one activity where the teacher provided a live online camera shot of a city in the focus country, as well as other educational videos that enriched students' learning. The teacher also incorporated robotics (Ozobot) that enabled a focus on the geography of the country. The use of technology was designed to help students to become more actively engaged and helped them build curiosity to learn more about the world.

Data Collected

Data were collected from three sources; interviews, observations of classroom implementation, and the curriculum. A semi-structured interview was conducted at the beginning of the unit that focused on the implementation of the curriculum. A second and third interview

covered the details of the implementation of the unit, as well as, expectations and focused reflections. The interviews followed a protocol and contained targeted interview questions (See Appendix A for the interview protocol). The first interview occurred before the unit was taught. The second interview occurred mid-way through the lessons. The third interview occurred at the end of the unit. Field notes were collected during each classroom observation (see Appendix B for the observation protocol). Finally, the curriculum functioned as a third source of data for the analysis (Appendix C).

Analysis of Data

Data for this research was derived from interviews, observations, and the curriculum. For the three interviews, a digital recorder was used. The interviews were transcribed, and the information organized according to the research questions and sub-questions. The data were analyzed using a grounded theory approach, which provided a way to develop explanations supported by evidence. Grounded theory methodology “enables persons to take actions to alter, contain, and change situations. Furthermore, grounded theories can be revised and updated as new knowledge is acquired” (Corbin & Strauss, 2008).

Copies of all the notes and transcriptions were coded as primary data. After organizing all of the transcripts by data type and completing preliminary coding, the data were reorganized according to categories. As categories began to emerge, the smaller pieces of data were matched to the categories, and as new data came in, the categories were altered accordingly. After organizing and analyzing the data, more formal codes were generated. As the findings became more concrete, themes in the data were color-coded making it easier to incorporate new data as it was collected.

Interview data, field notes, and students' responses to the teacher's active instruction were documented. There was a strong connection between the field notes and interviews. Codes emerged that supported the teacher's pedagogy and students' experiences in the classroom. As the data were organized and coded, interpretative findings emerged. They were validated and organized as more formal findings. The findings were triangulated between interview transcriptions, field notes, and curriculum data. This approach allowed a thorough examination of the data to ensure the conclusions were valid and trustworthy.

CHAPTER 4: FINDINGS

This study explored the approaches used by a global education teacher to implement a technology-infused, inquiry-based global education curriculum about the country of Brazil in a 1st grade classroom. A single case of one global education teacher was selected with thirty 1st grade students. Interviews and observations occurred throughout the teaching unit involving the country Brazil.

The research question for this case study is:

How does a 1st grade teacher implement an inquiry-based, technology-infused curriculum in a 1st grade classroom?

- Related sub-questions are: How does inquiry-based learning relate to global education?
- How is technology integrated in a global education class?
- How does global education teacher's pedagogy positively influence students' global knowledge?

Specifically, this study focused on inquiry-based learning and technology integration in a global education unit study about Brazil and analysis of Ms. Bailey's implementation of the inquiry showed three findings that emerged:

1. Ms. Bailey did not fully implement all of the elements in the unit, but after partial implementing she was considering using inquiry in the future.
2. Ms. Bailey was not clear or comfortable about when to ask questions. In some lessons, she did not use the inquiry questions from the unit. She believed the questions were too rigid and above the students' level.

3. Ms. Bailey believed students exceeded expectations and that they responded well to the inquiry. She was happy to see that students who typically didn't participate started to respond eagerly and enthusiastically.

Implementation of a 1st-Grade Global Education Curriculum

Ms. Bailey was a novice teacher with two years of experience teaching global education at this school. She was one of the founding members of the school, a member of the PTA, and an active member of a conservation group. She has a strong passion for teaching and attended a World View Global Education Leaders Program to seek more knowledge about teaching global education. Ms. Bailey mentioned that she had not done anything like inquiry with her 1st grade students and said, "that will be a new thing to try." When asked about the inquiry curriculum she was teaching, she said,

We use a lot of books, we always use maps...They learn the continents, we look at big features that stand out, we look at landmarks...We're looking at doing books, working on paper, we also watch videos...learning a few phrases from the languages spoken in the country...They love to draw...I like to be able to make it a little bit more three-dimensional in some way because we can't go there, so I try to make it as multi-dimensional as I can.

Technology was also a major feature of the lessons that included multimedia resources and robotics embedded in the unit. When asked about technology, Ms. Bailey's initial response was,

I'm not into technology...I like to do things that I think go together...we watch a video, that's not technology at all, but that is the extent of what we do because I try to keep it simple. I try to keep it relevant and I have 30 children in a room, so it's not like we can

sit down and do technology ... that doesn't work with this large group...I'm not a technology person, I'm never going to be a technology person ...we're old school... like books, so like hands-on things and that's what I feel is going to be more memorable for them as well in the end.

However, Ms. Bailey hoped that students would eventually connect with the technology. There was some concern about students being distracted once they engaged with technologies, such as the robot. She mentioned that she feared “that they'll see a robot and what they're actually doing will kind of go out the window.” She was concerned that “they'll be wanting to play with this robot and see it work, and that they won't be thinking about where this animal lives.”

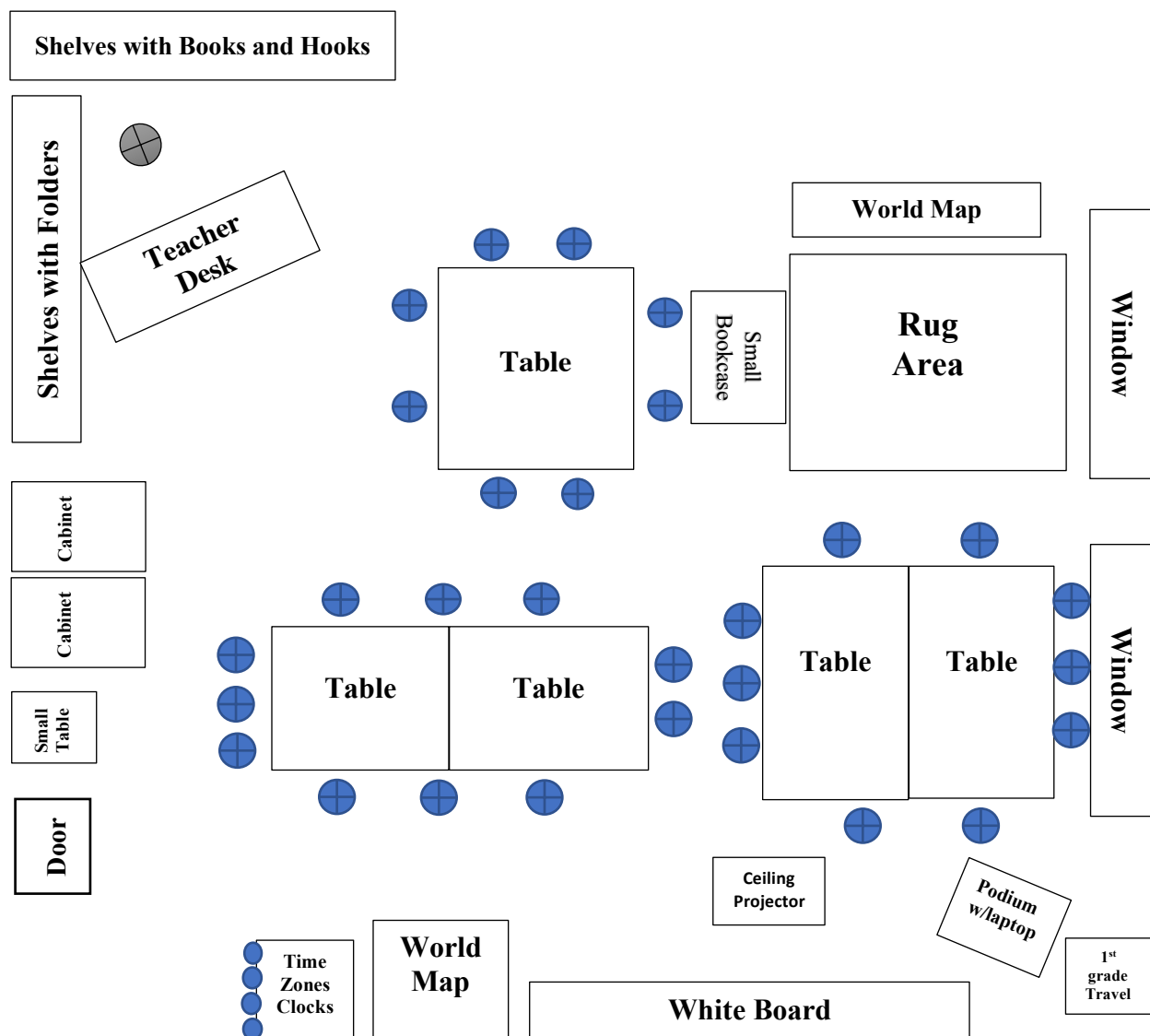


Figure 4.1. Classroom Map

Ms. Bailey had 30 students in her 1st grade class. When asked to compare different classes and teaching methods she has used in her classroom she responded that her students were “all eager and happy to be here.” The 1st grade class that was observed for this research was scheduled right after recess, which Ms. Bailey thought “might help a little bit more too, they’ve run and played.” The classroom was arranged in an open format with table-based work stations and a comfortable setting student to complete their assignments (Figure 4.1).

Teaching global education was new to Ms. Bailey. She was hired in the summer of 2017 after submitting a proposal to her administrators in the school about a potential elective class. She envisioned a course that cultivated students' understanding of the universal values of inclusion, cooperation, equality, and tolerance, as well as environmental science, cultural studies, financial literacy, endangered species, and global demographics and geography. She recognized that the course would be a work in progress and that "in practice, I keep learning, and I'm having things added in all the time." She relied on her personal teaching style and implied that she doesn't follow a specific curriculum, and that "it's my own curriculum." Ms. Bailey emphasized that in planning the overall curriculum she "tried to choose one country per continent, a country that the students would be interested in."

Ms. Bailey was familiar with the structure of the Inquiry Design Model (IDM) after I introduced her to some of the online IDM materials and connected her with another teacher who uses IDM. Teaching through inquiry required that students remain engaged in their learning, thus allowing the teacher to provide a student-centered lesson. Inquiry provides the opportunity for students to share their thoughts in a safe space, connect content with personal experiences, and explore new ideas and deepen their knowledge. The inquiry-based learning method helped Ms. Bailey understand her students better and focus students' learning on outcomes. When Ms. Bailey was asked about her thoughts regarding the inquiry based structure of the unit, she said, "I haven't done anything like that so I'll have to see how it goes...that will be a new thing to try." When she referred to the Inquiry Design Model and the inquiries that I shared with her, she said, "I haven't done that inquiry method like the ones we've seen online. I need to try one, but with so many classes, it's hard." When asked if she would be using inquiry in the future, her response

was, “my problem is finding time to like really plan it and do it.” One of the biggest challenges for Ms. Bailey was in using questions.

The importance of questions when teaching inquiry. As Ms. Bailey taught using inquiry, she confessed to simply stating the questions written in the lesson plans and then teaching the “lesson how I always did.” She was anxious about following what she viewed as a more structured curriculum with IDM. She said, “I feel more anxious, so I liked my pace where I know I’m going to do this story...watch this video...going to draw this picture.” In addition, Ms. Bailey said, with regard to inquiry, “it makes me more anxious to do things a certain way,” particularly having the questions written in a specified format. However, she also said it “would’ve been better to ask questions before we started,” when the students were ready to answer the questions. She also said that she was happy about the use of questions. While at the beginning, students “were not all ready” to answer the compelling question, it was “something good for me to do moving forward.” Overall, Ms. Bailey thought that it was good to have a compelling question that “we don’t have a concrete answer to...just open-ended.” She felt like such a question would allow students to develop their global understanding of the country chosen for the unit.

Ms. Bailey was more concerned about following the steps described in the lesson plan than focusing on the compelling and supporting questions. She said, “we didn’t use that question today. I see it there now, but I was just looking at my one, two, three, four” steps. At times, Ms. Bailey was not quite sure how to use the compelling and supporting questions. She confessed at one point,

is that when I ask it, or do I ask it every time? I didn't obviously today, and I haven't, because I didn't even see it up here to be honest, because I'm looking at this and this and I'm stressing about what I have to do.

There was a sense of hesitation and midway through the unit she stated that while she was not initially comfortable teaching inquiry, she would consider using it at a simpler level for her students in the future.

Despite Ms. Bailey's hesitations, students responded to inquiry positively. About halfway through the unit, Ms. Bailey realized that students had "responded fine. They just answered the question." As evidenced in classroom observations, students were eager to answer questions. Lots of students wanted to participate, often calling out with answers. As evidenced in classroom observations, students were eager to answer questions as well.

Student learning and questions during the inquiry. Ms. Bailey emphasized that for the inquiry-based lessons, the "questions were more rigid" than the approaches she had used in the past. At the end of the unit, when asked for her thoughts on teaching the unit for this inquiry, she said,

I think it went well. I think maybe the [compelling] question might not have been the right question, How do we impact Brazil? I think that went way above of them, I could have thought of maybe a different question. I don't know that they really made a connection with that so much, a little bit. Maybe a few kids did.

Ms. Bailey assumed her students' knowledge aligned with the learning outcome, and, as a result, the 1st grade students had done well. However, she added that she did not talk very much about deforestation, and that "we talked about it probably three times." Given that understanding

deforestation was an important learning outcome, Ms. Bailey realized there was room for improvement.

When asked about modifying inquiry to help her students better understand the learning outcomes, she emphasized that “having questions ready at the end,” after reading the books was necessary instead of having the questions “come to me at the time.” Ms. Bailey realized that if she had read the books more closely and been better prepared ahead of time, inquiry-based learning would be more effective.

When asked about teaching another inquiry lesson, Ms. Bailey said, “I think I will think of questions to add into my lessons moving forward with 1st grade.” She noticed that students did respond well to inquiry, especially for one student who “never raised his hand for anything. I had him for two years, and he was really eager to participate, which is happy to see. I’ve never seen him raise his hands.”

Despite having no prior experience teaching global education through inquiry, Ms. Bailey accepted the idea after trying it with her students. She expressed excitement about students’ positive experiences with inquiry-based learning. Ms. Bailey also needed some time to adjust to this new teaching method and emphasized “I think I’ll add questions for sure like that, I’m thinking when I’m starting my unit.”

A reluctance to use technology. The inquiry materials featured in this research were designed to take advantage of technology to enhance student learning. In practice, Ms. Bailey described her uses of technology as limited. She said that students “watch a video, [but] that’s not technology at all, but that is the extent of what we do because I try to keep it simple.” She emphasized that “the kids love to watch a live feed of the location that we’re learning about at that current time.” Ms. Bailey implied that she is an “old-school person.” She did not see the

need for students to have access to computers when they were in her classroom. Ms. Bailey indicated that students “don’t get access to books as much as they need to,” therefore, she was reluctant with technology integration into the lesson because she found that books were a stronger foundation for the curriculum. She viewed technology, as “more than something that has a mind of its own that I’m scared of.” As a result, Ms. Bailey concluded technology was a tool “that wouldn’t be the thing that I’d ever embrace.”

The class size (30 students) also made her anxious, and doing things out of the ordinary was a challenge for her because she was hesitant about the unexpected. While the technology implemented was relatively simple, Ms. Bailey worried. “I have 30 children in a room, so it’s not like we can sit down and do technology.” Specifically, she was concerned about students using Chromebooks in the classroom, as it would be difficult for 30 students to bring in their computers into the classroom.

Ms. Bailey typically structured her units around books, videos, and drawings/writing, so the technology in this unit was new for her. In keeping with her reliance on using technology to deliver content, the second lesson in the unit included a Prezi Presentation, which presented different animals and sounds in the rainforest. Prior to the Prezi presentation, Ms. Bailey read a book aloud and the students answered questions related to the animals and the layers of the rainforest. Ms. Bailey then reviewed the layers of the rainforest. Afterwards, she scrolled through the animals in the Prezi presentation and asked “Which layer does the animal live in?” and other questions, such as “Why does it [a poison dart frog] have bright colors?” Students also made observations during the presentation about the thickness of the tree branches and about the animals living in the water.

The next lesson, which featured robots, was more interactive. Students seemed to enjoy this lesson, and Ms. Bailey was more at ease and seemed rather confident. Ms. Bailey was initially “nervous about the technology part” and “didn’t feel like that fit in,” however, “it went well and they did fine with it...they got the overall message.” In contrast to the Chromebooks, she viewed students’ use of robots as enabling them to gain a better understanding of where the animals live. They “got the idea of moving between layers.” The robots lesson also had accompanying print resources, including 16 maps that were colored and labeled as the layers of the rainforest. Ms. Bailey was grateful for these print materials and mentioned, “that was a lot of work for you to make these... That wouldn’t be easy to do.” As it did take time to do each map, she stated, “that’s something I wouldn’t have had time to do.”

There was some thought to using these print materials online, but with the limited resources and Ms. Bailey’s reluctance, we decided to make the posters (see Figure 4.2).

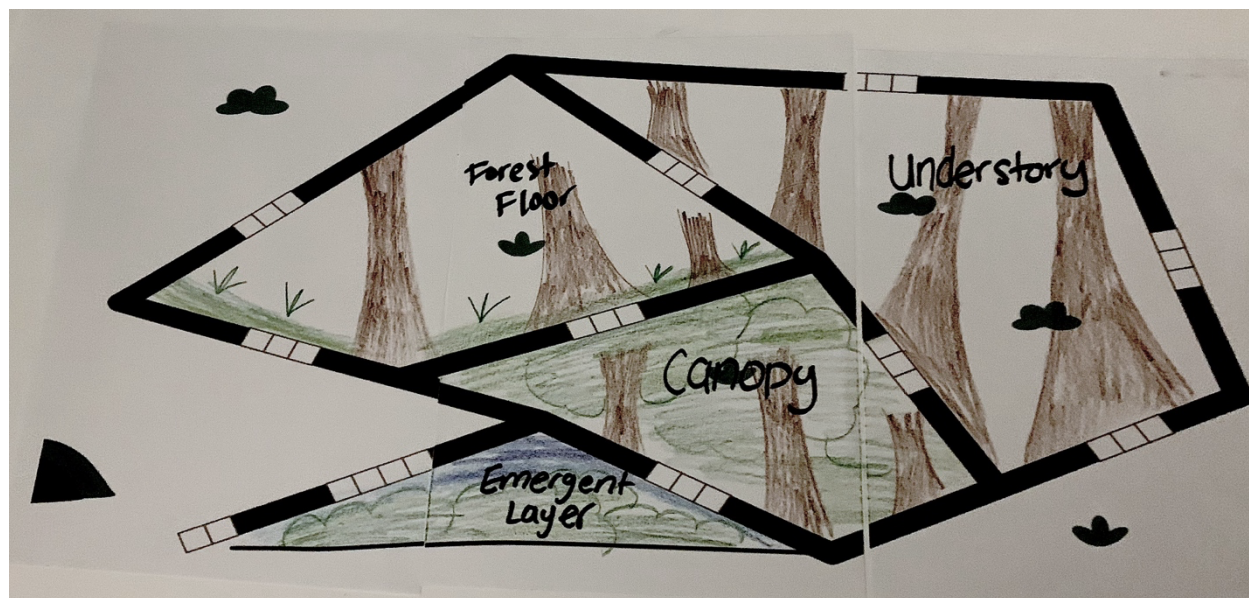


Figure 4.2. Coding Map Poster for Ozobot Lesson

The poster maps were presented to the students, and the teacher asked, “Does it look familiar?” One student stood up and matched the words on the poster map to the layers of the

rainforest poster that was displayed next to Ms. Bailey. She also showed the students the code sheet, and asked them, “Does a jaguar go fast or slow?” The students responded, “Fast!” to which she responded, “But it does also go slow, especially when it hunts or when it’s sneaking around. Ok, so codes, red, black, red. It’ll slow down until it goes to the next code.” One student asked if the robots reads the words, and Ms. Bailey answered that it only reads the color codes, “So it’ll follow the code you color in!”

Ms. Bailey informed the students, “Yesterday, a monkey kept climbing up the tree!” to spark their imagination and the idea that the robots were functioning as the animal. She also made sure the students knew where each animal lived and told them that the robots can do tricks. All of the robots were calibrated before the lesson started, and it took about five minutes to divide the students into groups and spread out across the room.

There were also five 7th grade students in the room as teacher-helpers. One was a floater and made sure everyone was on task and the lessons were going right on time; the other four had, on average, seven 1st graders in his/her group. Interactions between the students occurred, and in one group, the 7th grade student asked a 1st grade student to color in a code, and the student said, “But if it’s not good handwriting, the robot may not read it.”

Ms. Bailey sat with one group herself and began to look at the code sheet. She divided the codes among the students and said, “Let’s test it, we have 15 minutes!” When the robot started going over the code, she said, “It’s working! It’s doing a tornado!” One student in her group said, “I’m good at coloring!” The student colored in the code, and as the robot was moving on the map, he said to the robot, “Do you want to be eaten by a bird? Go, go!” The students were very enthusiastic. One student started giggling and said, “That was a dance!” Ms. Bailey laughed

and said, “That was a turbo, that was the best one!” She gave a turn to another student to color in the code, and the student said, “Look, look how fast it went!”

One of the 7th grade helpers informed Ms. Bailey that they had only four minutes left. The students continued to color in the codes, and one said, “That was a funny dance, let him do it again.” In Ms. Bailey’s group, all of the students were engaged except one student who was sitting next to her. He was talking to himself and daydreaming. He came close to Ms. Bailey and informed her that he was not having fun. When their time was complete and the lesson was wrapping up, the students thanked the 7th grade students and lined up. The interactive part of the lesson that included robot’s integration took thirteen minutes.

Ms. Bailey commented “that robots work sometimes and sometimes they don’t...they have a mind of their own.” When asked about other ways the students could have gained the same understanding, without the use of technology, Ms. Bailey suggested other ways in which students “could have played a board game,” similar to the coding map posters.

The fourth lesson used video as technology (run time 2 min 48 sec) about deforestation from the National Geographic channel. Once the video finished, Ms. Bailey said, “Let’s talk about the video, we have four minutes left. What are the reasons for deforestation?” Students answered with words like,

“Farming.”

“Building houses.”

Ms. Bailey also added a few more reasons to the board, such as logging and mining.

In Lesson 5, the final lesson, she showed the students a rainforest song video while they were working on their global education folders and drawing their favorite animal in the

rainforest. Overall, Ms. Bailey was “afraid of technology. The thing that probably scares me the most about teaching.”

Inquiry Design in the Classroom

The Brazil unit had one compelling question: “How do we impact Brazil?” and there were five supporting questions.

- (a) What is Brazil?
- (b) Why are the rainforests important?
- (c) How can technology impact the rainforest?
- (d) Is the relationship between humans and the rainforest good or bad?
- (e) How can we help Brazil?

Compelling question. It was challenging for Ms. Bailey to simplify the compelling question for the students. The role of the compelling question was to encourage students to think about the ways we impact Brazil and distinguish the commonalities and differences between the U.S. and Brazil based on the information presented throughout the lessons. The supporting questions addressed various aspects of the compelling question. When completing the formative tasks, students gathered basic information about Brazil and identified and expressed their ideas about the rainforest, deforestation, and how changes in the rainforest affect animals. They categorized the layers of the rainforest and expressed how our relationships with animals affected their lives. The students then formulated and organized their ideas about how to best conserve the rainforest.

The compelling question challenged Ms. Bailey as she presented it to the students. She was focused on the order of tasks in each lesson, but could not connect with the question. “I

don't love that [compelling] question. I don't see it myself, but I'll ask it," since students "might surprise me" when asked a compelling question.

Supporting questions. Supporting questions aligned with the compelling question and allowed students to connect the unit to their personal experiences. The first supporting question was, "What is Brazil?" The other support questions focused on the importance of the rainforests, technology and the rainforest, the relationship between humans and the rainforest good or bad, and how we help can Brazil and the rainforest. Ms. Bailey connected more closely with the supporting questions than the compelling question, although she was not explicit in sharing these questions with students. She asked the students other questions that related to the students' personal lives and experiences for each of the supporting questions and supporting students as they move through the related tasks.

Students learning through compelling, supporting, and emerging questioning. In addition to the compelling and supporting questions that were part of the unit design, Ms. Bailey used emerging questions to guide students' learning. The first emerging question that Ms. Bailey asked was, "What can we do to change our city?" Many students raised their hands and responded,

"No throwing trash on the ground"

"Don't go fishing because there will be no more fish."

"It'll hurt the ocean."

She rephrased the question, "How can we help the environment in our city?" Students mentioned,

"Use the 3 R's [reduce, reuse, recycle] and help the environment."

"Stop cutting down trees."

“Make compost for our gardens”

“Plant flowers.”

She then asked the students, “What do we have in common between us and Brazil?” Many students replied with various answers, including

“We’re all people.”

“We’re all mammals.”

“We both play soccer.”

Ms. Bailey informed the students that throughout this unit, they would think about the compelling question, “How do we impact Brazil?” Ms. Bailey was not as explicit with the first supporting question, however by the end of this lesson, if asked the supporting question, students would have been able to answer, “What is Brazil?”

The second lesson emphasized the Amazon rainforest in Brazil, as well as the layers of the rainforest, and which animals live in these layers. The supporting question in this lesson was, “Why are rainforests important?” Ms. Bailey started Lesson 2 with emerging questions such as,

“Why is it called Brazil?”

“Are there no seasons in the rainforest?”

“Do you think a jaguar can climb to the understory?”

“Which is the darkest spot? The brightest? The thickest?”

This lesson was heavily focused on facts, animals, and understanding the layers of the rainforest. Again, Ms. Bailey was not explicit with the supporting question, but it was reiterated in the third lesson, during which it was mentioned and asked before the students’ robotics group work.

The third lesson focused on the animals in the rainforest and the students depicted the Ozobot robot as an animal and color-coded the poster map for the animal to move between the layers of the rainforest. The supporting question in this lesson was, “How can technology impact the rainforest?”

Ms. Bailey acknowledged that she was not sharing the supporting questions with students that point because, she “didn’t know where to put that” question, as it “would’ve been better to have asked it before we started.” Nevertheless, she continued, by lesson three “they were ready for that question...which I was happy about...they weren’t ready for this question when we started.” Students responded to this third supporting question, “Why are rainforests important?” with answers such as,

“Lots of animals live there”

“Oxygen comes from the rainforest”

“Lots of interesting plants.”

The fourth lesson was focused on the animals in the rainforest and connected deforestation and our relationship with the rainforest. The supporting question was, “Is the relationship between humans and animals good or bad?” Ms. Bailey read a classic book, “The Kapok Tree,” which focused on deforestation. Throughout the readings she paused and asked more emerging questions such as, “What happens if we cut down trees?” Students responded,

“We won’t have any oxygen, and we can’t breathe”

“Animals lose their homes”

“Animals lose their family.”

Ms. Bailey explained that some animals could become extinct. During the reading she asked, “Why do people cut down the trees from the rainforest?” and students responded by saying,

“To build stuff.”

“To get wood for fires.”

“To get wood for furniture.”

“Trees give us oxygen!”

Ms. Bailey explained cattle-ranching and mud slides to them which led her to ask, “How can we get people to stop cutting trees?” Students responded,

“You can chop a tree, leave its roots, and it will grow back.”

“Build a gate around it and write to not chop it down”

Students were also asked, “How can we get people to stop cutting trees?” They responded by saying,

“Tell them that not only animals are in danger, but you are too.”

The supporting question for the fourth lesson was shared but not emphasized. It asked, “Is the relationship between humans and the rainforest good or bad?” One student responded,

“We could hurt the animals.”

Another student related his family’s experience with cutting down trees and how he saw a tree from the inside. At this time, the teacher said, very quickly and in a lower tone voice, “I only have a few minutes and I’m wondering if I’m going to be able to do everything I need to do.”

Ms. Bailey asked another emerging question, after showing a brief video about the rainforest, “What happens if we cut it all down?” The students listed the disadvantages of cutting down trees and talked about how it takes a long time for the trees to grow back.

To conclude the unit, the fifth lesson contained a set of tasks that related to the compelling and supporting questions. In this lesson, students had to think of ways we can help

Brazil. When Ms. Bailey asked another emerging question, “How can we stop cutting down trees in the rainforest?” They answered,

“We can try to cut down one tree and not all the ones that have species in them.”

“We can call the tree police and they can come.”

“Animals need their food and if we cut down trees, you’d feel bad for the animals.”

“Maybe if we teach others about trees, they won’t cut them.”

“We don’t think that trees give us oxygen.”

When they thought about how animals were affected by deforestation, students mentioned that,

“When a family lives there, and rain falls, it can hurt the animals.”

When the students speculated on the reasons the Amazon rainforest is being destroyed, they answered,

“What if those animals destroy your home since we destroyed their home? We should treat them like you want to be treated.”

“If someone cuts down our tree, they may cut down theirs.”

When asked about what they can do as 1st grade students to help the rainforest, they said,

“We can make posters that say don’t cut down trees.”

“We can cut a little part of a tree, and have it grow back.”

Ms. Bailey asked the compelling question in Lesson 5: “How do we impact Brazil?” Students responded,

“We can leave [trees] the way they are.”

“We can plant more trees, when they fully grow, animals can live there.”

Supporting questions were designed to scaffold students thinking. In practice they were less important than the emerging questioning that Ms. Bailey had used to engage students’

discussions that were based on their experiences and knowledge. Students expressed themselves in response to these emerging questions and provided their opinions on a range of issues. When students were provided with the opportunity to expand their thoughts, they engaged in thoughtful discussions and were willing to participate because their voices were being heard.

Factors Affecting the Implementation of the Unit

The lessons in this unit developed over time, but were adjusted as the unit was being implemented. Several factors played a role in those implementation adjustments. These included the unit design, the nature of the sources, finding the time to use inquiry, and the teacher's emotional state of mind.

The unit design. The five inquiry lessons in the unit were organized and structured to enhance Ms. Bailey's overall goals for her class. Each lesson had a title, list of materials, compelling and supporting questions, and a numerical order indicating the flow of the lesson. At the end of each lesson students were supposed to write their answers to supporting questions on an exit slip. However, after the first lesson Ms. Bailey indicated that the exit slips idea did not work well with the students, and, as a result, were removed. Ms. Bailey thought her students were overwhelmed with the amount of writing they had to do. The purpose of the exit slip was to help students answer the supporting question and ease the transition to the next lesson, but it just did not work out. Due to time constraints, students did not reflect or discuss work at the end of most of the lesson tasks.

The format of each lesson was different. In the first two lessons, Ms. Bailey was the focus. The third lesson focused on the robot. In lesson four, students brainstorm solutions to help end deforestation, and ended up working as a whole group. Minor adjustments were made in lesson given, but they did not directly affect students' actions.

Sources. The materials for each lesson were described in the unit, and Ms. Bailey carefully prepared them for use in the classroom every week before the lesson began. The books were all checked out from the local library ahead of time. The handouts were printed and placed in their folders before the unit began. The layers of the rainforest poster was displayed prominently for students to use with every lesson. In addition, there were sixteen other maps and a set of markers and coding sheets for each group to use. Four Ozobot robots were also used as sources. In addition, all of the multimedia materials that Ms. Bailey used were pulled up ahead of time on the laptop to project on the whiteboard. Even with all of this preparation, Ms. Bailey made lots of adjustments when implementing the unit and using the sources.

Finding the time to use inquiry. When Ms. Bailey was first introduced to the inquiry unit, she was eager and interested to learn more about it. However, it was not a straightforward process for Ms. Bailey to understand the unit design. While the goal in designing the unit was to make it simple and easy for the teacher to follow, Ms. Bailey was concerned with “these steps, steps, steps, when you have to stop and look.” With regard to the overall curriculum, she was concerned that it was “just far more scripted than usual.” Nonetheless, she stated that she was going to adapt the unit to work given her approach to managing the instructional time.

Ms. Bailey’s biggest issue was “finding time to really plan it and do it.” She reflected about the ways she could have modified inquiry and adjust for time by reading the some of the sources (i.e. books) aloud “then having questions ready at the end, instead of having the questions come to me at the time.”

Emotional state of mind. Ms. Bailey developed her own way to cope with challenges she faced in her teaching. She persisted with the same format she had used in previous lessons, but was willing to make more changes for this unit than other units in the curriculum. In the

initial interview, she stated that it had been a very long day for her, and by the third class, she felt “more anxious.” Ms. Bailey liked to follow her own teaching pace, “where I just know I’m going to do this story this time, we’re going to watch this video, we’re going to draw this picture or color.” In contrast, the inquiry felt more scripted for her. In addition, when she knew she had to do something differently, she felt like it made her more anxious “to do things a certain way.” Ms. Bailey expressed concern that was “more technology” and the questions were “more rigid” in the inquiry unit that she was used to in her lessons. As a result, she worried that the inquiry teaching was “a little more...I don’t want to say it...stressful,” because she knew that “someone is going to watch me and I have to follow this plan.”

The design of the inquiry also created some stress. Ms. Bailey confessed that she was “not initially comfortable” with the compelling and supporting questions, although students did respond positively, which surprised her. Her biggest concern was about the inferences that students might make from the questions about how we impact Brazil. “I don’t want them to stereotype. I’m always nervous about looking at different cultures, like looking at people specifically. I’m always nervous of that.”

Technology was also an area of concern and stress for Ms. Bailey. She confessed that she “was nervous about the technology part and I didn’t feel like that fit.” But as a result, the students did “well and they did fine with it, and I think they got the overall message that we wanted them to get in the end.”

Student Engagement

Teacher-led pedagogy. Overall, Ms. Bailey controlled the instructional pace of the inquiry lessons using a teacher-led pedagogy for most of the instructional time. In the first lesson in the inquiry unit, Ms. Bailey used a teacher-led approach, which took 36 minutes of class time,

and students had seven minutes to complete a task (i.e. flag coloring sheet). In the second lesson, there was 25 minutes of teacher-led instruction, and the students again, had seven minutes to complete a rainforest diagram. Lesson three included 19 minutes of teacher-centered instruction and 13 minutes for students to complete the robots activity. The fourth lesson included 28 minutes of teacher-focused instruction, then a video and a brief discussion about the reasons for deforestation. The last lesson was 24 minutes to the teacher-led instruction and then students watched a video and drew their favorite animal in the rainforest, which took a total of six minutes.

At the start of each lesson, students reviewed the countries and continents they visited throughout the year. As they had only covered four countries and continents, this only took one minute at the beginning of class. Ms. Bailey showed them where they had “traveled” on the map of the world on the bulletin board. At the bottom of the map, there was space for the flags of the countries they visited. Ms. Bailey pointed to each flag and engaged in a call and response form of questioning. She asked, “Country?” With a unified answer, the students said, “Chad.” Then she asked, “Continent?” and with a unified answer, the students said, “Africa.” The other countries and continents covered in class were Pakistan-Asia, Italy-Europe, Canada- North America, and Brazil-South America. After this part of the lesson, Ms. Bailey pulled out the rainforest poster (Figure 4.3) and students named all of the layers. This manner of engagement with students during the lessons was consistent all throughout the unit.

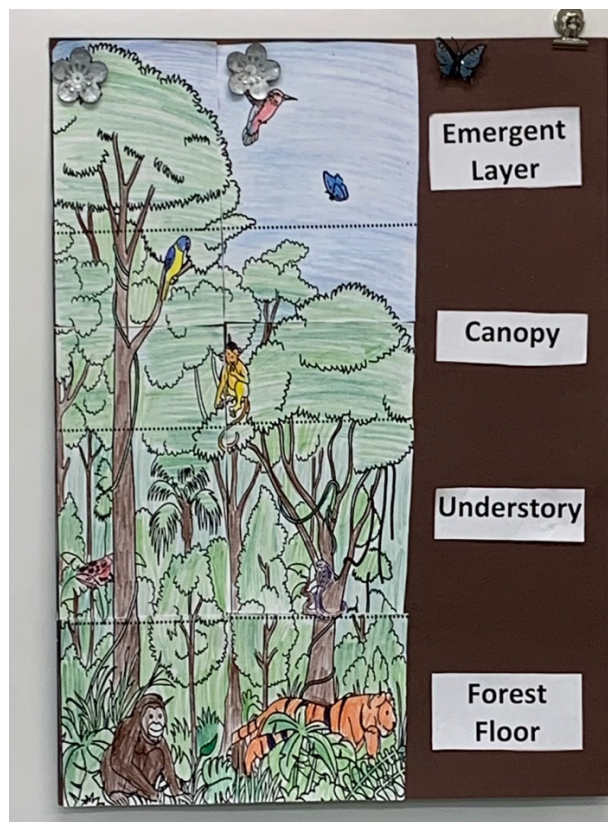


Figure 4.3- Layers of the Rainforest Poster

The approach preferred by Ms. Bailey was teacher-centered and the students relied on her to structure their interaction with sources and other materials. She presented the map, read the book, asked questions, and shared the video. Toward the end of class, students had a few minutes to color, draw, or record information they had engaged with in their global education folders. Early on in the unit, the other approaches suggested in the inquiry design (e.g. exit slips, discussion, small grouping) were not implemented. Ms. Bailey explained that exit slips and small group work were not effective in her 1st grade classroom because she found group work to be difficult because there were too many students. However, after the robotics lesson, Ms. Bailey came to believe that group work was possible. Nonetheless, Ms. Bailey continued throughout the unit to use a didactic approach that featured factual questions asked as they came to her mind during the lesson (Table 4.1).

Table 4.1 – Didactic fact-based questions used in the unit

What do cattle eat?
Is soccer popular in our country?
Brazil is the 5 th largest country, what is the 1 st ?
Which language do they speak in Brazil?
Why is it called the rainforest?
Do you think a jaguar can climb to the understory?
Which is the darkest spot in the rainforest? The brightest? The thickest?
Which layer does a bull shark live in?
Which layer does a monkey live in?
Where do we want the sloth to end up?
Who can eat a falcon?

Ms. Bailey had 7th grade students assist in the lesson that feature robots. She wanted to be more of a facilitator in this lesson, but she did take over one group when a 7th grade student helper had to leave early. However, in this lesson with the other 1st grade sections, Ms. Bailey was more of an observer and facilitator to students. She realized that students “definitely liked it,” but, she also noted that at least one student, “wasn’t interested and just sat with his arms crossed. So, I said, why don’t you get a book, and he was happy with that.” Ms. Bailey offered the following explanation for the students lack of interest in the robots.

That would be me probably as a kid. I kind of saw myself in him and I reflected, ‘I wonder why I didn’t say, okay come on, let’s get back in the group.’ You know, I didn’t even redirect him back. And then [another student] over here today was saying ‘that wasn’t fun for me.’ I didn’t do anything or redirect him either. If I could have floated

around the room, I may have had him read a book too, but I couldn't because we had that departure.

Student-centered pedagogy. During the times when the inquiry shifted to student-centered work, their efforts were almost always guided by emergent teacher questions. The teacher asked questions that required critical-thinking skills, and students responded willingly. Aside from the compelling and supporting questions, Ms. Bailey used other emerging questions that emerged during implementation of the unit such as, "What can we do to change the environment in our city?" Students responded,

"No throwing trash on the ground."

"Don't go fish, because if there are no more fish, it'll hurt the ocean."

Another question Ms. Bailey asked was, "How can we help the environment in our city?"

Students responded:

"I know how trash comes to the ocean! Hurricanes!"

"When people have trash, throw it in the recycle...use the 3 R's, and help the environment."

"Stop cutting down trees!"

"Make compost for our gardens and plant flowers."

Students communicated their responses about deforestation and concluded that,

"We won't have any oxygen, we can't breathe."

"Animals lose their homes."

"Animals lose their family."

Students thought about the reasons why deforestation occurred and mentioned that people cut trees down "to build stuff," as well as "make furniture," and "get wood for fires."

Ms. Bailey asked, “How can we get people to stop cutting trees?” The students’ responded,

“Tell them that not only animals are in danger, but you too.”

“You won’t have any oxygen.”

“You chop a tree, leave a root, it will grow back.”

“Build a gate around it and write to not chop down the tree.”

Students thought of ways to stop cutting down the trees, and said,

“We can try to cut down one tree and not all the ones that have species in it.”

“Not only animals, but we can also get hurt.”

“Cops would come.”

“Animals need their food, and if we cut down food, you’d feel bad for the animals.”

“Maybe a jaguar would eat ants.”

“Maybe if we teach others about trees, they won’t cut them.”

Ms. Bailey extended the discussion and asked, “What can we do as 1st grade students to help the rainforest?” The students said,

“We can make posters that say don’t cut down trees.”

“Cut a little part of a tree and have it grow back.”

Adaptations to engage students. Later in the unit (lessons 4 and 5), students were divided into groups to brainstorm solutions to end deforestation and answer a set of questions. Ms. Bailey altered those sections and made it into a group discussion. She indicated it was better when students had large group discussions instead of small groups because students seemed to have “handled the inquiry parts well in a group setting.” Ms. Bailey added “when I did it with a small group, it wasn’t successful.” Ms. Bailey thought if she had more help in the classroom, it would be possible to divide the students into groups, as she declared, “if it wasn’t just me and I

had more help, it maybe would have worked.” When Ms. Bailey had the 7th grade students help in lesson with the robots, she thought the student engagement was better. “It would be a better idea to have more supervised groups, like when we did the robot group work with the 7th graders.”

Engagement with technology. When students used the Ozobot robots, they were excited and eager to code and watched the robot move from section to section on the map. Their time with the robots captured their imaginations. Students expressed their excitement.

“Do you want to be eaten by a bird! Go, go!”

“He said I’m in the canopy, I don’t belong there!”

There was a lot of laughter among the children, and they all enjoyed the collaboration. Ms. Bailey mentioned the greatest takeaway from this excitement was “the habit of getting them to work together. I never do that because it’s so many of them.” She stated, “I love that my small kids get to work with big kids. I love seeing them get involved and that is one of the things I want to happen at our school.” This was a learning curve and she “learned that it wasn’t too many,” and “it wasn’t too noisy.” The elementary students benefited from interacting with older students, in which Ms. Bailey emphasized that those were “the bigger lessons than the technology itself.”

CHAPTER 5: DISCUSSION

The purpose of this study was to explore how a global education teacher implemented an inquiry-based, technology-infused curriculum in a 1st grade global education classroom. The research question for this case study is:

How does a 1st grade teacher implement an inquiry-based, technology-infused curriculum in a 1st grade classroom?

- Related sub-questions are: How does inquiry-based learning relate to global education?
- How is technology integrated in a global education class?
- How does global education teacher's pedagogy positively influence students' global knowledge?

Three findings emerged from the analysis of data.

1. Ms. Bailey did not fully implement all of the elements in the unit, but after implementing she was considering using inquiry in the future.
2. Ms. Bailey was not clear or comfortable about when to ask questions. She sometimes did not use the inquiry questions from the unit in some lessons, and thought these inquiry questions were more rigid and above the students' level.
3. Ms. Bailey believed students exceeded expectations and that they responded well to the inquiry. She was happy to see that students who typically didn't participate started to respond eagerly and enthusiastically.

Summary of Findings

The findings of this research reveal the approaches that a global education teacher, Ms. Bailey, used an inquiry-based approach to teaching and learning that featured technology-

integration. Ms. Bailey was in her second year of teaching global education and was mostly comfortable with the content. She also understood the inquiry methods being used in the unit as suggested by the Inquiry Design Model (IDM) and wanted to implement the plan as designed, but faced obstacles when putting the plan into instructional action. Ms. Bailey's integration technology was more limited and less effective.

With regard to the inquiry design, the compelling question for the unit helped establish related supporting questions and content that was to be taught related to Brazil. However, Ms. Bailey's lack of knowledge about inquiry-based learning affected the way she implemented the curriculum. Ms. Bailey said that she understood the compelling and supporting questions, but changes were made to fit with Ms. Bailey's teaching style. Given that Ms. Bailey was implementing a curriculum designed by someone else (i.e. the researcher), it was important to establish her comfort-level with the content knowledge, resources, materials, and information presented to the students. Clandinin (1985) describes that when "teachers are expected to facilitate someone else's intention" it is vital to account for teachers' perspectives. Researchers need "to understand the teacher as an active holder and user of personal practical knowledge" (Clandinin, 1985, p.364). However, if teachers do not perceive that they are active and personally involved, "the limited success of curriculum implementation" may result (Clandinin, 1985, p.364). Ms. Bailey's limitations with implementing the inquiry lesson may have resulted from her feeling as if her teacher-directed perspective was not accounted for in the design process. In contrast, "when the more vital teacher view is adopted, the importance of understanding teacher's personal practical knowledge is heightened and we are led to more adequate ideas of school reform" (Clandinin, 1985, p.364).

While the initial implementation did not go as planned, subsequent lessons were adjusted to account for what Ms. Bailey was learning about inquiry implementation. Her increased agency as the person responsible for implementing the inquiry lessons also seemed to empower Ms. Bailey as a curriculum designer and was reflected in her actions to make changes to the instructional plans. Ms. Bailey used additional teacher-centered pedagogical strategies at times, but there was also a steady emphasis on student engagement during the inquiry. The inquiry exercises prompted the students to think independently and critically about content, and Ms. Bailey noticed that the students were regularly engaged in the tasks and eagerly participating in class. Students were willing to express themselves and formed a deep understanding of the content as they communicated their knowledge through discussion during the inquiry. Students' collaboration through inquiry also positively impacted their learning and their engagement in the learning process.

Technology integration presented another opportunity for Ms. Bailey to develop agency with the inquiry unit. She had limited knowledge of technology in general and the robots featured in the unit in particular. For the most part, Ms. Bailey limited her implementation of technology by either controlling the uses of technology through direct instruction or, when she arranged for the 7th grade students to facilitate, by enabling others with more knowledge and comfort using technology. However, Ms. Bailey noticed a lot of laughter and learning when students were engaged with technology resources. She found that students used their imagination throughout the time period and came to appreciate the uses of technology, particularly the robots.

Planning an Inquiry

Ms. Bailey was exposed to IDM in the year prior to this research, and she had seen the structure and flow of the lesson plans from the C3 Archives. She met with another teacher who

was using IDM in his classroom and learned about how it can enhance student experiences in social studies. She was also provided with a list of technologies, resources, and journal articles to learn more about inquiry. The inquiry curriculum materials planned and implemented in this research were focused on the needs of students, and her efforts to “determine what students need to know, what they actually know, and what activities might be needed to bolster their knowledge” (Lee, 2008, p.63). Ms. Bailey benefitted from learning the IDM process, but she was skeptic about the use of inquiry early on. Ultimately, she decided she was willing to use inquiry in her classroom.

Ms. Bailey believed that as a global education teacher she needed extra help because global education teachers, as she put it “don’t exist.” She wanted to share ideas and collaboration with like-minded colleagues developed successful courses. Ms. Bailey possessed in-depth content knowledge about what she was teaching, and was passionate about her field of study. She relied on various sources, such as the local library, and external support when designing the curriculum.

Implementing an Inquiry

When implementing the inquiry unit featured in this research, Ms. Bailey used the pedagogical strategies she was most comfortable with, while extending her teaching methods to reflect some of the new ideas in the inquiry plan, particularly those related to technology. She discovered that students were engaged through inquiry and did not simply repeat facts. Through the use of student-centered pedagogies, Ms. Bailey encouraged student engagement and listened to their responses.

During the inquiry, students collaborated in many of the exercises. These collaborations occurred mostly in large groups, with the exception of the robots’ lesson, which was

implemented in small groups. Through group collaboration, students, with Ms. Bailey's support, were able to help each other build a deeper understanding of the lesson objectives.

During these collaborative exercises, Ms. Bailey used an oral question and answer approach to implementing the inquiry. Cochran-Smith and Lytle (1993) claim, "oral inquiries provide access to a variety of perspectives for problem posing and solving...they are the least visible of the types of teacher research that are currently occurring" (p.30). Ms. Bailey's implementation of this technique enabled multiple perspectives to be heard as it enhanced student participation and impacted her students.

Students' work on the supporting questions and answers derived from their understanding and created opportunities for students to engage with one another, aligning with a central aim of early elementary education in social studies. At the same time, Ms. Bailey encouraged students' perceptions of their world, and one way she did so was through nurturing students' abstract thinking. Ms. Bailey used a mix of fiction and non-fiction books. Through non-fiction books, Ms. Bailey asked questions to students to imagine if a similar incident would happen in real life and how they would react. She taught and expanded their imagination through the readings and questions in class, as well as students interaction with the robots.

Planning Technology

Initially, the amount of technology planned for the unit was minimal. When the curriculum was first developed, there were videos and a virtual field trip included. As the unit was finalized, additional innovative technology was added. The Ozobot robot was the most obvious of these technology additions. However, it was a challenge for Ms. Bailey to connect with the technology applications planned in the unit. In particular, she viewed the content focused on the lesson on climate and rainforest of Brazil as something was more "natural." For

Ms. Bailey, technology and nature were opposites. This rainforest lesson revolved around a map-based visual representation of the animals and the layers of the rainforest (Figure 5.5). This lesson also included the Ozobot robots representing animals in the rainforest that students used to interact with the map as they navigated through this visual representation of the rainforest.

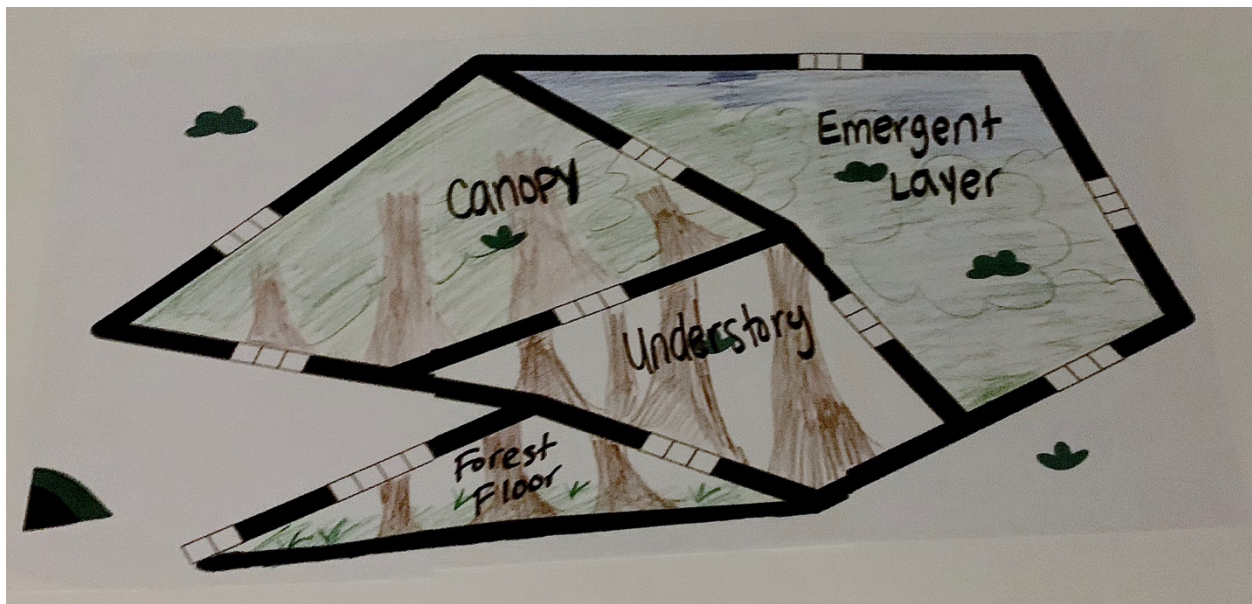


Figure 5.5- Coding Posters to use during the Ozobot lesson

Implementing Technology

When technology was integrated into the lessons, the use of it was more robust than Ms. Bailey expected. She identified herself as “not a technology person...not a big fan of technology.” Ms. Bailey was reluctant to use technology, however, in practice, she overcame her concerns about using technologies such as the robots and was engaged with the students when she led them through the task. Ms. Bailey perceived that students liked the robots lesson and it was not as distressing to her as she initially anticipated. At the same time, Ms. Bailey connected with the students who were not interested in participating in the robot’s lesson given that she had also been apprehensive. The implementation of this lesson also included older 7th grade students as facilitators; kids who knew more about the technologies and were more

inclined to use them. The biggest takeaway for Ms. Bailey, was that the collaboration between the 7th graders and the 1st graders allowed them to listen to each other and learned to take turns.

Global Education Curriculum

This inquiry unit was developed, modified, and altered over a long period of time. From the initial brainstorming sessions to the final tangible lessons that were implemented in the class, the structure and format of the unit and lessons remained compatible with Ms. Bailey's needs. When the development of the unit began, the idea was to make the lessons flexible so they could work with other grade levels in a global education classroom. Similar to Reimers (2017) notion of a dynamic global education curriculum, the idea was to not expect teachers to teach the lessons presented, "but that they treat this curriculum as a resource to help them design and evolve their own prototype" (Reimers, 2017, p.19).

Although the Brazil unit was more scripted than had been originally designed, Ms. Bailey was still flexible in her implementation. She valued the support and collaboration with the researcher in designing the unit, and claimed to learn new teaching strategies. She also expressed a new-found comfort in talking about the content and methods of the unit. Darling-Hammond and Bransford (2005) emphasize that "it is the combination of knowledge, skills, and dispositions about how to create curriculum and make curriculum decisions that enables teachers to be responsible practitioners and to learn from their own teachings."

Ms. Bailey and the researcher created a personal connection with the curriculum. Clandinin (1985) notes that teachers who construct their own way of thinking through a "personal practical knowledge" method "develop and use a special kind of knowledge (p.362). This knowledge is neither theoretical, in the sense of theories of learning, teaching, and curriculum, nor merely practical, in the sense of knowing children" (Clandinin, 1985, p.361).

Ms. Bailey's special knowledge was "composed of both kinds of knowledge, blended by the personal background and characteristics" (Clandinin, 1985, p.361) that were expressed by her in specific situations.

Recommendation for Future Research

This case study examined how Ms. Bailey, a global education teacher in a charter school, implemented an inquiry-based, technology-infused curriculum in a 1st grade classroom. Ms. Bailey learned about the benefits of inquiry and the impact it can have on students. Ms. Bailey benefitted from her collaboration with the researcher who shared with her new approaches to inquiry-based teaching method and helped ease the process of technology integration into the unit.

A potential follow-up study with Ms. Bailey could provide additional data about what she has learned and how she might continue to grow in her knowledge and abilities with using inquiry.

After teaching inquiry, Ms. Bailey had a better sense of when to ask the compelling and supporting questions, and she acknowledged that asking the questions before diving into the content of the lessons created a better structure and enabled students to come up with better answers. Additional research might examine other issues of timing and how best to implement questions through specific sources and with particular sources. In addition, Ms. Bailey needed more structured time to prepare the inquiry. Again, additional research may provide us with insight about how best to structure teachers' work designing inquiry lessons.

Limitations

As a single case-study, there were limitations to the findings in this study. The sample size was limited to one global education teacher and one section out of four classes. The class

included thirty students in a 1st grade class. It was the only global education class at the school. This study provided data about the teacher's implementation of inquiry and technology integration, but focused on a single inquiry within a larger curriculum. Ms. Bailey was purposely selected because she was passionate about this field of study and because she valued the opportunity to share her knowledge about the world with her students. Her enthusiasm for the content might not be representative of the broader body of elementary teachers who often teach social studies with little or no preparation in the content. This class was an elective at the school and students did not receive a grade. It provided an enriching environment for children to learn about and express understanding of the world around them. Future studies could incorporate additional inquiry-based learning and technology into the more mainstream classroom as more commonly taught in schools at an elementary grade level.

Another limitation to this study was time. Since only one unit was observed, there was no ability to determine whether the teacher would incorporate changes into future lessons. The main focus of this study was to see how Ms. Bailey implemented the inquiry design given the aims for integrating technology.

Conclusion

Ms. Bailey was cooperative and accommodating throughout this research. She expressed an appreciation for the experience of designing and implementing the inquiry lesson and said she learned and benefitted from collaboration. Ms. Bailey played a significant role throughout the entire curriculum development process, especially during the planning stage, and she provided insights about what worked best in the school structure and environment. The inquiry unit examined in this research required several modifications from the original design. Going forward, the unit will be modified given what was learned in this research and what was seen to

be beneficial for students. This was Ms. Bailey's first time using an inquiry-based teaching method and innovative technology in a 1st grade classroom. She valued what she had learned throughout the process, and although she was initially reluctant to technology use, when asked if she will use inquiry in the future, she stated, "yes, I would, definitely."

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APPENDICES

Appendix A

Teacher Interview Protocol – Before Implementing the Unit

Initial Interview – Conducted before teaching the unit

Teacher: _____ Course/Section: _____
 Date: _____ Time: _____ Location: _____

Purpose:

- To gather baseline information regarding the research questions in regards to implementing the unit study planned in the curriculum
- To understand any assumptions, beliefs, or experiences that might serve as a reference point to compare this inquiry-based, technology infused unit with prior units.
- To receive responses about what was planned compared to what will be observed when the inquiry is taught and technology is used.

Introduction

Thank you for agreeing to talk with me today about the inquiry-based, technology-infused lessons you will teach. My goal is to study how you will implement a technology-infused, inquiry-based unit based from the curriculum developed for 1st grade. The purpose of this interview is to gather baseline data and use it later for analysis. I will ask you a set of questions designed to gather this data, and the conversation will be structured while also being flexible enough to probe for understanding based on our conversation.

Interview Questions (targeted research question)
Please tell me a little about your curriculum.
Describe some of the processes taken to develop the units?
What do you hope to gain from the inquiry-method?
What are some of your fears in planning inquiry?
When you envision an effective unit, how does it look like?
What are your expectations for student understanding as you complete this unit?
What role do you think inquiry will affect student learning in this unit?
What role do you think technology will affect student learning in this unit?
What are some ways you have used inquiry in your classroom before?
Based on your experience in planning a unit, how have your ideas changed to plan these units for your classes?

Teacher Interview Protocol – After Two Lessons in Teaching the Unit

2nd Interview – Conducted after teaching two lessons from the unit

Teacher: _____ Course/Section: _____
 Date: _____ Time: _____ Location: _____

Purpose:

- To gather formative data regarding the following research questions about the implementation of the lesson plans in the unit through teaching inquiry and infusing technology.

Introduction

Thank you for agreeing to talk with me today about the inquiry-based, technology-infused lesson you have taught. The purpose of this interview is to check in now that inquiry has been taught, and technology has been used in the classroom. I will ask you a set of questions designed to gather this data, and the conversation will be structured while also being flexible enough to probe for understanding based on our conversation.

Interview Questions (targeted research question)
Please tell me a little bit about how you feel teaching inquiry went?
Please tell me a little bit about how you feel integrating technology went?
Explain some ways how you find the compelling questions targets how you would plan to teach inquiry?
How comfortable are you with teaching inquiry as it was planned?
How comfortable are you with integrating technology as it was planned?
What are some ways you might need to modify inquiry to help your students better understand the learning outcome?
How might the supporting questions help facilitate students learning?
How do you feel your students responded to inquiry?
How do you feel your students responded to technology?
How would you compare your previous units to this inquiry unit?

Teacher Interview Protocol – After Teaching the Complete Unit

Final Interview – Conducted after teaching the full unit

Teacher: _____ Course/Section: _____
 Date: _____ Time: _____ Location: _____

Purpose:

- To gather summative data regarding the following research questions in regards to how the unit was implemented through inquiry and technology.
- To reflect on the process of implementing a unit and understanding teachers pedagogy through inquiry-based learning and technology integration

Introduction

Thank you for agreeing to talk with me today about the inquiry-based, technology-infused lesson you have taught. The purpose of this interview is to reflect on the whole process of the curriculum and teaching a unit, especially to how you view students understanding using inquiry-based learning and technology integrated lessons. I will ask you a set of questions designed to gather this data, and the conversation will be structured while also being flexible enough to probe for understanding based on our conversation.

Interview Questions (targeted research question)
Please tell me a little about how you feel teaching the unit for this inquiry went?
Explain some of the ways that the compelling questions targeted how you taught the lesson.
How did the supporting questions help facilitate student understanding of the lessons?
How do you feel your students responded to the inquiry designed in the lessons?
How did your predictions about how your student's outcome of understanding compare to what they have learned?
What were some key things your students learned as a result of this inquiry?
What were some key things your students learned as a result of using technology?
What might be some other ways they could have come to the same understanding using other teaching methods?
What were some things that made collaborating during the curriculum development be worth your time?
What were some things that made collaborating during the curriculum development not be worth your time?
What might be some reasons you would try to teach another inquiry lesson?

Appendix B

Observation Protocol

This form will be used as part of the research journal to collect data and themes on each observation in in the global education classroom. The lesson plan will be used to compare the fidelity between what was planned and what was taught.

Teacher: _____

Type of Contact: _____

Date: _____ Time: _____

Location: _____

What are some of the most important points from the observation?

How does the lesson plan compare to what was taught?

Lesson Plan Item

Observation Notes/Quotes/Comments

Appendix C

BRAZIL



Unit Overview

The Brazil unit includes five lessons designed through a globally-focused education that is technology-infused and inquiry-based

1. To foster students' global awareness and knowledge of other countries in the world.
2. To enhance students' understanding of social skills and cross-cultural studies.
3. To explore how ecosystems influence our biological standards of living and how we can protect our ecosystems through our global community.
4. To empower students as citizens to contribute to a more protected, clean, and sustainable environment.

Learning Outcomes

Students will be able to:

- Express ways they can change the environment in their society to the better
- Distinguish the commonalities and differences between the US and Brazil by expressing their thoughts based on the knowledge presented
- Identify ways they can impact Brazil, as well as identifying the relationship between humans and the rainforest
- Explain their ideas about deforestation, and weighing the outcomes of deforestation/reforestation
- Categorize the layers of the rainforest, identify the animals living in each layer, and express the ways in which our relationship with these animals affect their lives.
- Utilize technology through learning about the layers of the rainforest, and reflect on how well technology can be used to model (or help with understanding) nature.
- Formulate responses about conserving the rainforest and classify ways we can help preserve it.

Enduring Understanding

Students will understand:

- The importance of preserving our world for our generation and for those to come.
- Global interaction and working together to help sustain the world to create a better environment for everyone.

Lesson 1: *A Place to See: Brazil!* – This introductory lesson emphasizes the demographics of the country, flags, type of culture, holiday's celebrated, societal living, communities, and music. Students would be able to develop global awareness and understanding about the country, as well as comparing their own lives to children living in Brazil. They are exposed to the concept of human diversity, as well as shared human perspectives, feelings, and interests. Students will be able to value human differences and understand that it is important to treat everyone with respect, equity, and dignity, regardless of their background.

Lesson 2 and 3: *Animals in the Rainforest!* – In this lesson, students will explore the different types of animals in the Amazon rainforests. They will understand specific types of animal's contribution to the rainforest. Children will also learn about the layers of the rainforest and the types of animals that live in each level of the layers. They will also interact with robots and technology to mimic animal habits and habitats.

Lesson 4: *The Amazon Rainforest!* – This lesson introduces children to the learning of environmental science. Students will learn the conflicts that arise when we do not maintain the environment, and what we can do to save the rainforests. In addition, students will understand both sides of the issue and analyze their thoughts and understandings about Brazil's environment and our impact on the country. Students will also learn about deforestation, and what will happen if it continues. As a class, children will discuss ways to save the rainforests, and how they, the children, can contribute to creating a sustainable environment for all. They will begin to develop an awareness that their choices and actions can have a positive impact on others. They will be able to see their connection to the natural world, and how important it is for us to take action to help save our world.

Lesson 5: *Brazil Wrap-up* – In this culminating lesson, students will explore how Brazil connects to the global world. As a class, they will learn how to can make a difference collectively, and determine how they, too, can be active global citizens in order to contribute to a sustainable, better world.

LESSON 1: INTRODUCTION TO BRAZIL

Materials:

- Flags
- Flag page
- Book: *Brazil in Colors*
- Optional: Brazilian Playground music on YouTube

Compelling Question: *How do we impact Brazil?*

Supporting Question #1: *What is Brazil?*

Optional: Students walk into class with the Brazilian Playground: Putumayo Kids music playing: <https://www.youtube.com/watch?v=RjEg-DcuDJc&list=PL4D1BD7674B82634B>

1. Review the countries, Chad, Pakistan, and Italy by holding up the flags and asking the children what country and continent they are located. Find the countries on the map.

2. Introduce the country of Brazil, point to it on the map. Ask the children which continent it is located. On the map, put a pushpin on Brazil and connect Italy and Brazil with a string. Affix a label along the string with miles between the two countries. Make note of what ocean is crossed during this trip.

3. Read *Brazil in Colors*
 - Brazil is the 5th largest country in the world
 - Largest country in South America
 - Large coastline along the Atlantic Ocean
 - World's second largest river, the Amazon
 - Language is: Portuguese
 - Industry: World's leading coffee producer, mining/gems especially diamonds, beef cattle and cowboys.
 - Land: climate is mostly tropical, Amazon is the largest rainforest. Enormous rich variety of plants and animals that are only found in the rainforest and nowhere else in the world! More than 50% of the trees, plants, and animals found in the Amazon are only located there!

4. Ask the students, *“How can we change the environment in our city?”* As the teacher leads the discussion, students can respond by saying: pick up trash, cut down trees, build, recycle, etc.

5. Discuss together as a class what the US and Brazil have in common

6. Inform the students that they will be answering the question, *“How do we impact Brazil?”* throughout this unit.

7. Play/Listen to the Brazilian Playground music and notice the soft rhythm. In the meantime, students will color the flag page in their global education folder.

8. Share the flag of Brazil and show the children the flag page in their folders. The flag is green with a yellow diamond in the center. In the diamond is a blue globe with stars that make up a constellation. The words on the flag, *Ordem E Progresso* translates to Order and Progress.

9. In their green folders, students will color the flag page in their global education folder.

LESSON 2: ANIMALS IN THE RAINFOREST- PART 1

Materials:

- Flags
- Prezi Presentation
- YouTube Video: Exploring Layers of the Rainforest
- Books: *The Rainforest*- J. Murray and *In the Rainforest*- Kingfisher Readers
- Handouts: Rainforest diagram
- Poster for the layers of the rainforest
- Paper squares for exit slips

Compelling Question: *How do we impact Brazil?*

Supporting Question #2: *Why are rainforests important?*

1. Students review the countries, continents, and flags

2. Students are introduced to the Amazon rainforest and asked, “What is a rainforest? Why is it called a rainforest? (because of the high level of precipitation [rain] the forest receives per year)

3. Read the book, *The Rainforest by J. Murray and In the Rainforest-Kingfisher Readers*, asking about which layer each animal introduced in the story lives. Show the poster board indicating the layers of the rainforest.

4. Start with a Prezi presentation of the different animals in the rainforest, and notice the names of the animals (Pink Whale, Glass Frog, Bull Shark, Jesus Lizard)

5. Show the students the video: [Exploring the Layers of the Rainforest](#)

6. Provide each child a rainforest diagram and have them label the layers. Students can color the handout and draw the animals in each layer. The students can draw their favorite animal on the title/flag page. They can glue it into their Global Education folder.

7. Provide exit slips, and ask the students to answer the question, *why are rainforests important?*

Prezi: http://prezi.com/2m53ph4vkj4p/?utm_campaign=share&utm_medium=copy

LESSON 3: ROBOTS IN THE ANIMAL RAINFOREST- PART 2

Materials:

- Flags
- Poster for the layers of the rainforest
- Ozobot robots
- 4 maps for each group (16 total)
- Markers (included with robots)
- Coding sheets (1 per group; 16 total)

Compelling Question: *How do we impact Brazil?*

Supporting Question #3: *How can technology impact the rainforest?*

1. Review countries, continents, and flags.

2. Read Rainforest colors and review the layers of the rainforest and ask for examples of animals which live in each layer

3. Reiterate the question, why are rainforest important?

4. Introduce Ozobot, and inform the students that they will be divided into groups. Each group will have an animal that is from one layer of the rainforest.

- Group 1- The Emergent Layer- Capuchin Monkey
- Group 2- The Canopy Layer- Sloth
- Group 3- The Understory Layer- Beetle
- Group 4- The Forest Floor- Jaguar

- 5. Students will be presented with a map, and they will consider the ways to model the animal's behavior with Ozobot (e.g. a sloth is slow, a jaguar is fast). This way, they will design their own animal habit and habitat.

- 6. They will use the Ozobot's line-following and the angles of the intersections to allow Ozobot to act like the animal, running around, and reaching their final destination which is the correct layer of the rainforest they live in. They must help Ozobot ("OzoCapuchin Monkey, OzoSloth, OzoBeetle, OzoJaguar) on its way to their habitat (which are the point codes). Students will need to think about which direction Ozobot will go and what intersections it will take. Students are successful when their robot reaches its layer of the rainforest. The map will have blank spots, which are the point codes. These point codes will be coded for the animal to reach their destination. Therefore, the Ozobot (which is the animal), will need to find its way quickly through the other layers of the rainforest.

- 7. Students then reflect on how well their animal was able to accomplish the task, how well it reflected the animals behavior, and how can Ozobot be programmed to model nature?

LESSON 4: THE AMAZON RAINFOREST

Materials:

- Flags
- Book: *The Great Kapok Tree*

Compelling Question: *How do we impact Brazil?*

Supporting Question #2: *Is the relationship between humans and rainforest good or bad?*

1. Review countries, continents, and flags

2. Begin with introducing ways to help the environment, reasons why deforestation happens, and what are the results/outcomes of our impact in Brazil.

3. Read the book: *The Great Kapok Tree*

4. Read the book: *The Great Kapok Tree*

5. Discuss the moral of the story and how people can conserve the rainforest. Introduce to the students the new term: deforestation (it is the cutting down or clearing of forest trees). Tell the students that the trees in Brazil's Amazon Rainforest are being cut down. Ask the students, why do they think people cutting down the trees in the rainforest in Brazil? (the biggest cause of deforestation is cattle ranching. It is also used for logging, mining, building houses/roads, selling land).

6. Discuss their thoughts and what happens to Brazil's environment, economy, and lifestyle after deforestation. Talk about the ways we impact their way of life. Discuss both sides of

the issue, and have the students demonstrate their understanding of human impact on the environment.

7. Divide the students and have each group brainstorm and come up with a solution to help the environment, as well as end deforestation.

8. Discuss together the solutions to the rainforest, and write them on the large white paper.

9. As a result, ask the students: *Is the relationship between humans and rainforest good or bad?*

10. Write on the board, “We can help end deforestation by _____” and children can copy that to their global education folder.

LESSON 5: BRAZIL WRAP-UP

Materials:

- Flags
- Books: *A is for Anaconda* (or *The Umbrella*)
- Rainforest song by David Williams
- Question sheet for each group with the questions for groupwork

Compelling Question: *How do we impact Brazil?*
 Supporting Question #4: *How can we help Brazil?*

1. Review countries, continents, and flags.
2. Review with the children about conserving the rainforest. Discuss the animals that live in the rainforest and how it is important for them to stay there.

3. Read the book, *A is for Anaconda* (or the story: *The Umbrella*), and ask them which is their favorite animal.

4. Share the Rainforest song video by David William's, being mindful that this is a song about ALL rainforests, not just the Amazon rainforest. There will be examples of animals that do not live in Brazil

5. Divide the students into groups and have each group discuss the ways people use/misuse the rainforest. Provide each group with a question to answer:
 - a. How can we stop cutting down trees in the rainforest?
 - b. How are animals affected by deforestation?
 - c. Why is the Amazon rainforest being destroyed?
 - d. What can we do, as 1st grade students, to help the rainforest?

6. Students can draw/write out their responses and present to the class.
