THESIS

PHOTOVOICE FOR POST-OCCUPANCY EVALUATION:

STUDENTS EXPLORE HEALTH IN A SUSTAINABLE SCHOOL

Submitted by

Jenifer Marley

Department of Construction Management

In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Summer 2012

Master's Committee

    Advisor: MaryEllen Nobe

    Caroline Clevenger
    James Banning

ABSTRACT

PHOTOVOICE FOR POST-OCCUPANCY EVALUATION:

STUDENTS EXPLORE HEALTH IN A SUSTAINABLE SCHOOL

This study engaged six fourth grade students who attend a LEED® gold certified school, Bethke Elementary School located in northern Colorado, as co-researchers to explore their perspectives about health in their school environment. The methodology used in the study was developed as a participatory post-occupancy evaluation (PPOE) method, an innovative adaptation of an existing participatory visual research method, photovoice. The study documents a PPOE method that provided students an opportunity to voice their perspectives through the use of photography, digital story-telling and semi-structured focus group discussions. The method emphasizes the first-hand perspective of building occupants, in this case children. The study raises awareness about the opportunities green schools have to facilitate children's health. The students identified fourteen physical environmental attributes that they perceive as facilitating health according to their own conceptual definition established during a focus group discussion at the beginning of the study. Two of the fourteen attributes emerged as the most significant, including community connectivity and a connection to nature. Additionally, the research discusses social sustainability in relationship to an internationally recognized health framework. Five themes emerged in the study including stewardship; a desire for learning; participation in recreation, physical activities, and relaxation; sense of belonging to a community; and cultural values and attitudes of well-being. The study

ii

addresses shortcomings of existing post-occupancy evaluation techniques, and proposes an interdisciplinary, qualitative approach to the evaluation of children's environments. Building professionals, school facilities planners, school administrators, as well as others interested in the health and well-being of children in relation to their everyday environments will find this study meaningful.

ACKNOWLEDGEMENTS

The builder lifted his old gray head: "Good friend, in the path I have come," he said, "there followeth after me today, a youth whose feet must pass this way. This chasm, that has been naught to me, to that fair-haired youth may a pitfall be. He, too, must cross in the twilight dim; good friend, I am building the bridge for him." – Will Allen Dromgoole

Logan, Calvin and Skyler, I dedicate this to you. You are my inspiration and the joy in my life. You have challenged me to be a bright and determined student and to always work hard, just like you. To my husband, Chad, thank you for making this journey possible for me. I could not have done this without you. Thank you for being patient and believing in me always. The values I draw from every day came first from my parents. I care deeply about this work because you shaped who I am. Thank you.

My dear friend, Meg, this would have been a lonely road without you beside me every step of the way. I'm so grateful to you for always being there.

Mary Nobe, thank you for giving me the freedom and opportunity to pursue my passion for this topic. Your belief in me as a student gave me the confidence I needed to persevere. Jim Banning, thank you for your interest in my research. I am humbled that you agreed to work with me. You have taught me so much, especially to "have fun!" Caroline Clevenger, you have challenged me to do my best work. Thank you for your insight and feedback that improved this work. Thank you, all, for your support and encouragement and for the doors you have opened. I also want to thank the faculty and staff in the Department of Construction Management who supported me along the way.

Finally, I am indebted to the students and staff at Bethke Elementary School and to Poudre School District. Thank you for allowing me to share in this research with you. To the students who participated as co-researchers, thank you for making this study meaningful and for sharing your perspective. You are amazing!

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER ONE: INTRODUCTION

Context of the Problem

Children are among the most vulnerable of all human beings (Freeman & Mathison, 2009), yet many spend the better part of every day in school buildings that are unhealthy and unsustainable (Karliner, 2011). One in five people in the United States spend their days in K-12 schools, including 55 million children (Karliner, 2011; Olson & Kellum, 2003). Research shows not only a link between the physical attributes of school buildings on student performance and achievement (Olson & Kellum, 2003; Tanner, 2000), but also the potential to reduce health risks for occupants in buildings (Karliner, 2011; Karolides, 2011). The research also shows multiple opportunities to promote human health and well-being through building design and construction (Day, 2004; Kamaruzzaman, Zawawi, Ali, Che-Ani, & Egbu, 2011; Kellert, 2005; Schweitzer, Gilpin, & Frampton, 2004; Suresh, Smith, & Franz, 2006; Ulrich, 1984). Builders and designers have historically implemented construction techniques that protect the quality of buildings, but more recently many building professionals are striving to protect the occupants and living surroundings of the built environment through sustainable practices (Day, 2004). Kellert (2005) suggests that the current sustainable building approach to school design emphasizes energy and resource efficiency and minimizes harmful health effects yet misses the opportunity to promote physical and mental development in children, leaving potential for improvement.

Perhaps in no other environment is the argument for creating healthy buildings more compelling than in those that affect children, such as schools. According to the Green Schools Alliance (2009), school communities have the opportunity to develop a sustainable future through collective strength, acting as stewards for environmental, economic and social responsibility. Since the 1980s, standards for student achievement have become higher than ever before as a result of initiatives for public education reform, but standards for school buildings themselves have remained much the same (Tanner, 2000). K-12 schools continue to face challenges stemming from the need to serve accelerating student populations amid demanding community expectations with aging buildings, constrained budgets, and increasing energy costs (Green Schools Alliance, 2009). The United States Department of Energy reported that in 2003, the average school building was 42 years old and half of all schools were in need of major improvements (U.S. Department of Energy, 2003). In 1995, the United States General Accounting Office projected that $112 billion dollars in construction was needed to bring existing schools up to basic health and safety standards, and the United States spent $15 billion dollars on school construction in 1999 (Tanner, 2000).

Social Impacts of the Built Environment

Colantonio (2008) argues that within the sustainable development movement, policy makers have yet to prioritize the social impacts of the built environment, which are often more intangible and difficult to define, in comparison to the environmental and economic priorities. However, nearly every decision made by a building project team will have a social impact (Wendt, 2009). Colantonio explains that social sustainability is difficult to define, but found both traditional and emerging social sustainability themes in

2

the literature. Traditional themes of social sustainability, Colantonio states, include such topics as basic needs, education and equity. Colantonio also identified new themes of social sustainability emerging in the literature such as identity, sense of place and culture; empowerment, participation and access; health and safety; well-being, happiness and quality of life. For this study, I have accepted the emerging themes in social sustainability presented by Colantonio as a frame of reference. The scope of this study focuses on the topic of health and well-being for children within the context of their school environment.

Purpose Statement

The intent of this case study implementing an adapted photovoice method (Wang & Burris, 1997) is to identify, explore and raise awareness about which attributes of a school environment facilitate children's health by engaging fourth grade students in an innovative participatory visual research approach to post-occupancy evaluation. The study is bound to an elementary school in Colorado built in 2008 as a sustainable educational environment with a mission to promote sustainability. The participants collectively defined health to establish the theme for the study during an initial focus group discussion.

Significance of the Study

Children have the right to voice their views about issues that concern them. Thomson (2008) provides rationale for including children in research by pointing to the 1990 United Nations Convention on the Human Rights of the Child (UNCRC). Thomson explains that children's rights have evolved from formerly protecting children from "abuse and exploitation" to currently giving children civil and political rights such as

3

"entitlement to education, health and well-being." Pivik (2010) also refers to Article 12 of the UNCRC as a rationale for including children's perspectives about environments, such as schools, that have a significant impact on their lives. According to Sanoff (2000), children need to be given an active role in influencing their environmental conditions, for example, by having a voice in planning for community building projects.

By implementing a participatory visual research method in the proposed study and engaging children in research about their school environment, the study will raise awareness about previously unidentified or intangible benefits of sustainable building initiatives, particularly opportunities to facilitate and promote health and well-being. Building professionals, school facilities planners and administration, and professionals from multiple disciplines who are interested in the health and well-being of children in schools will find this study of interest.

CHAPTER TWO: REVIEW OF LITERATURE

Sustainable Building

The sustainable development movement grew out of synergies between the

environmental movement of the 1960s and the basic human needs advocates of the 1970s

and includes initiatives that address environmental, economic and social impacts of the

built environment (Colantonio, 2008). Sustainable, or green, building is essentially a

building philosophy and part of the broader concept of sustainable development which

Parkin described as "a process that enables all people to realize their potential and

improve their quality of life in ways that protect and enhance the Earth's life support

systems" (Karolides, 2011, p. 3). According to Karolides, green building practices

provide a model for improving not only the environmental and economic impacts of

buildings during new construction and renovation projects, but also the impacts of

buildings on occupants. Green school buildings are made healthier by incorporating

attributes such as ample natural daylight, improved indoor air quality, views to the

outdoors, better acoustics and comfortable temperatures (LPA, Inc., 2009). Specifically,

many professionals have studied and practiced ways to not only mitigate harmful effects

of unhealthy buildings, but to actually facilitate and promote health for occupants (Day,

2004; Kamaruzzaman et al., 2011; Kellert, 2005; Schweitzer et al. 2004; Suresh et al.

2006; Ulrich, 1984). Schweitzer et al. explain there is a hierarchy of existing approaches

in current building design and construction to address health issues that result in built

environments that are nontoxic and safe to those that are salutogenic and actually promote human health.

Person-Environment Relationship

It is important to consider the person-environment relationship when creating built environments that successfully meet the needs of people (Iwarrson & Stahl, 2003). Although the person-environment relationship is not concretely defined, the World Health Organization's (WHO) International Classification of Functioning, Disability and Health (ICF) provides a framework for the context of a person's level of functioning and well-being in relation to the environment (World Health Organization, 2001). In 2001, the WHO revised the ICF which shifted the previous reference of disability in a medical model to a more positive language of health and well-being promotion in a social model. The classification now emphasizes the impact of environments on human health. The WHO defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 2001). The WHO (2007) also released an ICF for children and youth (ICF-CY) which considers a bio-psychosocial concept of health, pointing to the potential of the environment as a determining factor in children's functioning and development (Pivik, 2010). Khetani, Bedell, Coster, Cousins, & Law, (in press) describe the ICF-CY framework as the prominent guide for researchers internationally who are developing measures about environmental attributes that support child development.

Additionally, documents developed in 1992 by the United Nations in Rio de Janeiro, Brazil, which link sustainable development to human health reinforce the responsibility we have to consider human health when planning and creating a

sustainable built environment (Thompson, Whitehead, & Capon, 2010). This necessitates seeking opportunities to not only eliminate ill-effects of buildings on humans, but also to facilitate and promote health and well-being through better building design and construction practices.

Since the late 1800s, researchers and professionals from multiple disciplines have widely studied and written about the relationship between people and the environment (Kopec, 2006). The most notable contributions regarding the person-environment relationship have emerged from the relatively new field of environmental psychology. Egon Brunswick first used the term in 1943, and it later became a recognized field of study when City University in New York offered the first Ph.D. program in environmental psychology in 1968 (Kopec, 2006). Kopec defines environmental psychology as "the study of symbiotic relationships between humans and their environments" with a theoretical framework including cognitive, humanistic, behavioral, neurobiological and sociocultural perspectives about humans in relation to both built and natural environments.

Ulrich, (1984) an environmental psychologist, whose work has advanced the concept of the environment's impact on people, has specifically studied how attributes of the built environment affect human health. Ulrich's "Theory of Supportive Design" has primarily informed healthcare design by identifying the built environment's restorative potential for human health and well-being. The principles of supportive design in healthcare settings help people to cope with stress resulting from illness and hospitalization (Ulrich, 1991). Preiser (2001) has also made significant contributions in the literature about the person-environment relationship, with studies showing the built

environment's influence on occupants. Preiser's work emphasizes the role of universal design (Preiser & Smith, 2011) and post-occupancy evaluation in improving the built environment for people. Research linking buildings and health has evolved mostly in the social sciences with studies comparing attributes such as natural daylight and ventilation to learning and worker production (Kopec, 2006). However, despite genuine efforts by many social scientists and designers, Kopec states that most building professionals continue to give little attention to the effects that buildings have on human health.

Built Environment and Human Health

The Leadership in Energy and Environmental Design (LEED®) standards, the "nationally accepted benchmark for the design, construction and operation of green buildings," addresses health issues for occupants (U.S. Green Building Council, 2011). Schweitzer et al. (2004), state that these standards ensure a nontoxic environment by limiting exposure to unhealthy chemicals and substances throughout the construction of buildings, through material selection and construction practices. However, Kellert (2005) argues that the LEED® standards fall short in guiding designers and builders in creating environments that facilitate and promote health. Schweitzer et al. suggest focusing future building initiatives on the potential for health promotion.

Schweitzer et al. (2004) identify multiple attributes of the built environment that facilitate health. For example, the stimuli of an open environment through operable windows provide healthy fresh air through natural ventilation and exposure to natural light. Schweitzer et al. explain that natural light affects systemic physiologic responses that improve mood and decrease depression, irritability and fatigue and is critical for biochemical and hormonal body function. They also state that connections between

indoor and outdoor environments which provide views of nature improve mood, decrease

blood pressure and decrease heart rate. Further opportunities to facilitate health include

providing optimal air quality, temperature, odor, noise, ergonomics, as well as spaces for

social gathering, relaxation, and exercise (Kamaruzzaman et al. 2011). Although themes

of health and well-being for occupants in the built environment exist and are emerging in

the literature, the discourse lacks the specific topic of children's experiences of health in

sustainable schools. Green building initiatives attempt to protect the health of building

occupants, but school institutions have yet to study how children perceive their

environment after new green schools are built and occupied (Marley, Nobe, & Clevenger,

2012).

Post-Occupancy Evaluation of Buildings

In practice, professionals sometimes examine the relationship between people and

their environment through needs assessments, also called predesign research, and by

conducting post-occupancy evaluations (Kopec, 2006). Post-occupancy evaluation

(POE) first emerged in practice in the 1960s beginning with case studies, and developed

into more cross-sectional evaluations in the 1970s and 1980s (Preiser, 2001). Preiser

defines post-occupancy evaluation as "the process of evaluating buildings in a systematic

and rigorous manner after they have been built and occupied for some time." It focuses

on the requirements that occupants have in terms of "health, safety, security, functionality

and efficiency, psychological comfort, aesthetic quality and satisfaction" (Federal

Facilities Council, 2001). Meir, Garb, Jiao, & Cicelsky (2009) suggest that post-

occupancy evaluations provide an opportunity, in part, to integrate the relationship

between building performance and occupants' needs, making buildings more sustainable.

As an example, Meir et al. argue that POE provides a means of ensuring that schools not only meet sustainable building standards, but also meet the needs of the children attending them. They discuss schools as an area where POE plays a convincing role because of the fact that schools must uphold significant public accountability for the well-being of children.

Expected Outcomes

The study will explore, document and raise awareness about ways in which sustainable building practices used for designing and constructing school environments help to facilitate children's health. The study employs an innovative adaptation of photovoice which will document children's unique and important voice, a perspective that is currently lacking, to the literature about the health benefits of sustainable building. Finally, the study documents a new, qualitative approach to post-occupancy evaluation as a model for future practice. By including children's voice, through their images and stories, I explored research questions that will fill a void in the literature and offer a new perspective about health in sustainable schools.

Research Questions

The central question guiding the inquiry is: What attributes of the school environment do children perceive as facilitating health and well-being?

Sub-questions related to themes in the study include

- How do children define health and well-being?

- How do children describe what a healthy place looks like?

- What theoretical lenses help us understand the children's perception about health within the context of their school environment?

- What attributes that facilitate health are unique to this school environment?

Procedural sub-questions include

- How do children describe their school environment in terms of health and well-being through photographic images, verbally and in writing?

- What are the themes that emerge from the images and stories that the participants created?

- How would I interpret the themes within the larger framework of social sustainability?

CHAPTER THREE: METHODOLOGY

Qualitative Study Design

The nature of the research problem that resulted in this study is rooted in the complex topic of social sustainability, including themes that have not been universally defined or agreed upon (Colantonio, 2008). The qualitative paradigm is suitable for complex topics, which quantitative approaches would oversimplify (Lancy, 2001). I selected the qualitative research paradigm as way to explore the unique perspective of children about a complex topic.

Photovoice

I developed a qualitative research design by adapting an existing participatory visual research method, photovoice, developed by Caroline Wang and Mary Ann Burris (Wang & Burris, 1997). Wang and Burris describe photovoice with the overarching premise that often what people at the grassroots level think is important doesn't match what policy makers think is important.

> "Photovoice is a process by which people can identify, represent, and enhance their community through a specific photographic technique. It entrusts cameras to the hands of people to enable them to act as recorders, and potential catalysts for social action and change in their own communities. It uses the immediacy of the visual image and accompanying stories to furnish evidence and to promote an

effective, participatory means of sharing expertise to create healthful public policy." (Wang & Burris, 1997)

The Photovoice method provides participants the opportunity to visually express their perspectives and experiences by not only collecting photographic data, but participating in the analysis as well (Wang & Burris, 1997). Originally, Wang and Burris developed photovoice as a participatory method for needs-assessment in the public health discipline, but they suggest that photovoice is flexible and adaptable for multiple research goals among various groups and communities with distinct issues.

Wang and Burris (1997) explain that photovoice provides a useful framework for participatory evaluation after the completion of projects to learn what worked well and what failed. Wang and Burris outline that the three primary objectives of photovoice are (a) to enable participants to record and reflect the strengths and concerns within their community, (b) to promote dialogue and knowledge about issues through discussion about the photographs, and (c) to reach those who create policy. According to Wang and Burris, researchers from multiple disciplines can use photovoice to raise awareness about social and health issues, often involving participants who are marginalized or disadvantaged. This made photovoice an appropriate methodology for studying an educational setting, which likewise encompasses health and social issues.

Participatory Post-Occupancy Evaluation

I adapted the photovoice method to develop an innovative POE strategy called participatory post-occupancy evaluation (PPOE) (Marley et al., 2012). I intend for the PPOE method to inform decision-makers who influence the planning, design, and

construction of school building projects and address the imperative to facilitate health for children in conjunction with sustainable building initiatives.

Although the Federal Facilities Council (Federal Facilities Council, 2001) does not specifically identify participatory visual research methods as a viable option to evaluate how a building performs for and meets the expectations of occupants, they do recommend soliciting and representing occupants' needs more richly, as a means to improving subsequent building projects. Traditionally, post-occupancy evaluations have incorporated primarily quantitative measurements and monitoring of indoor environmental quality, indoor air quality and thermal comfort, as well as qualitative surveys through the use of observation, user-satisfaction questionnaires, and interviews (Meir et al., 2009).

By going in to the school environment and studying directly with the students in their everyday setting, we can understand the context of what the participants are expressing, and explore their experiences of their school environment in depth and from their point of view. The perspective that participants can provide by creating their own photographic images and participating in the analysis of those photographs is an innovative post-occupancy strategy that has not, according to Meir et al. (2009) been conducted previously.

Research with Children

Sanoff (2000) discusses the benefits and importance of involving children directly as equal participants in decisions related to the environments in which they live, learn, and play. Researchers should not, according to Sanoff, include children simply as a courtesy, but because they belong as contributing members of the community. Sanoff

further describes the ways in which children can directly benefit from participating in evaluation of their environments. They gain a sense of belonging and empowerment and develop skills in teamwork, communication and evaluation.

Through their collaboration in PPOE as co-researchers in this study, children were provided an opportunity to publicly share their perspectives that are, according to Thomson (2008), rarely, if ever, heard. Many researchers who study young people share the view that children are capable and competent; their perspectives about their daily lives at home and school are of value (Clark, 2010; Sanoff, 2000; Thomson, 2008). Clark and Thomson both discuss that children provide unique insight into their everyday lives when we do research *with* children as co-researchers, instead of conducting studies on, or about children. The term co-researcher indicates the intention of sharing power during the research process between researcher and participants, when their perspectives are given value and status (Clark, 2010). The use of photography to collect data further reduces the power imbalances that would typically exist between an adult researcher and the children as participants (Freeman & Mathison, 2009). Freeman and Mathison explain that the advantage of allowing participants to generate their own documents is it allows them to control their perspective, and it reflects their natural mode of communication, especially for children. Clark (2010) points to an example in the literature where young people successfully act as co-researchers by using photography to document their views of a neighborhood play space (Burke, 2008). Further, photography engages young people in a way that incorporates the use of technology that they may already be interested in, use, and enjoy (Hall, Jones, Hall, Richardson, & Hodgson, 2007).

This study provides opportunities for children to collaborate in research and to visually express their perspectives in a way that is interactive and fun for them (Hall et al., 2007). Researchers have used visual participatory methods successfully with children as a way of gaining information about their lives, points of view, and interests (Burke, 2008; Clark, 2010; Freeman & Mathison, 2009; Hall et al., 2007, Thomson, 2008).

There is a significant ethical responsibility to protect children during research. Freeman and Mathison (2009) explain that children are inherently vulnerable because they are smaller in size and have less knowledge and experience about research than adults. They have diminished autonomy due to the reality that the decision to participate in research ultimately lies in the hands of adults. Finally, Freeman and Mathison identify that children's rights are primarily determined by their age, but the risk to the participants in this particular study was minimal. During the review process, the Institutional Review Board did not anticipate that this study would create physical or emotional risk greater than the children would normally experience in daily encounters.

Theoretical Lenses

I used the following theoretical lenses to position the study within the related literature. Creswell (2007) describes the quality of life orientation as a broad understanding of behavior and attitudes in the context of environment and culture. The quality of life orientation is relevant in this study because the purpose was to explore quality of life themes with students in their school environment. A related theoretical lens, and one that I reviewed more thoroughly in the literature, is the person-environment relationship as described in the discipline of environmental psychology (Kopec, 2006). Through our understanding of the person-environment relationship, participatory

methods for planning and designing, and also for POE of building projects make sense and become relevant in professional practice (Sanoff, 2000). Both my personal understanding in regard to the topic of study and the review of related literature narrowed the scope of the study.

I based the study on a social constructivist worldview as presented by Creswell (2007) and on past experiences and education. I worked as an occupational therapist and in related services in multiple preschools, elementary schools, and secondary schools early in my career, experience which shaped my viewpoint of the person-environment relationship, particularly in built environments that impact children.

Site Selection and Participant Recruitment

In order to gain access to the site and to recruit participants, I applied for and received approval from both the Colorado State University Institutional Review Board (Appendix A) and the Poudre School District's Research and Evaluation Director (Appendix B) to conduct the study with students at Bethke Elementary School (Bethke). I selected Bethke because of its commitment to sustainability, which is articulated through the design and construction of their school building, completed in 2008. The school building achieved LEED® Gold certification for sustainable schools. Bethke is committed to teaching students 21st Century skills by integrating technology into instruction, providing enrichment through the arts, and teaching about sustainability and conservation (Poudre School District, 2010). This commitment aligns well with the objectives and methodology of the study which likewise encompasses the integration of technology, art, and sustainability, making Bethke Elementary School conducive for the

study. The principal at Bethke was supportive of the study, and facilitated the recruitment of six students who agreed to participate in the study.

Data Collection Strategies

The data collection strategies for this study engage participants in focus group discussions and taking photographs. By using multiple data collection strategies, participants have the opportunity to choose how they contribute and what they want to express. This is an effective way to engage children as active participants in research about their own environments (Darbyshire, MacDougall, & Schiller, 2005).

The first session in photovoice typically begins with an overview of cameras, ethics, and power. This includes a discussion about sharing photographs with community members as an expression of "appreciation, respect or camaraderie" (Wang & Burris, 1997). Researchers teach the technical aspects of using a camera, including how to use and maintain them, and provide a basic overview of photography.

Next, the methodology includes a focus group discussion to engage students in defining the topic; in this case, health, and narrowing the scope of the photographs they take (Freeman & Mathison, 2009). During the focus group discussion, I asked the students questions that I devised as a guide including

- What does it mean to be healthy?
- Is health only physical? What other ways can a person be healthy? What might a healthy person look like?
- What does a healthy place look like? Share more about what you might see or experience in a really healthy place.
- What is it about your environment that encourages you to be healthy?

18

After the scope is narrowed and the topic defined, the participants collect photographs in preparation for the next session, which begins the data analysis phase of the study.

Data Analysis Procedures

The data analysis process emerged throughout the study as an iterative, rather than linear, process which is appropriate for case study research (Creswell, 2007). The analysis followed a spiral approach of reading/memoing, describing, classifying, and interpreting described by Creswell (2007) in combination with the participatory analysis method used for photovoice studies (Wang, et al., 1996). The analysis procedures included a combination of the constant comparative method (Glaser & Strauss, 1967) to analyze the focus group data, participatory analysis strategies (Wang, Ling, & Ling, 1996) implemented with the students during the photovoice study, and template analysis techniques (King, 2004), applied to thematically analyze the data.

Photovoice engages the participants in analyzing their photographs during a three-phase process. I modeled the data analysis procedures after Wang, Ling and Ling's (1996) recommendations for participatory analysis which includes selecting, contextualizing, and codifying photographic data. First, participants collectively select the photographs that they view as the most important and best reflect their perspective. In the second step of the participatory data analysis, Wang et al. emphasize contextualizing, or story-telling, which ensures that the participants express, and do not lose, the context of the photographs. The opportunity to talk about their photographs is an important step in exploring the participants' socio-cultural context of everyday school

experiences (Darbyshire et al., 2005). Finally, the participants help code the issues, themes or theories that emerge in the data.

During a final discussion to conclude the study, the participants had an opportunity to voice responses to questions such as

- What are some things your school could change or add that would make it a healthier place?

- If you were designing a school in the future, what would you include that would encourage and promote health for the children going to school there?

Trustworthiness

To establish trustworthiness in the study, I incorporated validation strategies as discussed by Creswell (2007). First, I clarify my biases by commenting on past experiences and stating how my professional interests have shaped this study. I integrated triangulation into the research design. According to Creswell, triangulation in qualitative research is achieved by using multiple and varied sources and methods for collecting data in an effort to emphasize the theme and focus of a study. The data sources include focus group discussions, photographic data, and a collective digital story which includes the images, and verbal and written context produced by the participants. In their study, Darbyshire et al. (2005) found that by using multiple methods for gathering data, policy decision-makers, planners and practitioners who were interested in children's health issues related to their environment deemed the findings trustworthy and credible. I also employed member-checking techniques by engaging in ongoing dialogue with and providing visual displays for the students to ensure my interpretations of their perspectives were accurate. During the final session, I asked the participants' to respond

to the final digital story, to identify if any viewpoints were missing. Finally, the rich and transparent descriptions about the setting and participants included in the following chapter make this study transferable to future inquiries.

CHAPTER FOUR: DISCUSSION AND FINDINGS

Implementing the Study

Setting and Participants

Figure 1. Bethke Elementary School[1]

Bethke Elementary School, recognized as being a healthy educational
environment, was the first school in the United States certified by the USGBC's LEED®
for Schools rating system, achieving gold certification (RB+B Architects, 2011). RB+B
Architects designed the 63,000 square foot school with capacity for 525 students in
grades K-5 for the Poudre School District (PSD), located in Larimer County in northern

[1] Retrieved from: http://www.bethkeelementary.com/photos-of-bethke.html

Colorado. Bethke is located within a neighborhood development in Timnath, Colorado, a rural community southeast of Fort Collins, Colorado. Since 2006, the Poudre School District has committed to organizational sustainability initiatives. In 2010, PSD added "Health and Wellness" to its Annual Sustainability Report, recognizing their educational facilities impact student and occupant physical and mental health (Poudre School District, 2010). PSD supports multiple sustainable educational opportunities for staff and students, including the Environmental Club at Bethke.

The principal and the Environmental Club teacher invited six students who agreed to participate in the study, each members of the Environmental Club. The nominated sample included three girls and three boys from the fourth grade class without disabilities, ranging from nine to ten years in age. The mission of the Environmental Club is to inform interested individuals about the green aspects of their school (J. Gallagher, personal communication, 2012). The club raises awareness about how to create a sustainable environment for all. Students in the Environmental Club engage in activities such as creating educational videos and gathering the school's recycling. They also participate in the TerraCycle Program, which turns waste into affordable green products. We met during the Environmental Club's regularly scheduled weekly meeting time, a 45 minute lunch period for six weeks, from April 5, 2012 to May 10, 2012. The students agreed to work outside of this on four occasions in order to complete the study. At the conclusion of the study, we met to review and celebrate the project and complete a final discussion.

The school principal formed a project team to help support and facilitate the study, including the Environmental Club teacher and the technology teacher at Bethke.

Although I provided leadership for the team, this collaborative relationship proved to be an integral part of the success of the study because it allowed me to integrate into their school environment as much as possible.

Prior to the first meeting with the students, I met with the project team to review and finalize the details of the study, establish a timeline, and discuss participant recruitment. During this meeting, I provided the project team with a packet to send home to parents or guardians, including a letter explaining the study (Appendix C), a consent form for them to sign and return (Appendix D), and a copy of the student assent form (Appendix E).

Additionally, we discussed the data storage requirements summarized from the approved IRB protocol. Storing and managing the data, which included written documentation and photographic images, was an important detail of this study. The students took photographs on digital cameras belonging to Bethke. As a project team, we agreed during this meeting that all of the data storage requirements could be met, supported by the technology teacher. The technology teacher created a secure, shared data storage file that allowed the students to continue collecting photographic data throughout the week. This provided secure, remote access to the data so I could prepare materials between weekly sessions.

Focus Group

During the first session, I introduced myself and the study through the letter of assent, which the students all independently signed and dated, voluntarily agreeing to participate (See appendix E). I also created a brief presentation about the study using Microsoft Photo Story 3, which is the same digital story-telling software the students

used to create their own digital story during the study. By using three examples from

children's literature, I explained how images in books can help us learn. I based this on a

documented strategy used for teaching children visual research methods (Johnson, 2008).

The literary examples expressed to the students that images (a) communicate information

(b) portray a unique point of view and (c) show that people and their surrounding

environments are reciprocally connected. I included these literary examples to help the

students understand the purpose of the study and the value of photographic data. I also

explained two rules for the study; (a) they could not take photographs of people, only of

places and things; and (b) they were the only students who had permission to take

photographs during the study.

The Environmental Club teacher issued one camera per two students. They

signed a "pass," a piece of paper giving them permission to use, and acknowledging their

responsibility for, the camera. Bethke is a technology-rich environment, and the students

had experience with digital cameras and basic photographic composition. Their

experience allowed us to begin data collection without further instruction on proper use

of the cameras, which is normally a part of the introductory session in photovoice studies.

After introducing the study, I facilitated a group discussion to establish a

definition of health and narrow the scope of the study. This definition became the

overarching theme for the study, guiding subsequent data collection and data analysis

phases. The Environmental Club teacher documented the session on a desktop computer

connected to the SMART™ Board, an interactive white board at the front of the

classroom. The SMART™ Boards at Bethke provided an opportunity to integrate

member-checking strategies throughout the study due to the visual immediacy of information.

In order to analyze the focus group interview data and determine a conceptual definition of health, I implemented a constant comparative analysis method, a three-step inductive approach to qualitative data analysis. The constant comparative method helps the researcher interpret, and create meaning, from the data (Glaser & Strauss, 1967). First, I coded the students' focus group responses, employing an open-coding process, and noted multiple concepts related to health. Second, I classified, or grouped together, these concepts, in a process called axial coding. This procedure employs inducing categories that encompass, and group together, the open codes. Finally, I generated a conceptual definition of health during the third, selective coding, the final step in the constant comparative method (Appendix F).

As an outcome of the group discussion, concepts about the meaning of health emerged, which I classified as either related to the physical environment or the social/cultural environment. The students correlated health with physical environmental attributes that mimic or include nature such as vegetation, clean water, sunlight and fresh air. Additionally, the students discussed that safety is important to them. They explained that in order to be healthy, they need to be safe. The students perceived that living in an area that is less densely populated keeps them safe and affords them a healthier life. The students described a healthy place as including physical activity, healthy eating, learning, safety, and acts of stewardship. They described that personal behaviors combined with physical environmental attributes contribute to a person's overall physical and mental health.

Figure 2 summarizes the concepts that emerged in the focus group discussion and the students' conceptual definition of health. When I presented this display to the students, they affirmed that it reflected their views and ideas about their meaning of health. Because the students' defined health from their own perspective, they were able to focus on a topic that was relevant and meaningful to them during the remainder of the study.
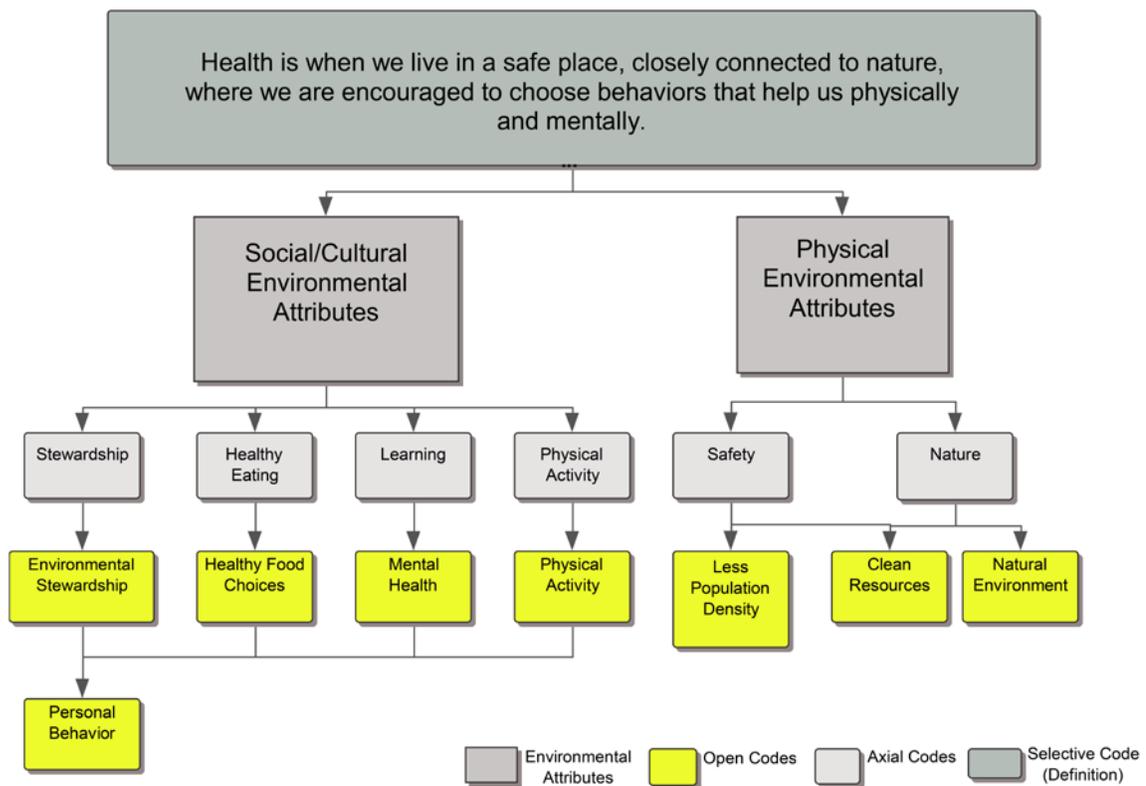
Figure 2. Focus group themes and conceptual definition of health (Marley 2012)

Photographic Data Collection

During the second weekly session, with digital camera and pass in hand, the students began taking photographs of their school environment. Their task was to photograph places and attributes of Bethke, both inside and outside that related to our theme of health. I observed them as they did this, giving them freedom to explore their

surrounding environment through the lens of a camera. I followed one group as they moved through the corridors and onto the playground outside. All six students were there. I noted that the first place they sought out for capturing photographic images of health was outdoors, on their playground.

Figure 3. Student photograph: Playground at Bethke (Marley 2012)

The students looked and sounded excited as they ran about, cameras in hand, discussing, exploring, and capturing their school environment. They were uninhibited, creative, and expressive in their actions as I observed them. Later in the week, I was able to view their photographs. I saw the school environment from the students' perspective, and I shared their enthusiasm for what they had created.

Data Analysis Process

With the data collected, I engaged the students in the three-phase participatory analysis method for photovoice, and a subsequent thematic analysis described below.

Participatory Analysis

Selecting.

To prepare the photographic data for analysis, the participants selected photographs that were the most meaningful to them and best reflected the story they wanted to tell about health in their school. A decision tree provided a general guide to the students as they decided whether or not to select and include each photograph for their final digital story. The questions included

- Does this photograph relate to our theme of health?

- Do you have a story or something to tell about this photograph?

- Is it important to you that we select this photograph?

The students collectively selected photographs. By the end of the initial data collection phase, the students had taken 175 photographs. Through the selecting process, they identified 10 duplicate photographs that were eliminated from the data set, 60 they decided not to include, 35 they were unsure about, and 70 they wanted to include.

The students were eager to explain why they took the photograph, where they took it, and what it meant to them. One of the boys shouted, "This is so much fun!" I was listening to their voice, and they seemed excited for me to hear it. This was the point in the study, when I believed I had established trust and reciprocity with the students. The process seemed interactive and fun, and they were freely sharing their perspective.

Contextualizing.

After hearing the student's excitement about the context of the photographs, I recognized that I needed to adjust how to facilitate the contextualizing phase of the analysis. Time was a limitation to this process; we had numerous photographs the

29

students wanted to include, and they had many things to say about them. As planned, the contextualizing phase was to be done as an independent activity that the students could work on throughout the week between our sessions. I planned to have the students write about their photographs using the digital story-telling software available to them at school. However, after experiencing their enthusiasm for talking about their photographs verbally, the best way to record this seemed to be to let them share verbally, as a collective group. We used the classroom SMART™ Board again to document the students' context of each photograph. We completed this as a collaborative group process.

During the contextualizing phase, the students expressed interest in going back to collect additional photographs to replace or add to the ones they had already taken. The students commented "I think we need to get a better picture," and "that reminds me of another photograph I think we need to take." The next week, they collected 14 additional photographs, and added 13 more the week after that. With new photographs added over the course of study, we reiterated the selecting and contextualizing process until finally the data set was reduced to include 58 photographs and corresponding context. The students naturally engaged in this emergent research design, which added depth to the study that I could not have achieved had the study design been more structure oriented, and less process oriented.

Coding.

The coding phase provided an opportunity for the students to classify their photographs based on an ethnographic analysis strategy called taxonomical analysis (Spradley, 1979). The students followed a deductive classification system to reduce and

organize the data set. We classified their images and context according to concepts identified in the focus group analysis, which included (a) learning, (b) nature, (c) safety, (d) healthy eating, (e) stewardship, and (f) physical activity (Figure 2).

After the students classified the slides, we inserted them into the digital story-telling software, Microsoft Photo Story 3. The students, working in pairs, audio recorded the contextual language that corresponded to each photograph. The resulting product, a digital story, includes the photographic images and the voices of the students describing their school environment in relation to the overarching topic of health from their collective perspective. I provided a copy of the digital product to Bethke Elementary School and to each of the student participants at the conclusion of the study.

Thematic Analysis

In order to identify overarching themes in the study and understand them in relationship to the physical environmental attributes that the students at Bethke photographed, I implemented a type of thematic analysis strategy, called template analysis (King, 2004). Template analysis involves developing a coding scheme, or template, useful for summarizing concepts identified in the data set and organizing them in a way that allows the researcher to interpret the data and report findings. Template analysis employs a combination of deductive and inductive codes, and I used a combination of both to develop a two-level coding scheme template (Table 1). Although there are a series of techniques used in template analysis, the process is not entirely linear, and throughout the analysis, I also reflectively analyzed the data.

Following King's techniques, I developed the first-level of the coding scheme template which included six domains. Four of the first-level domains align with the

dimensions of environment as outlined in the World Health Organization's (2007)

International Classification of Functioning, Disability and Health for Children and Youth

(ICF-CY) framework. These domains correspond to concepts I recognized in the data

set. These dimensions include the (1) *setting* (natural and built attributes as well as the

products, equipment and technology in the physical environment); (2) *institutional*

policies and initiatives (things that make the school unique), (3) *psychological needs*

(cultural values and attitudes), and (4) *social needs* (opportunities for social

relationships). I devised the other two first-level domains, not from the ICF-CY, but by

inductively recognizing examples of them in the data set. They included: (5) *behavior*

(kinds of behavior and action) and (6) *physiological needs* (desired physical experiences).

Table 1. *Two-Level Coding Scheme Template*

Domains	Setting: attributes of the physical environment: built & natural (ICF-CY e210-e260) products, equipment, and technology (ICF-CY e110-e165)	Behavior: kinds of behavior and action	Institutional initiatives and policies: things that make this school unique (ICF-CY e510-e595)	Psychological Needs: cultural values and attitudes (ICF-CY e410-e465)	Physiological Needs: desired physical experiences	Social Needs: opportunities for social relationships (ICF-CY e310-e360)
Codes	1. building circulation 2. community connectivity 3. connection to nature 4. creative spaces 5. equipment for cleanliness 6. equipment for conservation 7. exposed systems 8. learning spaces 9. lighting 10. materials 11. places and equipment for physical activity and play 12. signage/informational artifacts 13. technology 14. water sources	1. conserving/saving 2. including others 3. learning/reading/working 4. moving/exercising 5. playing 6. relaxing/resting 7. sharing	1. name of setting/Bethke	1. beauty 2. creativity 3. empowerment 4. enjoyment/fun 5. feeling safe 6. friendliness/community 7. gratitude 8. happiness/joy 9. knowledge/learning 10. pride 11. stewardship/concern for others 12. stewardship/concern for environment	1. calm/relaxed 2. clean 3. comfortable 4. easy to use 5. physically active	1. sense of community

Then, I developed the second level of codes, also inductively, by reading the data set again, and recognizing emerging concepts that related to the six, first-level, domains. Although I developed the two-level coding scheme template after extensively reading the data set through the preceding participatory analysis with the students, it took several iterations to settle on the codes that I included in the final two-level coding scheme template.

I coded, or applied, the template to two distinct parts of the data set. First, I assigned each of the students' 58 selected photographs one of the 14 physical environmental attribute codes listed under the *setting* domain from the template. Second, I assigned selected meaning segments (from the students' context about each photograph) the applicable codes listed under the five remaining domains (*behavior, institutional initiatives and policies, psychological needs, physiological needs,* and *social needs*) from the template. By the end of this coding process, I had organized all 58 photographs, with their corresponding context, according to 14 physical environmental attributes and displayed them in a conceptually clustered matrix (Appendix G) an analysis strategy described by Miles and Huberman (1994).

Finally, I created a thematic conceptual matrix (Miles & Huberman, 1994) to visually display the 14 physical environmental attributes, and presented them in relationship to the two-level coding scheme template. The thematic conceptual matrix depicts how I applied the template to the 58 photographs in the data set (Appendix H). I used the thematic conceptual matrix, a product of the template analysis, to help further organize the data set and write the final report. I organized the display and subsequent report of findings according to the 14 physical environmental attributes identified in the

students' photographs because that was the primary focus of the central research question.

As an outcome of the thematic analysis process, which included coding and organizing the data set using techniques from template analysis, five broad themes emerged. The five themes are words and phrases that summarize my interpretation of the attributes of the students' photographs and stories that characterize their perspective about health in Bethke Elementary School.

Findings

Discussion of Themes

Five themes emerged during the analysis of the students' data set that included their photographs and stories about health in Bethke Elementary School. The five themes as a whole reflect my interpretation of the students' perception of health in their school. The themes emerged as an outcome of both the participatory and the thematic analyses.

Stewardship.

Not only did the students at Bethke express commitment, interest, and mindfulness of environmental conservation and stewardship, they also portrayed a genuine concern for other people. They perceived the importance of including everyone in their school. The cultural values and attitudes about stewardship within this school environment emerged in the voices of the students as they shared stories about their photographs such as

> *Our school likes to recycle. This is a big part of Bethke. Our building is made of recycled material. Some schools don't even have recycling. This surprises us.*

> *I see the wheelchair sign. People who use wheelchairs don't have to struggle to open the door.*

Brail on the signage is important…for students who are blind. This shows we care about them.

Desire for Learning.

The students perceived their school environment as supportive of their quest for knowledge and personal growth. They related knowledge and intelligence as a means to their own health by sharing expressions such as

Reading is good for your mind so when you grow up you get a better job. When you think about this sign, kids are reminded that we can have a good job that we enjoy…or get into a better college and enhance our education.

Participation in Recreation, Physical Activity, Relaxation.

The students expressed multiple opportunities they have at Bethke to participate in movement, exercise, play, and relaxation. They provided visual examples to show how they feel encouraged to be physically active in their school environment. The students specifically identified the playground and outdoor areas as places where they participate in physical endeavors, rest, and relaxation. They expressed that living in close proximity to recreational opportunities provides escape from life's stressors. They told me they feel stress. They shared ideas about places in and near their school where they try to cope with stress. They seek places in their everyday environment that support their need for calmness and relaxation.

We go to the mountains to get away from everyday life. My favorite thing to do ever is relax! We have stress, and this gives us a break.

Sense of Belonging to Community.

The students at Bethke perceive the initiatives and policies of their school environment as supportive of their social need for community. They portrayed a sense of place, or belonging, within their immediate school environment, and also a connection to

their surrounding neighborhood, local community, state, and world. They expressed these connections in terms of sharing spaces, equipment and resources as well as appreciation for friendliness and feeling welcome. The students show concern for others, seen in the theme of stewardship, and act on this concern by engaging in opportunities their school provides for collaboration with each other and the larger community. Throughout the study, the students selflessly spoke of health by focusing their attention on others. They seemed to recognize that their behavior impacts not only them, but other people and the world around them. The students emphasized places in their school setting where they can share resources and work collaboratively.

We raised money; we help our community.

This is a space we share. Everyone can work together.

Cultural Values and Attitudes of Well-Being.

The students weaved experiences of psychological well-being such as pride, gratitude, happiness and joy, experience of beauty, enjoyment and fun, empowerment, and feeling safe into their stories about all 14 of the physical environmental attributes documented in their photographs. They perceive the physical attributes of their environment as inextricably related to their cultural values and attitudes of well-being. They also described physical needs associated with well-being such as their need for cleanliness, being comfortable and having equipment and materials in their setting that are easy for them to use. This theme emerged early on, and I recognized that the students' perception of health connected directly to their cultural values and attitudes.

There are lots of trees...they are beautiful. We like to have pretty things around...We feel proud when our school looks nice.

We have opportunities that other kids don't have.

Kids don't have to worry.

Everyone likes to play. It's fun.

Discussion of Physical Environmental Attributes

The five themes that emerged in the study are inextricably related to the physical environment, or setting domain, at Bethke. All of the students' photographs depict attributes of the physical environment, and the discussion below provides a sense of how these attributes and the five themes relate. The discussion is ordered according to the fourteen physical environmental attributes, with photographs shown as a sample from the complete photographic data set of 58 slides (Appendix I). The discussion reflects my interpretation of the students' description and perception of health in their school. The five themes are embedded into the discussion in italics to provide a sense of how the themes relate to the fourteen physical environmental attributes.

Building Circulation.

Figure 4. Student photograph: Stairs, Bethke (Marley 2012)

The students voiced that attributes comprising their school building's circulation areas, such as the elevator, entry area, and light-filled staircase are easy for students of all ages to use, with any means of mobility. Within these circulation areas, the students perceived an opportunity for *stewardship;* where they can include all of the students in their school. Inclusion seemed important to them. The students' expressed feelings of *well-being* such as safety and empowerment. They showed a genuine concern for others when describing photographs of these areas.

Community Connectivity.

Figure 5. Student photograph: Open Space, Bethke (Marley 2012)

The students perceived their social relationships, not only within Bethke, but within the larger community and world, as a healthy aspect of their school environment. When they told about acts of *stewardship,* such as participation in charitable events, they revealed a *sense of belonging.* The students photographed a connection to their community, explaining direct proximity to the neighborhood where many of Bethke's students live. They valued that this provides opportunities for *physical activity,* such as riding their bikes to school. This also facilitates a sense of *well-being.* The students described feeling relaxed and calm because they have less stress about getting to school when they live nearby. As part of a community, they enjoy themselves, *learn*, and show genuine concern for the people and world around them.

Connection to Nature.

Figure 6. Student photograph: Recreation, Bethke (Marley 2012)

At Bethke, there are numerous natural elements, which contribute to the students' perception of health and *well-being*. Attributes such as fresh air, natural lighting, landscaping, vegetation, and proximity to recreational opportunities provide a landscape for the students to relax and *learn* as a *community*. The students described nature as a place where they *participate in recreational and physical activities*. In doing so, they experience beauty, enjoyment, gratitude, happiness, and pride. They said they feel safe at Bethke, surrounded by natural elements like those in their photographs. The students contribute to conserving and protecting nature through commitment to environmental *stewardship*.

Creative Spaces.

Figure 7. Student photograph: Student Artwork, Bethke (Marley 2012)

The walls and corridors at Bethke were designed as a place to display students'

work. The students seemed excited about the collective school art project shown in the

photograph above. They expressed that when they have an opportunity to share their

work and accomplishments with others, it contributes to their experience of health and

well-being. The students showed pride in sharing their artwork with their school

community, voicing that it brings them joy.

Equipment for Cleanliness.

Figure 8. Student photograph: Garbage Can, Bethke (Marley 2012)

The students at Bethke expressed appreciation for having access to equipment they can easily use to keep themselves and their school clean. They take pride in their contribution to environmental *stewardship.* The students perceived a clean environment as means to health and *well-being.* They photographed equipment such as hand-washing stations with sensors, hand sanitizers placed in the cafeteria, and practical placement of disposal bins to represent that they are encouraged to keep themselves and their school clean.

Equipment for Conservation.

Figure 9. Student photograph: Temperature, Bethke (Marley 2012)

Environmental *stewardship* is an integral part of Bethke. The students took multiple photographs that represented this initiative. The students recognized their own *well-being,* by voicing feelings of calmness, cleanliness, comfort and pride as a result of their commitment and contribution to conservation. For example, they participate in recycling efforts and conserve water with low-flow devices. They monitor classroom temperatures on digital thermostats.

Exposed Systems.

Figure 10. Student photograph: Teaching Wall, Bethke (Marley 2012)

The students recognize Bethke as a sustainable school where they are empowered

to participate in sustainable initiatives as a school *community.* Their photographs showed

several visually exposed systems and components such as ductwork, fire safety systems,

vents, and water pipes. In one of the corridors, there is a transparent section of wall,

called the teaching wall, where students said they *learn* about the green features and

materials used in the construction of their school. This information and knowledge

facilitates their *well-being*; they voiced feeling empowered, safe and comfortable as a

result of seeing and knowing about the exposed systems. When the students told about

the exposed systems at Bethke, they also related them to opportunities for *stewardship*.

Learning Spaces.

Figure 11. Student photograph: Learning Spaces, Bethke (Marley 2012)

At Bethke, there is a flexible classroom under the staircase shared among the school. In the library, there are multiple options for seating. The students said they feel comfortable in these types of learning spaces, in particular, where they experience enjoyment and happiness working together as a *learning community*. The students perceive such spaces as facilitating a sense of *well-being*.

Lighting.

Figure 12. Student photograph: Switches, Bethke (Marley 2012)

Natural light radiates throughout Bethke. A combination of large windows and Solatubes create a bright environment where the students said they feel calm and relaxed, as an indication of *well-being*. They photographed naturally-lit areas where they described feeling safe and being able to work and *learn.* Additionally, the students recognize their own contribution to environmental *stewardship*, through conscientious use of artificial light.

Materials.

Figure 13. Student photograph: Recycled Material, Bethke (Marley 2012)

Recycled materials, visible on the exterior of the building, visually represent

Bethke's commitment to environmental *stewardship*. Inside, the students photographed

design features such as light-colored wall tinting and spoke of how they think this

contributes to health and *well-being* in their school. They expressed pride in their

building and said they feel clean, comfortable and focused on *learning*. They share in

their school *community's* common mission toward sustainability.

Places and Equipment for Physical Activity and Play.

Figure 14. Student photograph: Movement, Bethke (Marley 2012)

The students first went directly to the playground to begin describing Bethke in terms of health. When they described areas and equipment where they *participate in physical activity* and play, such as the playground, they referred to all six domains from the first-level of the coding scheme template. The students photographed the playground, including play equipment, bike racks, ground cover, fences, and open space to represent where they meet many of their needs for health and *well-being*. These needs include being physically active as well as relaxed. The students voiced participation in acts of *stewardship* in places like the playground by including others and conserving resources. Here, they exercise, play, and relax. They said they enjoy being on the playground where they feel safe and connected with their school *community*.

Signage and Informational Artifacts.

Figure 15. Student photograph: Character Traits, Bethke (Marley 2012)

The students described signage and informational artifacts in depth throughout the study as encouragement to be healthy. Signs provide information such as behavioral and character expectations, *community* and enrichment activities, safety and way-finding, and recycling. Informational artifacts such as flags, digital clocks and communication systems reminded the students of physical, psychological and social health and *well-being*. They correlated the signage and informational artifacts in their environment to feelings of empowerment, enjoyment, safety, friendliness, gratitude, knowledge, pride, and *stewardship*. Their photographs represented health at Bethke and showed a sense of *belonging to a community* with common values and attitudes.

Technology.

Figure 16. Student photograph: Tech Lab, Bethke (Marley 2012)

The students expressed genuine gratitude and pride in the opportunities they have, for example, a technology-rich environment. They perceived places with technology, such as the computer laboratory, as areas where their school *community* can share resources as they work and *learn*. They described sharing the technology resources and laboratory space as an act of conservation and *stewardship.* They also photographed technology devices, such as security scanners, and voiced how these attributes contribute to their overall *well-being* and feelings of safety.

Water Sources.

Figure 17. Student photograph: Water Fountains, Bethke (Marley 2012)

Drinking fountains in each classroom and in common areas throughout Bethke are accessible and easy for the students to use. They perceive that having water readily available facilitates their ability to *learn*. The students voiced that access to clean water and proper hydration is important to their overall health and *well-being*. Some of the drinking fountains are multi-height, which the students explained is a way of including everyone, of all sizes, ages, and abilities. They expressed concern for others, showing kindness, respect and *stewardship*.

Discussion

The interpretive summaries above portray how attributes of the physical environment in the setting and the five emergent themes promote children's health. Although their collective images and stories about the physical environment portray a holistic view of Bethke, I noticed two attributes that stood out the most in the students' voice.

First, the students' photographs and context, their stories, about *Community Connectivity* provide an example of how the physical environment facilitates health. The significant features of *Community Connectivity* included engagement with the greater community during community events and through acts of stewardship. The spatial proximity of their school to where they live was important to them. They said they feel less stress as a result of living nearby their school. Their stories about *Community Connectivity* encompassed all five themes including stewardship; a desire for learning; participation in recreation, physical activities, and relaxation; sense of belonging to a community; and cultural attitudes and values of well-being.

Likewise, attributes of the physical environment that foster a *Connection to Nature* encompassed all five themes. The significant attributes of *Connection to Nature* that facilitate health from the students' perspective included natural elements such as natural light; views to the outdoors; open spaces with less population density; fresh air; vegetation and landscaping; clean water; and places for recreation that mimic or include nature.

The study focused primarily on the strengths and assets of Bethke. The positive emphasis is a possible and worthwhile approach in photovoice studies (Wang & Burris,

1997). However, I would be remiss to not discuss one concept that seemed to be missing from the students' story. They emphasized the importance of healthy eating during the focus group discussion, and this concept even emerged as one of their six original taxonomical classifications during the participatory analysis phase of the study. However, as I further analyzed the data, there were no photographs and no stories about healthy eating, or even mention of food at all. Although the students' identified healthy eating as an important facilitator of health, they did not collect any images nor tell any stories about food at Bethke. During the concluding discussion with the students, I inquired about this, and they provided the suggestion to offer healthier lunches, and perhaps add organic foods to the menu as a way of improving their school and other schools in the future.

The only additional suggestions that the students' made for improving health in future schools was to incorporate more recycled materials and more shared learning spaces, similar to the current technology laboratory at Bethke.

The connection between the physical environment and health discussed in this study helps us visualize and understand how their environment impacts children's health. Each of the fourteen physical environmental attributes identified by the students in the study relate, in various ways, to the cultural values and attitudes that the students at Bethke equated with health. These cultural values and attitudes included beauty; creativity; empowerment; enjoyment and fun; feeling safe; friendliness; gratitude; happiness and joy; knowledge and learning; pride; environmental stewardship; and concern for others. The students also view their school environment as fulfilling their physiological need for calmness, cleanliness, comfort, ease of use and physical activity.

Attributes they photographed and described in their school setting such as *Community Connectivity; Learning Spaces; Creative Spaces; Connection to Nature; Building Circulation;* and *Places and Equipment for Physical Activity and Play* are all spaces that foster social relationships. Products like *Signage and Informational Artifacts; Technology; Equipment for Cleanliness; Equipment for Conservation; Exposed Systems; Lighting; Materials and Water Sources* are also physical attributes of Bethke that the students perceived as healthy.

CHAPTER FIVE: CONCLUSION

Significance of Findings

Institutions such as PSD recognize that their schools do impact student physical and mental health (Poudre School District, 2010). However, the current approach to sustainable school design and construction emphasizes energy and resource efficiency and minimizing harmful health effects, but overlooks the opportunity to actually promote, or facilitate, physical and mental development in children (Kellert, 2005). Additionally, children have rarely been included as participants in post-occupancy evaluation of LEED® certified school buildings (Marley et al., 2012). Meir et al. (2009) reviewed the use of post-occupancy evaluations in the literature, and they did not report that any specifically included children as participants. They reported that children's participation in the school building design and construction process is limited to predesign research. Schools that have committed to conducting post-occupancy evaluations do not include any evaluation beyond giving a numerical grade to user satisfaction (Donnell-Kay Foundation, 2005; Meir et al., 2009).

Although there is certainly value in the traditional quantitative methods used in post-occupancy evaluations, the PPOE method for this study offered a new perspective, allowing us to hear, directly from the students' in a green school, about their everyday environment through images and stories. To my knowledge, the perspective of children has yet to be documented in the literature about health in green school buildings using

qualitative methods. This study describes how specific environmental attributes that comprise this green school not only protect children's health, but actually facilitate their physiological, psychological and social health and development.

Through this study, I learned about the first LEED® Gold school in the U.S. intimately from the students' who spend their days learning, working and playing there. Although this study is of a single green school, Bethke Elementary School, and the perceptions are those of a small cohort of students, the results are significant in the following ways.

- The study documents a participatory method for post-occupancy evaluation that policy makers, institutions and building project teams can implement as a way to meaningfully evaluate and document building projects. The method engages children as co-researchers in not only documenting and describing their unique perspectives, but in creating meaning about their experiences in their everyday environment; visually, verbally, and in writing. This qualitative method for participatory post-occupancy evaluation (PPOE) provides rich and meaningful information that can inform subsequent building projects, especially those intended for children.

- The findings raise awareness about the opportunities green school buildings have to facilitate children's health. By referring to research and practice from other human science disciplines, we understand the contribution that well-established models, in this case the ICF-CY, provide a meaningful, holistic conceptual framework that can guide policies and decisions during building project planning, programming, design and implementation. This is particularly relevant and

significant for building projects in which children will be the primary occupants, where we should be concerned and interested in how to facilitate, not simply to protect, all aspects of their health and well-being, including social, psychological and physiological health.

- The findings address the inextricable relationship between children and their everyday environments within a holistic framework of health. This study helps us understand how the themes of social sustainability in children's environments are embedded into the overarching framework of health. It documents some of the opportunities available for policy makers, schools, sustainable building professionals, and health professionals to work together to facilitate children's health through modification and creation of the built environment more holistically than current green building practices emphasize.

Response to the Research Questions

Central Question: What attributes of the school environment do children perceive as facilitating health and well-being?

Through photographic images and context, the students compiled a collective digital story, to share their perspective about health in their school. During this process, the students identified attributes of the school environment that they perceived as facilitating health; categorized as physical, social, cultural and institutional domains. These domains align with the ICF-CY (World Health Organization, 2007) dimensions of environment, which served as a guiding framework for the thematic analysis in this study. The domains, listed below, collectively describe the school environment at Bethke, which the students' perceived, overall, as a healthy place.

57

- The physical environment, including built and natural elements of the environment as well as products and technology within the environment.

- The social environment, including features that support their need for relationships and community belonging.

- The cultural environment, including psychological needs, values, and attitudes.

- The institutional environment, including the unique policies and initiatives of the school that encourage health.

Sub Research Question 1) How do children define health and well-being?

During the focus group discussion and subsequent analysis, the students and I developed a conceptual definition of health which helped us focus the study on a topic that was relevant and meaningful to the students. They defined health as a safe place, closely connected to nature, where they are encouraged to choose behaviors that help them physically and mentally.

Sub Research Question 2) How do children describe what a healthy place looks like?

The students collectively described a healthy place during the introductory focus group discussion. They described a healthy environment as a place that mimics nature and is safe; that supports their desire to learn; where they can see and participate in caring for others and the world around them; a place in which people eat healthy food and are active. Through this study, the students identified their own school environment, Bethke Elementary School, through photographs, verbally, and in writing as an example of what a healthy place looks like.

Sub Research Question 3) What theoretical lenses help us understand the children's perception about health within the context of their school environment?

The ICF-CY (World Health Organization, 2007) emerged as a promising conceptual framework for understanding the impact of the school environment on children's health.

Sub Research Question 4) What attributes that facilitate health are unique to this school environment?

The tone of the students' voices revealed that they view Bethke as special and unique. They reflected this best through expressions of pride such as, "Bethke was smart to buy more computers." They told me that "every day at Bethke kids are active," and "recycling is a big part of Bethke." They spoke specifically about their own school with a sense of pride, and they recognized with gratitude that "we have opportunities others kids don't."

Sub Research Question 5) How do children describe their school environment in terms of health and well-being through photographic images, verbally and in writing?

The students' photographs depict the natural and built attributes as well as the products and technology that comprise Bethke Elementary School. The photographic images, as a whole, include confirmable details of the physical environment found within the setting. It is the students' voice, the contextual story, though, that provided the rich details needed to create meaning and gain understanding about health in this school environment. The students' described the physical environment in complex relationship

to the cultural, social and institutional domains which facilitate health. They clearly recognized that their own behaviors and actions are a means to their own personal health and that their actions also contribute to the health of others.

Sub Research Question 6) What are the themes that emerge from the images and stories that the participants created?

Five themes emerged in the study that help us understand the students' experience of health at Bethke Elementary School. The themes are summarized as follows

- Stewardship – concern for the environment and acts of conservation, as well as concern for other people and inclusion of others

- Desire for Learning – a desire for knowledge as well as actions such as learning, working, and reading that fulfill this need

- Participation in Recreation, Physical Activity, and Relaxation – actions such as moving, exercising, playing, relaxing and resting; a desire for physical activity; and experiences of being calm and relaxed

- Sense of Belonging to Community – actions such as sharing; experiences of friendliness; and feeling like they belong to a community and school

- Cultural Values and Attitudes of Well-Being – experiences and feelings of pride, gratitude, happiness, joy, beauty, enjoyment, fun, empowerment, and safety, as well as being clean and comfortable; being able to use things easily; and being calm and relaxed.

Sub Research Question 7) How would I interpret the themes within the larger framework of social sustainability?

In the review of literature, emerging themes in the social sustainability discourse included identity, sense of place and culture; empowerment, participation and access; health and safety; well-being, happiness and quality of life (Colantonio, 2008). In this list, health is included as one isolated term within the broad topic of social sustainability. In this study, however, the findings position health in relation to social sustainability quite differently. Although, the themes that emerged during the study certainly relate to social sustainability, they were weaved throughout the students' photographs and stories with their own definition of health positioned as the broad topic.

In sustainable building, health is portrayed as a single topic within the realm of sustainability. In this study, we see health as the overarching framework, in which themes related to social sustainability emerged. This leads me to question whether "health," as described in frameworks like the World Health Organization's ICF and ICF-CY, can be used meaningfully as a guiding model for sustainable building projects, as a way to re-position social sustainability as a top priority when designing and building environments for children.

Implications for Practice

In order to position social sustainability as a priority for designing, building and evaluating children's environments, with health as a guiding framework, I suggest an interdisciplinary approach that extends beyond the traditional building and design professions such as architecture, engineering and construction. Professionals in education (Tanner, 2000), environmental studies (Kellert, 2005), and human development

and allied health disciplines, such as occupational therapy (Khetani et al., (in press)), are also working toward improving children's environments in a way that facilitates their health and well-being.

This study is an example of an interdisciplinary approach to post-occupancy evaluation. I conducted the study with the guidance and input from my graduate committee. Collectively, we have backgrounds in the disciplines of occupational therapy, architecture, engineering, construction management, psychology, environmental psychology, and education. This collaboration among professionals from the human sciences disciplines serves as an exemplar of a successful interdisciplinary approach that resulted in development of an innovative method for participatory post-occupancy evaluation (PPOE) and resulted in a meaningful study that discusses the complex inter-relationships between children's health within a sustainable school environment.

The findings from the study describe themes that can serve as a guide to inform future building projects. The five themes, including stewardship; desire for learning; participation in recreation, physical activity and relaxation; sense of belonging to community; and cultural values and attitudes of well-being, were meaningful to the participants in this study, specifically. Although these themes may very well be meaningful to other students, in other children's environments, each setting is unique, and the people who occupy those settings are unique, with their own set of cultural values and attitudes.

Therefore, it is the interdisciplinary, qualitative, and participatory approach to post-occupancy evaluation that can be replicated meaningfully to inform future design,

building and evaluation of children's environments as a means of facilitating the health and well-being of children.

Recommendation for Future Research

The opportunities for continued scholarly research and professional practice that can evolve from this work are numerous. Of particular interest is the continued development of innovative participatory research methods that engage children in research about their everyday environments as a means of facilitating human health and well-being. It would also be interesting to evaluate other children's environments, in varied cultural and geographical settings, to learn multiple perspectives, as an opportunity to prioritize and promote health through the built environment. Additionally, PPOE methods could be implemented with multiple populations as a way to learn the perspective of underrepresented individuals such as children with disabling conditions.

Concluding Remarks

By implementing a participatory post-occupancy evaluation method based on a qualitative research method, photovoice, I learned ways in which a sustainable school environment facilitates children's health. The students who participated as co-researchers in the study described specific environmental attributes at Bethke Elementary School as inextricably related to themes of stewardship; a desire for learning; participation in recreation, physical activities, and relaxation; sense of belonging to a community; and cultural values and attitudes of well-being.

As I explored the complex relationships between attributes of the physical, cultural, institutional and social environment portrayed in the photographic images and in

the context of those images, I perceived that the students recognize that their school environment, as a whole, facilitates their individual and collective health.

The way I learned this was by doing the research study *with* them; asking the students to share their perspective in their own terms, using methods and technology that are meaningful and relatable to them; and trying to really hear their voices as they shared their photographs and stories. As a result, we can see and hear what is important to the students who participated in the study at Bethke Elementary School. From my view, they described a profound account of how the environmental attributes that comprise their everyday school environment contribute to their overall psychological, physiological and social health. They also reflected that they are agents of their own health, by describing how their personal behaviors and actions, as well as policies an initiatives of their school that support those behaviors, contribute to their overall health. The themes that emerged tell a story about how the students at Bethke have a genuine desire for learning; they perform acts of stewardship that help the environment and the people in their school and community; they actively participate in recreation, physical activity and relaxation; they enjoy a sense of belonging to their school, community and world; and experience feelings of well-being. These environmental attributes and health-related themes collectively create a holistic description of health in a green school.

When we understand the perspective of children, we can use this information to create and modify the environments where they live, learn and play in a way that not only protects children, but actually facilitates their health.

REFERENCES

Burke, C. (2008). 'Play in focus': Chilren's visual voice in participative research. In P. Thomson, *Doing visual research with children and young people* (pp. 23-36). London: Routledge.

Clark, A. (2010). Young children as protagonists and the role of participatory, visual methods in engaging multiple perspectives. *American Journal of Community Psychology*, 45: 115-123.

Colantonio, A. (2008). *Measuring Social Sustainabilty: Best Practice from Urban Renewal in the EU.* Oxford: Oxford Brookes University.

Creswell, J. W. (2007). *Qualitative Inquiry & Research Design.* Thousand Oaks, CA: Sage.

Darbyshire, P., MacDougall, C., & Schiller, W. (2005). Multiple methods in qualitative research with children: more insight or just more? *Qualitative Research, 5*, 417-436.

Day, C. (2004). *Places of the Soul* (2nd ed.). Oxford: Elsevier.

Federal Facilities Council. (2001). *Learning From Our Buildings: A State-of-the-Practice Summary of Post-Occupancy Evaluation.* Washington, DC: National Academy Press.

Freeman, M., & Mathison, S. (2009). *Researching Children's Experiences.* New York: The Guilford Press.

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory.* Chicago: Adline.

Green Schools Alliance. (2009). *History*. Retrieved May 2011, from greenschoolsalliance.org: www.greenschoolsalliance.org

Hall, L., Jones, S., Hall, M., Richardson, J., & Hodgson, J. (2007). Inspiring Design: The Use of Photo Elicitation and Lomography in Gaining the Child's Perspective. *People and Computers*.

Iwarrson, S., & Stahl, A. (2003). Accessibility, Usability, and Universal Design: Positioning And Definition Of Concepts Describing Person-Environment Relationships. *Disability and Rehabilitation*, 57-66.

Johnson, K. (2008). Teaching children to use visual research methods. In P. Thomson (Ed.), *Doing visual research with children and young people.* New York: Routledge.

Kamaruzzaman, S. N., Zawawi, E. M., Ali, A. S., Che-Ani, A. I., & Egbu, C. O. (2011). The effect of indoor environmental quality on occupants' perception of performance: A case study of refurbished historic buildings in Malaysia. *Energy and Buildings, 43*, 407-413.

Karliner, J. (2011). *The Little Green Schoolhouse.* Retrieved March 1, 2011, from The Green Schools Initiative: www.greenschools.net

Karolides, A. (2011). Green Building Approaches. In R. Means, *Green Building Project Planning & Cost Estimating* (3rd ed.). Hoboken, New Jersey: John Wiley & Sons, Inc.

Kellert, S. R. (2005). Designing Healthy Schools. *Independent School*, 58-61.

Ketterle, J. (2011). *Green Schools For Better Education.* Retrieved May 2011, from USGBC: http://www.usgbc.org/News/USGBCInTheNewsDetails.aspx?ID+2987

Khetani, M. A., Bedell, G. M., Coster, W. J., Cousins, M., & Law, M. ((in press)). Physical, social and attitudinal environment. In A. Majnemer (Ed.), *Clinical and research measures for children with developmental disabilities: Framed by the ICF-CY.* London: Mac Keith Press.

King, N. (2004). Using templates in thematic analysis of text. In C. Cassell, & G. Symon, *Essential Guide to Qualitative Methods in Organizational Research.* London: Sage.

Kopec, D. (2006). *Environmental Psychology for Design.* New York: Fairchild Publications, Inc.

Lancy, D. F. (2001). *Studying Children and Schools: Qualitative Research Traditions.* Prospect Heights, IL: Waveland Press, Inc.

LPA, Inc. (2009). *Green School Primer: Lessons in Sustainability.* Australia: The Images Publishing Group Pty Ltd.

Marley, J., Nobe, M. E., Clevenger, C. M. (2012). Utilization of Post-Occupancy Evaluations in LEED Certified K-12 Schools. *Unpublished manuscript*. Department of Construction Management, Colorado State University, Fort Collins, Colorado.

Meir, I. A., Garb, Y., Jiao, D., & Cicelsky, A. (2009). Post-Occupancy Evaluation: An Inevitable Step Toward Sustainability. *Advances in Building Energy Research, 3*, 189-220.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis* (2nd ed.). Thousand Oaks, CA: Sage.

Olson, S. L., & Kellum, S. (2003). *The Impact of Sustainable Buildings on Educational Acheivements in K-12 Schools*. Madison, Wisconsin: Leonardo Academy, Inc.

Pivik, J. R. (2010). The perspective of children and youth: How different stakeholders identify architectural barriers for inclusion in schools. *Journal of Environmental Psychology*, 1-8.

Poudre School District. (2010). *Bethke Elementary School*. Retrieved January 2012, from www.psdschools.org: http://www.psdschools.org/school/bethke-elementary-school.

Poudre School District. (2010). *www.psdschools.org*. Retrieved April 2012, from http://www.psdschools.org/about-us/district-operations/sustainability/health-wellness.

Preiser, W. F. (2001). The Evolution of Post-Occupancy Evaluation: Toward Building Performance and Universal Design Evaluation. In F. F. Council, *Learning From Our Buildings A State-of-the Practice Summary of Post-Occupancy Evaluation*. Washington, DC: National Academy Press.

Preiser, W. F., & Smith, K. H. (2011). *Universal Design Handbook*. New York: McGraw-Hill.

RB+B Architects. (2011). *www.rbbarchitects.com*. Retrieved April 2012, from http://www.rbbarchitects.com/projects/project.aspx?ProjectID=25

Sanoff, H. (2000). *Community Participation Methods in Design and Planning*. New York: John Wiley & Sons, Inc.

Schweitzer, M., Gilpin, L., & Frampton, S. (2004). Healing spaces: Elements of environmental design that make an impact on health. *The Journal of Alternative and Complimentary Medicine, 10*, 71-83.

Spradley, J. P. (1979). *The ethnographic interview.* Fort Worth, TX: Holt, Rinehart, and Winston, Inc.

Suresh, M., Smith, D., & Franz, J. (2006). Person environment relationships to health and wellbeing: An integrated approach. *Interior Design/Interior Architecture Educators Association,* 87-102.

Tanner, C. K. (2000). The influence of school architecture on academic acheivement. *Journal of Educational Administration*, 309-330.

Thompson, S., Whitehead, A., & Capon, A. (2010). The healthy built environments program: A joint initiative of the NSW Department of Health and the Unviersity of NSW. *Public Health Bulletin, 21 (5-6)*, 134-138.

Thomson, P. (2008). *Doing Visual Research With Children And Young People.* New York: Routledge.

U.S. Department of Energy. (2003). *Rebuild America's Energy Smart Schools.* Retrieved May 2011, from Energy Smart Schools: http://www.energysmartschools.gov/energysmartschool/index.html

U.S. Green Building Council. (2011, May 13). *USGBC Trademark Policy.* Retrieved August 30, 2011, from USGBC: http://www.usgbc.org/ShowFile.aspx?DocumentID=3885

Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science, 224*, 420-421.

Ulrich, R. S. (1991). Effects of interior design on wellness: Theory and recent scientific research. *Journal of Healthcare Interior Design*, 97-109.

Wang, C., & Burris, M. A. (1997). Photovoice: Concept, Methodology, and Use for Participatory Needs Assessment. *Health Education & Behavior*, 369-387.

Wang, C., Ling, Y. Y., & Ling, F. M. (1996). Photovoice as a tool for participatory evaluation: The community's view of process and impact. *Journal of Contemporary Health, 4*, 47-49.

Wendt, A. (2009, September 25). Building for people: Integrating social justice into green design. *Environmental Building News*.

World Health Organization. (2001). International Classification Of Functioning, Disability and Health (ICF). Geneva: World Health Organization.

World Health Organization. (2007). *ICF-CY, International Classification of Functioning, Disability, and Health: Children & Youth Version.* Geneva: World Health Organization.

APPENDICES

Appendix A: IRB Notice of Approval

Appendix B: Poudre School District Approval to Conduct Research

Appendix C: Letter to Parents/Guardians

Appendix D: Consent Form

Appendix E: Assent Form

Appendix F: Focus Group Questions, Responses and Open Codes

Appendix G: Conceptually Clustered Matrix

Appendix H: Thematic Conceptual Matrix

Appendix I: Data Set from Digital Photostory3 Slides

Appendix A: IRB Notice of Approval

Colorado
State
University
Knowledge to Go Places

Research Integrity & Compliance Review Office
Office of the Vice President for Research
321 General Services Building - Campus Delivery 2011 Fort Collins,
CO
TEL: (970) 491-1553
FAX: (970) 491-2293

NOTICE OF APPROVAL FOR HUMAN RESEARCH

DATE:	February 02, 2012
TO:	Nobe, Mary, 1584 Cnstr Mgmt
	Marley, Jenifer, 1584 Cnstr Mgmt, Khattab, Mostafa, 1584 Cnstr Mgmt
FROM:	Barker, Janell, , CSU IRB 2
PROTOCOL TITLE:	Photovoice for Post-Occupancy Evaluation: Students Explore Health in a Sustainable School
FUNDING SOURCE:	NONE
PROTOCOL NUMBER:	11-2960H
APPROVAL PERIOD:	Approval Date: February 01, 2012 · Expiration Date: November 05, 2012

The CSU Institutional Review Board (IRB) for the protection of human subjects has reviewed the protocol entitled: Photovoice for Post-Occupancy Evaluation: Students Explore Health in a Sustainable School. The project has been approved for the procedures and subjects described in the protocol. This protocol must be reviewed for renewal on a yearly basis for as long as the research remains active. Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.

If approval did not accompany a proposal when it was submitted to a sponsor, it is the PI's responsibility to provide the sponsor with the approval notice.

This approval is issued under Colorado State University's Federal Wide Assurance 00000647 with the Office for Human Research Protections (OHRP). If you have any questions regarding your obligations under CSU's Assurance, please do not hesitate to contact us.

Please direct any questions about the IRB's actions on this project to:

Janell Barker, Senior IRB Coordinator - (970) 491-1655 Janell.Barker@Colostate.edu
Evelyn Swiss, IRB Coordinator - (970) 491-1381 Evelyn.Swiss@Colostate.edu

Barker, Janell

Barker, Janell

Includes:

Amendment is approved to recruit 6 student participants from Bethke Elementary School with the approved recruitment & consent/assent material for the parents and students. The above-referenced project was approved by the Institutional Review Board with the condition that the attached consent form is signed by the subjects and each subject is given a copy of the form. NO changes may be made to this document without first obtaining the approval of the CSU and PSD IRBs. Subjects under the age of 18 years old must obtain parental permission.

Approval Period:	February 01, 2012 through November 05, 2012
Review Type:	EXPEDITED
IRB Number:	00000202

Appendix B: Poudre School District Approval to Conduct Research

2/1/12

Dr. Nobe and Jenifer Marley,

Please consider this document as formal approval for you to conduct research within Poudre School District at Bethke Elementary based on your application materials originally received 1/20/12. Research project name: "Photovoice as a Post-Occupancy Evaluation Strategy: Exploring Health in a Sustainable Built Environment."

  * Date of project: Between January 2012 and August 2012 (If additional time is needed to complete the study, please notify me via email).

  * I would like to add two conditions: 1) It is requested that the researcher provide PSD an electronic copy of the project summary at the end of the project, and 2) if you decide to submit an article for publication, please provide an electronic version of the article to PSD when completed.

  * Priority consideration for future research partnerships with PSD will be given to individual researchers that have a demonstrated track record of submitting final reports for PSD consideration.

  * Please feel free to use this email in your correspondent with PSD schools and personnel regarding this research project.

Thank you for considering Poudre School District as a research partner. Please feel free to contact me if you have any questions, and I look forward to reading your findings.

Dwayne Schmitz

Dwayne Schmitz, Ph.D.
Director of Research and Evaluation
Poudre School District
(970) 490-3693
dschmitz@psdschools.org

2407 LaPorte Avenue · Fort Collins, CO 80521-2297 · (970) 482-7420

Appendix C: Letter to Parents/Guardians

Dear Parent/Guardian,

I am inviting your child to participate in a research project about green schools at Colorado State University.   This letter provides details you may want to know. Please review it completely. This is an exciting chance for your child to learn how to use digital photography and story-telling software as a research tool. By participating in this project, your child will learn about academic research and more about their green school!

My name is Jenifer Marley. I am a graduate student at Colorado State University. I am seeking a master's degree in Construction Management with an emphasis in Sustainable Building. I earned my bachelor's degree in Occupational Therapy from Indiana University. Early in my career, I worked in schools with all ages of students from pre-school through high school as an occupational therapist. I have three children of my own. I am passionate about how buildings affect health, especially for children.

If you agree to allow your child to participate, I plan to work with him or her on a project using a research method called photovoice. I will ask your child to take photographs of their green school building and then create digital stories about their photos. This is a way for them to share their ideas about the building. My goal is to learn and raise awareness about how green schools encourage children to be healthy.

I selected Bethke Elementary School for this project because it has shown a strong commitment to teaching 21st Century skills by integrating technology into instruction, providing enrichment through the arts, and teaching about sustainability and conservation. This aligns well with this research project, which also includes technology, art and sustainability themes. The study will raise awareness about health in green schools for future building projects, making them healthier places for children to learn and grow.

The project will take place during normal school hours beginning in March. Enclosed is a consent form that is required if you wish for your child to participate in the research project. There are two copies. One is for you to keep for your records. **Please return one signed copy of the consent form to your child's teacher before March 8th.** Also enclosed is a copy of a letter I have written to your child. This is a copy for you to keep. I will have them sign a copy of this letter on the first day of the project.

If you have any questions, please do not hesitate to contact me for more information. I am looking forward to working with your child during this exciting project!

Sincerely,

Jenifer Marley

Jenifer.Marley@colostate.edu
970-689-3451

Appendix D: Consent Form

Consent to Participate in a Research Study
Colorado State University

TITLE OF STUDY: *Photovoice for Post Occupancy Evaluation: Students Explore Health in a Sustainable School*

PRINCIPAL INVESTIGATOR: *MaryEllen C. Nobe, Ph. D., Colorado State University, Department of Construction Management,1584 Campus Mail, (970) 491-5215, Mary.Nobe@colostate.edu*

CO-PRINCIPAL INVESTIGATOR: *Jenifer Marley, B.S., graduate student, Colorado State University, Department of Construction Management, (970) 689-3451, Jenifer.Marley@colostate.edu*

WHY IS MY CHILD BEING INVITED TO TAKE PART IN THIS RESEARCH? *Your child's teachers have invited your child to participate in an exciting research project. We are doing this project because we want to learn children's views about how their green school building encourages them to be healthy. By taking part, your child will make this study successful and possibly improve other schools in the future.*

WHO IS DOING THE STUDY? *My name is Jenifer Marley, and I am a graduate student in the Department of Construction Management at Colorado State University (CSU). A committee of faculty members at CSU is overseeing the project, including Dr. MaryEllen Nobe, Dr. Caroline Clevenger, and Dr. James Banning.*

WHAT IS THE PURPOSE OF THIS STUDY? *The purpose of the study is to learn how green school buildings encourage and promote health and well-being for children. I am hoping to learn about this from the students' point of view.*

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST? *The research project will take place at Bethke Elementary School. Your child will work on this research project during their regular school day. They may choose to work on it outside of school hours in the computer lab, but this will be optional. Participating or not participating in this research will have no effect on your child's grade.*

WHAT WILL MY CHILD BE ASKED TO DO? *During the research project:*

- *We will briefly talk about how to properly use cameras and photographs in research projects and why/how photography is a useful research tool.*
- *We will briefly learn the technical aspects of using a camera, how to maintain the equipment, and practice using digital story-telling software.*
- *As a group, we will discuss the theme of health and well-being in green schools. During this discussion, your child will have the option of sharing his or her ideas about health and well-being, but it is up to them if they want to share.*
- *The students will take photographs of the school building, including things about the building that they view as promoting health and well-being.*
- *Your child will work in a group to create digital stories about the photographs they have taken.*
- *As a group we will talk about the themes that they see in the photographs.*
- *As a group, we will talk about how green schools encourage health and well-being for children, and I will ask them for ideas about how to improve school buildings in the future.*

ARE THERE REASONS WHY MY CHILD SHOULD NOT TAKE PART IN THIS STUDY? *None, that we are aware.*

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS? *There are no known risks of participating in this research project. The Poudre School District and Bethke Elementary School have approved this project, and we*

Page **1** of **3** Participant's initials _____ Date _____

79

have followed the procedures for doing the study. It is not possible to identify all potential risks in research procedures, but I have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

ARE THERE ANY BENEFITS FROM TAKING PART IN THIS STUDY? *There may be no direct benefit to your child. However, your child may:*

- *Gain a sense of belonging and empowerment about their school, of which they are in integral part*
- *Develop skills in teamwork, communication, analysis and evaluation*
- *Learn more about using a digital camera and digital story-telling software*
- *Identify multiple attributes of the school environment that affect and promote health and well-being*
- *Learn the general purpose of research by participating in a real-world academic study*

DOES MY CHILD HAVE TO TAKE PART IN THE STUDY? *Your child's participation in this research is voluntary. If your child decides to participate in the study, you may withdraw your consent and they may stop participating at any time without penalty or loss of benefits to which they are otherwise entitled.*

WHAT WILL IT COST FOR MY CHILD TO PARTICIPATE? *There are no costs for students to participate in this study. I will provide all of the equipment, materials and supplies required, including the use of digital cameras. The school is providing the use of computers and the digital story-telling technology. Your child will be asked to return all equipment, materials and supplies at the conclusion of the project*

WHO WILL SEE THE INFORMATION THAT MY CHILD GIVES? *We will keep private all research records that identify your child, to the extent allowed by law.*

Your child's information will be combined with information from other children taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. Your child will not be identified in these written materials. The students will not be identified in the digital photographs or digital stories they create. We will publish the results of this study; however, we will keep your child's name and other identifying information private.

We will make every effort to prevent anyone who is not on the research team from knowing that your child gave us information, or what that information is. For example, I will keep your child's name separate from the research records and these two things will be stored in different places under lock and key.

CAN MY CHILD'S TAKING PART IN THE STUDY END EARLY? *If your child decides not to complete the research project, that is ok. I will encourage the children to complete it, so that we have the best study possible.*

WHAT IF I HAVE QUESTIONS? *Before you decide whether to accept this invitation for your child to take part in the research project, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator,* **Jenifer Marley at (970) 689-3451**. *If you have any questions about your rights as a volunteer in this research, contact Janell Barker, Human Research Administrator at 970-491-1655. We will give you a copy of this consent form to take with you.*

The CSU Institutional Review Board for the protection of human subjects in research on January 26, 2012 approved this consent form.

WHAT ELSE DO I NEED TO KNOW? *I will ask your child to sign an Assent Form before participating in the study. A copy of the assent form is available to you. To request an additional copy, please contact Jenifer Marley at (970) 689-3451.*

Page **2** of **3** Participant's initials _____ Date _____

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 3 pages.

REQUIRED PARENTAL SIGNATURE FOR MINOR CHILD TO PARTICIPATE IN THE STUDY

As parent or guardian I authorize _____ (print name) to become a participant for the described research. The nature and general purpose of the project have been satisfactorily explained to me by Jenifer Marley and I am satisfied that proper precautions will be observed.

_____
Minor's date of birth

_____
Parent/Guardian name (printed)

_____   _____
Parent/Guardian signature   Date

_____   _____
Signature of Researcher   Date

Page **3** of **3** Participant's initials _____ Date _____

Appendix E: Assent Form

Hi!

I am a graduate student at Colorado State University. I study "green" buildings by doing lots of research! My research is about how buildings, like your school, can help kids be healthier. I am doing research by using photography and digital stories to help me learn about buildings. This is called Photovoice. I am asking you if it is OK that I study with you during this research project. If you say it is OK, I'll ask you to do lots of fun activities with me and we will learn a little bit about cameras and how photographs help us to learn. Before we get started, I will explain more to you about the reason I am doing this research.

First, we will review how to properly use a digital camera for research. We will practice using technology to create digital stories. After that, I will ask you some questions about health and healthy things you might find in your school. We will discuss what things in your school you want to take photographs of. Then comes the fun part! You will get to take digital cameras around your school and take many, many pictures by yourself! I will develop the pictures. When we meet the next time, I will ask you to start grouping the photographs together by looking for common themes you can find in the photographs. You will be doing real research! Then, we will create a digital story as a group about your photographs. We will include your words and stories about the pictures. When we finish it, I will share your digital story with other researchers and people who are interested in healthy buildings. Finally, I will ask you more questions about how you think school buildings can be even healthier in the future. Your answers are not right or wrong. You just get to share your own ideas and creativity! I won't use your names, so no one will know whose ideas were yours.

You won't receive a grade or any extra credit for doing this research, and agreeing to be in this project cannot hurt you. But you can learn a lot by doing it too. You may feel good about sharing your ideas about your school building. You will have a chance to use some really cool technology. You will learn more about your green school building. You will learn about real-life research and have the chance to be a researcher in an actual study! You don't have to do it. If you do say "yes" now but later change your mind, you can stop being in the research any time by just telling me.

I will ask your parents if it is OK that you do this, too. If you want to be in this research, sign your name and write today's date on the line below.

X _____

Student/Date

X _____

Researcher/Date

Appendix F: Focus Group Questions, Responses, and Open Codes
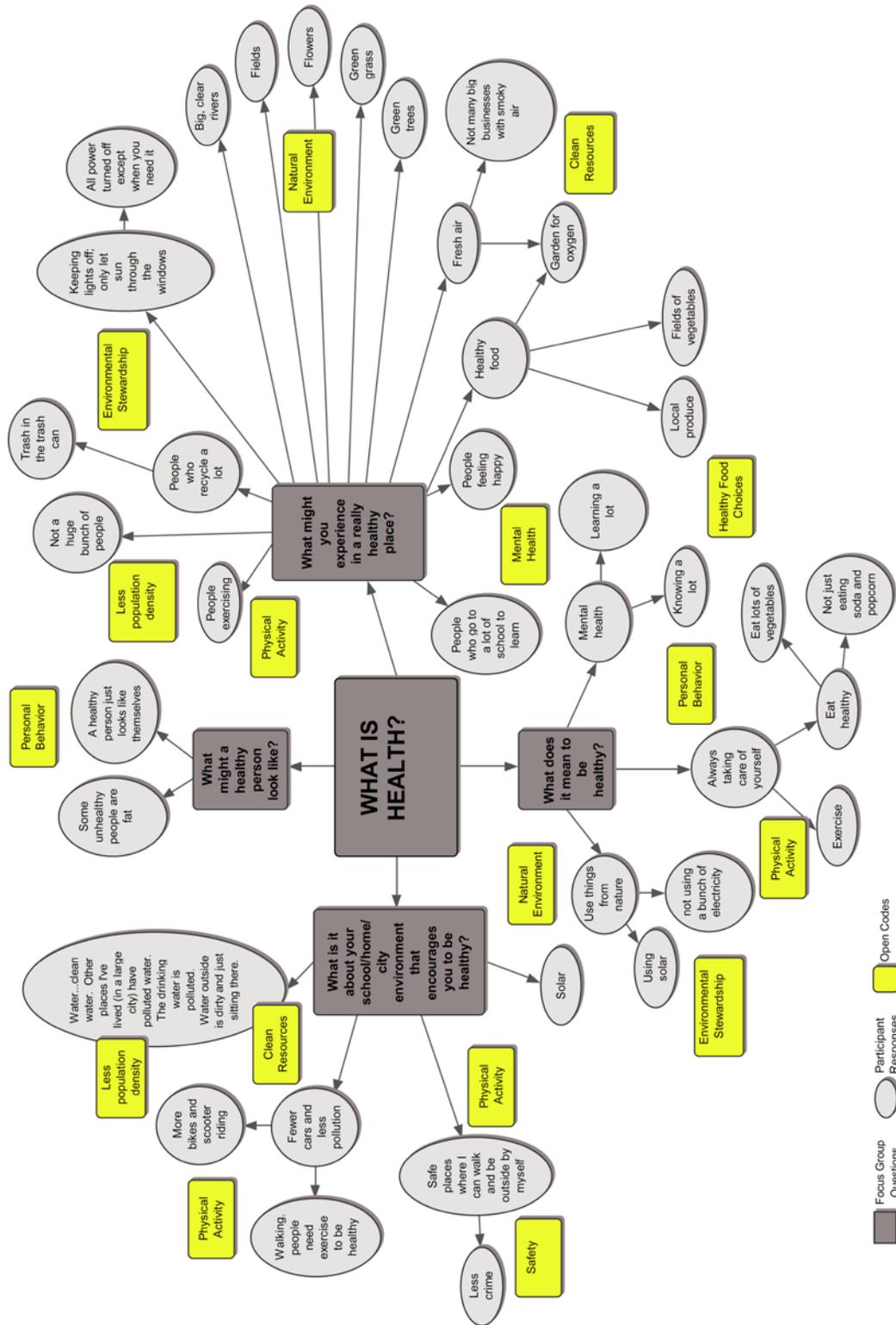
Appendix G: Conceptually Clustered Matrix

Relevant Meaning Segments - from data set < < << (context, or story, about each photograph)	Code - from template (assigned to cluster of Meaning Segments, organized by domain)	Photograph of Setting <<<< (attributes of the physical environment)	Code - from template (assigned to Photographs of Setting)
people with broken legs, crutches, wheelchairs can move around; all people people who use wheelchairs don't have to struggle easier to open…won't lose people in a fire the fire alarm is next to the door, it's right there allow people to work with natural light railing keeps young kids safe younger kids need this	BX including others PSYCH NEED empowerment feeling safe stewardship/concern for others PHYSIO NEED easy to use	Elevator Entry Stairs	1. Building Circulation
it was fun we had physical activities to do school is about learning; but…in a fun way we raised money; we help our community open space all around neighborhood close by kids can ride their bikes use less cars less stress about getting to school	BX conserving/saving moving/exercising relaxing/resting sharing PSYCH NEED enjoyment/fun friendliness/community knowledge/learning stewardship/concern for others stewardship/concern for environment PHYSIO NEED calm/relaxed SOC NEED sense of community	Literacy Event Open Space	2. Community Connectivity
air isn't smoky/no pollution like being able to see everywhere we leave the windows open; we like windows open big windows very few lights it's easier to read with natural light there are a lot of trees fresh air; breath easier beautiful; we like pretty things makes us feel happy makes us feel like we have more things we feel proud when our school looks nice sit and enjoy fresh air working outside; responsible recess; outdoor classroom trees; fresh air; mountain views beautiful and pretty we go to the mountains to get away from everyday life my favorite thing to do ever is relax we have stress, and this gives us a break mountains are majestic safe we are lucky snow rises and evaporates; we get rain; keeps things moist and green	BX learning/reading/working relaxing/resting PSYCH NEEDS beauty enjoyment/fun feeling safe gratitude happiness/joy pride PHYSIO NEEDS calm/relaxed physically active SOC NEEDS sense of community	Fresh Air Natural Lighting Landscaping Vegetation Recreation	3. Connection to Nature
pretty practical, useful, easy happy mood share our work/display our artwork	BX sharing ORG Bethke PSYCH NEEDS beauty creativity happiness/joy pride	Art Wall	4. Creative Spaces

Relevant Meaning Segments - from data set <<< (context, or story, about each photograph)	Code - from template (assigned to cluster of Meaning Segments, organized by domain)	Photograph of Setting <<< (attributes of the physical environment)	Code - from template (assigned to Photographs of Setting)
our school doesn't just throw trash around you don't have to go in to find a trash can don't have to touch the sink; fewer germs I am encouraged to wash there is a lot of space; everyone can get to it come in from playground to cafeteria and use this to clean our hands keeps germs from spreading clean water conserves water don't have to touch it prevents germs from spreading	BX conserving/saving PSCH NEEDS pride stewardship/concern for environment PHYSIO NEEDS clean easy to use	Garbage Hand washing Sanitizers Sensors	5. Equipment for Cleanliness
help us recycle we use these a whole bunch it uses less water we can change the temperature, but we have to think about it we need to be comfortable; we can focus on learning we don't waste electricity not too cold or too hot not too stressed	BX conservation/saving PSYCH NEEDS pride stewardship/concern for environment PHYSIO NEEDS calm/relaxed clean comfortable easy to use	Recycle Container Saving Water Temperature/Thermostat	6. Equipment for Conservation
always have fresh air at Bethke it could put out a fire if you're wondering…this tells us how things work circulates air helps us learn about our building doesn't just give everyone cold water	BX learning/reading/working ORG Bethke PSYCH NEEDS empowerment feeling safe stewardship/concern for others PHYSIO NEEDS comfortable	Exposed Duct Mechanical Teaching Wall Ventilation Water Pipes	7. Exposed Systems
flexible space/serve many purposes space we share we have different options for seating; we can be comfortable; we learn better when we're comfortable makes me think of mental health because of reading kids feel joy when they read	BX sharing learning/reading/working PSYCH NEEDS enjoyment/fun friendliness/community happiness/joy knowledge/learning PHYSIO NEEDS comfortable	Flexible Classroom Library	8. Learning Spaces
attracts sunlight, natural light tinted windows control glare which could hurt us allows light to come in our classrooms are white; white is calming our lights are off most of the time lets the sunshine in it saves money we don't use a lot of electricity; the switches are off use natural lights instead	BX conserving/saving PSYCH NEEDS feeling safe stewardship/concern for environment PHYSIO NEEDS calm/relaxed	Solatube Gym Windows Lighting Sunlight Switches	9. Lighting

Relevant Meaning Segments - from data set < < << (context, or story, about each photograph)	Code - from template (assigned to cluster of Meaning Segments, organized by domain)	Photograph of Setting <<<< (attributes of the physical environment)	Code - from template (assigned to Photographs of Setting)
Bethke doesn't just buy new things we reuse things light-colored walls give us more light light walls help us focus, isn't distracting white boards prevent odor and dust	BX conserving/saving learning/reading/working ORG Bethke PHYCH NEEDS pride stewardship/concern for environment PHSYIO NEEDS clean comfortable	Recycled Material Wall Tinting White Board	10. Materials
it's fun Bethke won't have kids staying inside at recess cars weaken the ozone layer Bethke encourages kids to ride their bikes this is a place where I was running Everyday at Bethke, students are doing something active on the playground our students are active no black top on the playground…safer and cooler encourages physical health kids want to play it's fun seats are clean encourage physical activity this helps reduce stress kids can play with these kids won't run in the street shows us the school boundaries I feel safe this look friendlier I like how it has open views; you can see outside feels like I'm outside, but I'm in school open fence looks friendlier physical activity perfect size for anyone anyone could play on this it's colorful; black would get hotter seems safer feel welcome to play	BX conserving/saving including others moving/exercising playing relaxing/resting ORG Bethke PHYCH NEEDS enjoyment/fun feeling safe friendliness/community stewardship/concern for environment PHYSIO NEEDS calm/relaxed clean comfortable easy to use physically active SOC NEEDS sense of community	Activity Bars Bike Racks Movement Mulch Playground Swings Stuffed Animals Fence Playground (2)	11. Places and equipment for physical activity and play

Relevant Meaning Segments - from data set <<< (context, or story, about each photograph)	Code - from template (assigned to cluster of Meaning Segments, organized by domain)	Photograph of Setting <<< (attributes of the physical environment)	Code - from template (assigned to Photographs of Setting)
signs remind us (of having good traits) Bethke has helpful, kind students; we have good traits care for our school we know what the expectations are it reminds me to try my hardest good to know you're in a free country tells us a tornado is coming; show which way the wind is blowing map of Bethke; for safety shows fire escapes, can see where to go kids don't have to worry keeps us safe gives our school purpose shows we are respectful, kind and show integrity signs encourage kids to read reading is good for your mind get a good job; can get a job we enjoy get into a better college and enhance our education this reminds us to recycle our school likes to recycle this is a big part of Bethke our building is made of recycled material some schools don't have recycling, this surprises us older schools don't have this; Bethke is new brail helps with safety this shows we care about students who are blind helps new students and visitors know where to go include everyone it's quiet; we need quiet spaces to learn this is how we get information we can reach each other it saves time and money	BX conservation/saving including others learning/reading/working ORG Bethke PHYCH NEEDS empowerment enjoyment/fun feeling safe friendliness/community gratitude knowledge/learning pride stewardship/concern for environment stewardship/concern for others PHYSIO NEED calm/relaxed clean comfortable easy to use SOC NEED sense of community	Character Traits Expectation Matrix Flag Map Pest Control Purpose Reading Sign Recycle Signage Clock Communication Signage	12. Signage/Informational Artifacts
not using energy opportunities that other kids don't have everyone can work together we work on computers kids have a lot of computers Bethke was smart to buy more computers gives us security; keeps us safe	BX conserving/saving learning/reading/working sharing ORG Bethke PSYCH NEEDS feeling safe gratitude knowledge/learning pride	Tech Lab Scanner	13. Technology
you don't have to bring a water bottle easy to use keeps us hydrated so we can think better there is size for everyone, of any size	BX including others learning/reading/working PSYCH NEEDS stewardship/concern for others PHYSIO NEEDS easy to use	Drinking Water Water Fountains	14. Water Sources

90

Appendix H: Thematic Conceptual Matrix

Setting: attributes of the physical environment: built & natural (ICF-CY e210-e260) products, equipment, and technology (ICF-CY e110-e165)	Behavior: kinds of behavior and action	Institutional initiatives and policies: things that make this school unique (ICF-CY e510-e595)	Psychological Needs: cultural values and attitudes (ICF-CY e410-e465)	Physiological Needs: desired physical experiences	Social Needs: opportunities for social relationships (ICF-CY e310-e360)
1) Photographs of Building Circulation (Elevator, Entry, Stairs) 1. Building Circulation	2. including others		3. empowerment 5. feeling safe 11. stewardship/concern for others	4. easy to use	
2) Photographs of Community Connectivity (Literacy Event, Open Space) 2. Community Connectivity	1. conserving/saving 4. moving/exercising 6. relaxing/resting 7. sharing		4. enjoyment/fun 6. friendliness/community 9. knowledge/learning 11. stewardship/concern for others 12. stewardship/concern for environment	1. calm/relaxed	1. sense of community
3) Photographs of Connection to Nature (Fresh Air, Natural Lighting, Landscaping, Vegetation, Recreation) 3. Connection to Nature	3. learning/reading/working 6. relaxing/resting		1. beauty 4. enjoyment/fun 5. feeling safe 7. gratitude 8. happiness/joy 10. pride	1. calm/relaxed 5. physically active	1. sense of community
4) Photographs of Creative Spaces (Art Wall) 4. Creative Spaces	7. sharing	1. Bethke	1. beauty 2. creativity 8. happiness/joy 10. pride		
5) Photographs of Equipment for Cleanliness (Garbage, Hand Washing, Sanitizers, Sensors) 5. Equipment for Cleanliness	1. conserving/saving		10. pride 12. stewardship/concern for environment	2. clean 4. easy to use	
6) Photographs of Equipment for Conservation (Recycle Container, Saving Water, Temperature, Thermostat) 6. Equipment for Conservation	1. conserving/saving		10. pride 12. stewardship/concern for environment	1. calm/relaxed 2. clean 3. comfortable 4. easy to use	
7) Photographs of Exposed Systems (Exposed Duct, Mechanical, Teaching Wall, Ventilation, Water Pipes) 7. Exposed Systems	3. learning/reading/working	1. Bethke	3. empowerment 5. feeling safe 11. stewardship/concern for others	3. comfortable	
8) Photographs of Learning Spaces (Flexible Classroom, Library) 8. Learning Spaces	7. sharing 3. learning/reading/working	1. Bethke	4. enjoyment/fun 6. friendliness/community 8. happiness/joy 9. knowledge/learning	3. comfortable	
9) Photographs of Lighting (Solatube, Gym Windows, Lighting, Sunlight, Switches) 9. Lighting	1. conserving/saving	1. Bethke	5. feeling safe 12. stewardship/concern for environment	1. calm/relaxed	
10) Photographs of Materials (Recycled Material, Wall Tinting, White Board) 10. Materials	1. conserving/saving 3. learning/reading/working	1. Bethke	10. pride 12. stewardship/concern for environment	2. clean 3. comfortable	
11) Photographs of Places and equipment for physical activity and play (Activity Bars, Bike Racks, Movement, Mulch, Playground, Swings, Stuffed Animals, Fence, Playground (2)) 11. Places and equipment for physical activity and play	1. conserving/saving 2. including others 4. moving/exercising 5. playing 6. relaxing/resting		4. enjoyment/fun 5. feeling safe 6. friendliness/community 12. stewardship/concern for environment	1. calm/relaxed 2. clean 3. comfortable 4. easy to use 5. physically active	1. sense of community

Setting: attributes of the physical environment: built & natural (ICF-CY e210-e260) products, equipment, and technology (ICF-CY e110-e165)	Behavior: kinds of behavior and action	Institutional initiatives and policies: things that make this school unique (ICF-CY e510-e595)	Psychological Needs: cultural values and attitudes (ICF-CY e410-e465)	Physiological Needs: desired physical experiences	Social Needs: opportunities for social relationships (ICF-CY e310-e360)
12) Photographs of Signage/Informational Artifacts (Character Traits, Expectation Matrix, Flag, Map, Pest Control, Purpose, Reading Sign, Recycle Signage, Clock, Communication, Signage) 12. Signage/Informational Artifacts	1. conserving/saving 2. including others 3. learning/reading/working	1. Bethke	3. empowerment 4. enjoyment/fun 5. feeling safe 6. friendliness/community 7. gratitude 9. knowledge/learning 10. pride 12. stewardship/concern for environment 11. stewardship/concern for others	1. calm/relaxed 2. clean 3. comfortable 4. easy to use	1. sense of community
13) Photographs of Technology (Tech Lab, Scanner) 13. Technology	1. conserving/saving 3. learning/reading/working 7. sharing	1. Bethke	5. feeling safe 7. gratitude 9. knowledge/learning 10. pride		
14) Photographs of Water Sources (Drinking Water, Water Fountains) 14. Water Sources	2. including others 3. learning/reading/working		11. stewardship/concern for others	4. easy to use	

Appendix I: Data Set from Digital Photostory3 Slides

Photovoice: Our story about health in a green school

Photovoice as a Participatory Post-Occupancy Evaluation Project

Bethke Elementary Environmental Club with Jenifer Marley
Colorado State University, Department of Construction Management

Spring 2012

About our Project

» Students in the Bethke Elementary Environmental Club contributed to this graduate-level research project at Colorado State University. As co-researchers, the students collected and analyzed photographic data. The images and words in this digital story are their own and show their perspective about how a green school is a healthy place for them to learn and grow.

What HEALTH means to us...

Health is when we live in a safe place, closely connected to nature, where we are encouraged to choose behaviors that help us physically and mentally.

"Health is Heaven" – metaphor written by a Bethke student

Learning

Learning is great and learning's our best fate

You learn so much your brain turns into a big bunch

It is fantastic that we recycle plastic

Poem written by students at Bethke
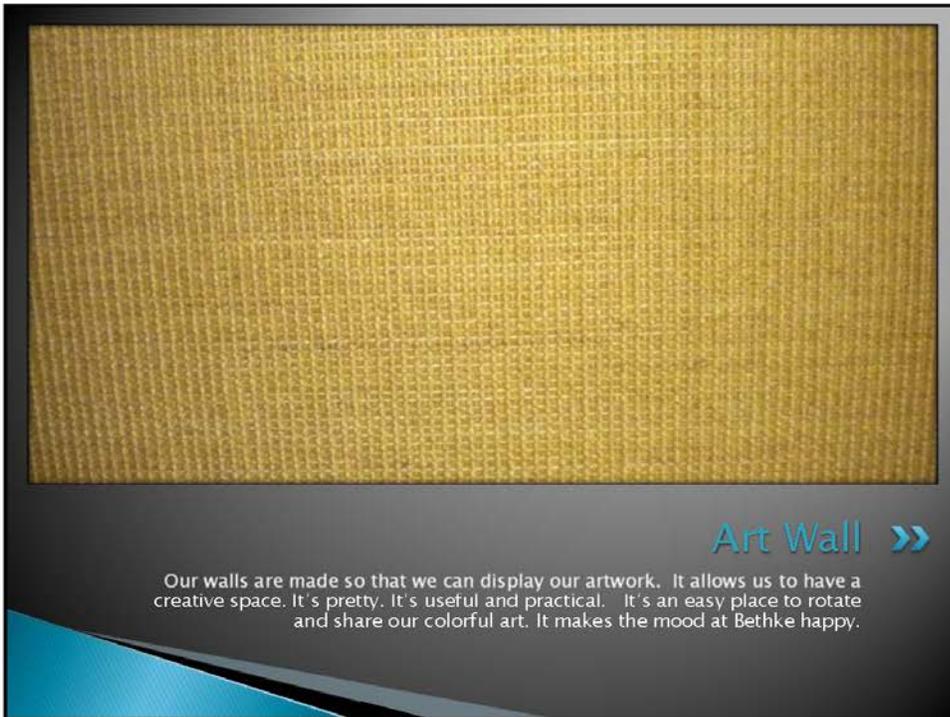
Art Wall »

Our walls are made so that we can display our artwork. It allows us to have a creative space. It's pretty. It's useful and practical. It's an easy place to rotate and share our colorful art. It makes the mood at Bethke happy.
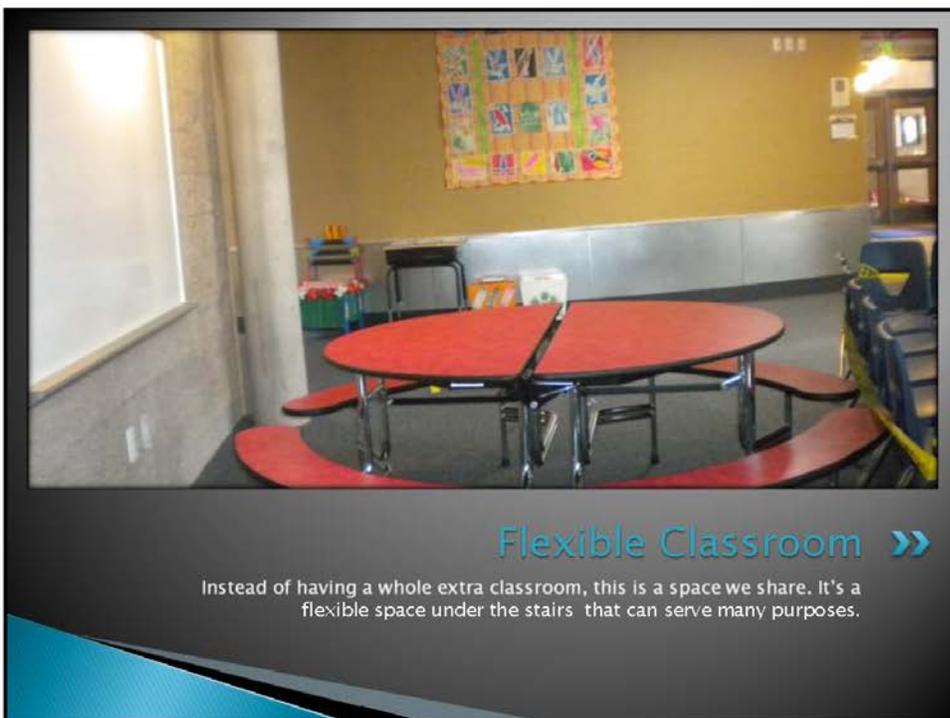
Flexible Classroom »

Instead of having a whole extra classroom, this is a space we share. It's a flexible space under the stairs that can serve many purposes.

Tech Lab »

This photo shows mental health because if you're doing research, you could work on computers. Everyone can work together. Computers here are for one class to use at a time. Not everyone uses it every day, so we're not using as much energy. We have a lot of computers, and Bethke was smart enough to buy more. Kids have lots of technology. We have opportunities that other kids don't.

Reading Sign »

This sign encourages kids to read more often. Reading is good for your mind so when you grow up you get a better job. When you think about this sign, kids are reminded that we can have a good job that we enjoy...or get into a better college and enhance our education.

Teaching Wall »

If you're a student, and you are wondering what is inside our walls, this tells us how things work in our building.

Water Pipes »

I think this shows that our school doesn't just give everyone cold water. This shows us what our heating system looks like. It helps us learn about our building.
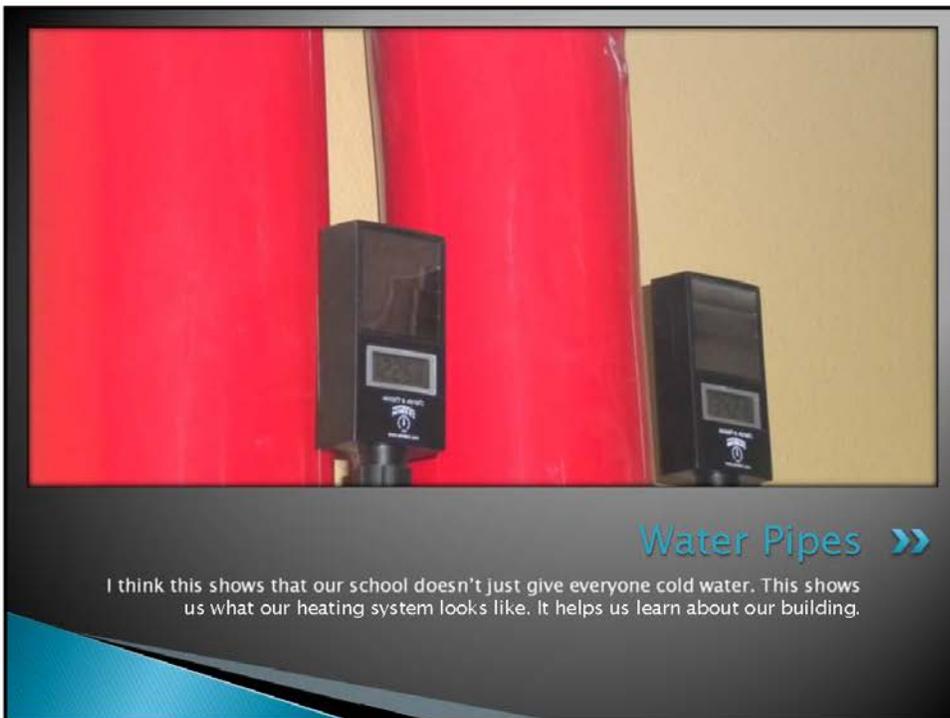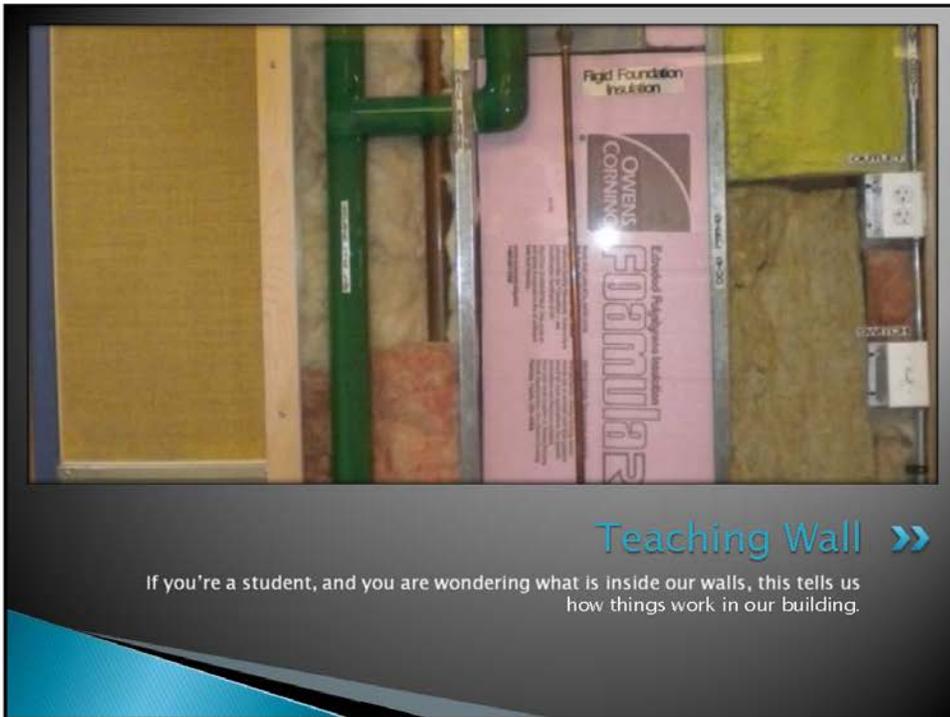
Library »

This is the area in our library for picture books. We have different options for seating so we can be comfortable. We don't have to be in only one place. We learn better when we're comfortable. This photo makes me think of mental health because of reading, and kids feel joy when they read.
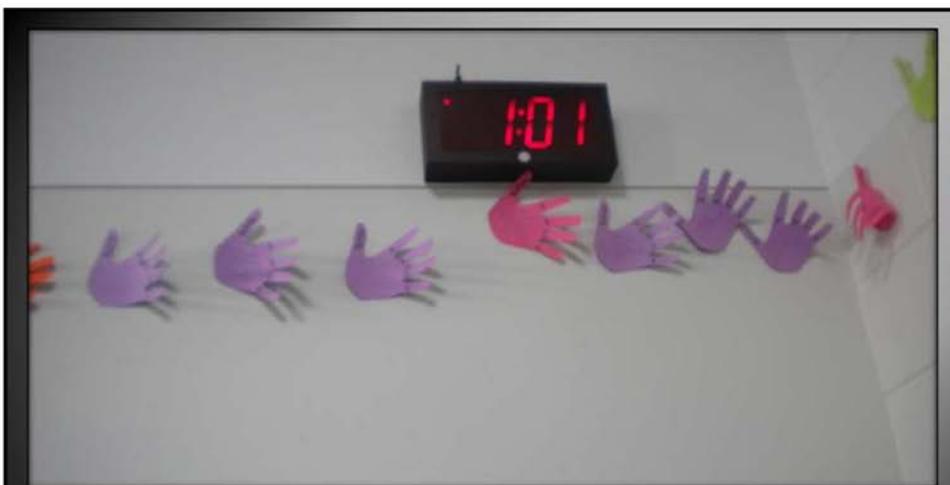
Clock »

Our clocks are digital so younger kids can read them. This helps include everyone, even those who can't read clocks with hands. This clock is quiet; there's no ticking. We need quiet spaces to learn.

Nature

Roses are red, violets are blue, nature is really good for you.

There are lots of trees up really high. I like to see them when I look at the sky.

The air is clean, the sky is blue. It makes me want to spend time with you.

Poem written by students at Bethke
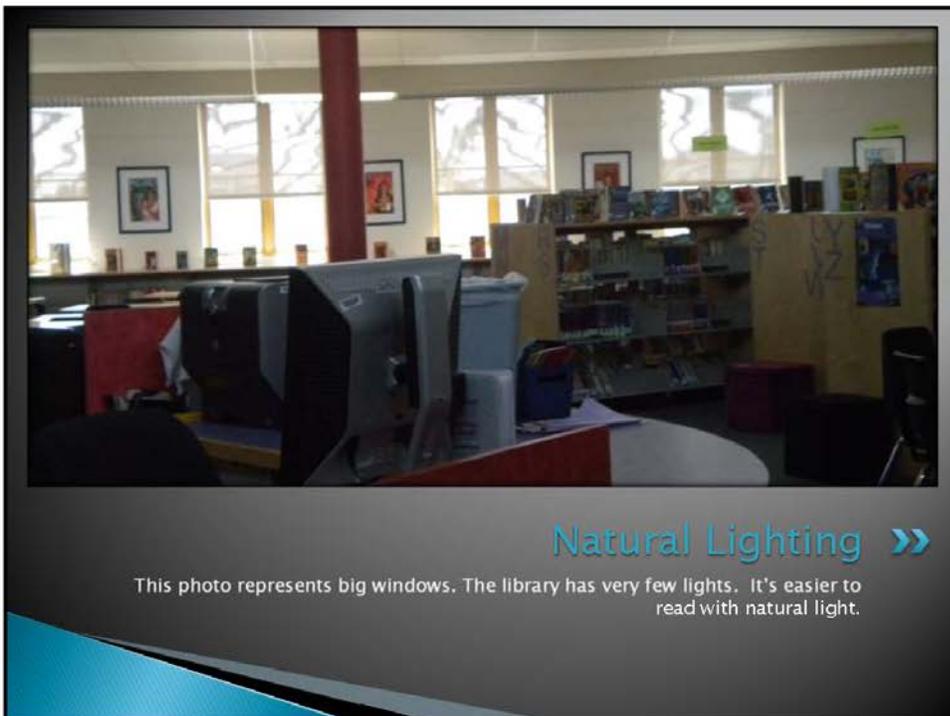
Natural Lighting »

This photo represents big windows. The library has very few lights. It's easier to read with natural light.

Sunlight »

This photo shows a Solatube from inside our school. It lets the sunshine in. It's much brighter than a normal light bulb. It's healthier for us to have natural light. It saves money.

Solatube »

This is a view outside our window. It shows the Solatube on the roof. The circle on top attracts sunlight. It's natural light.

Exposed Duct »

This photo shows air that goes through our system. We can always have fresh air at Bethke.
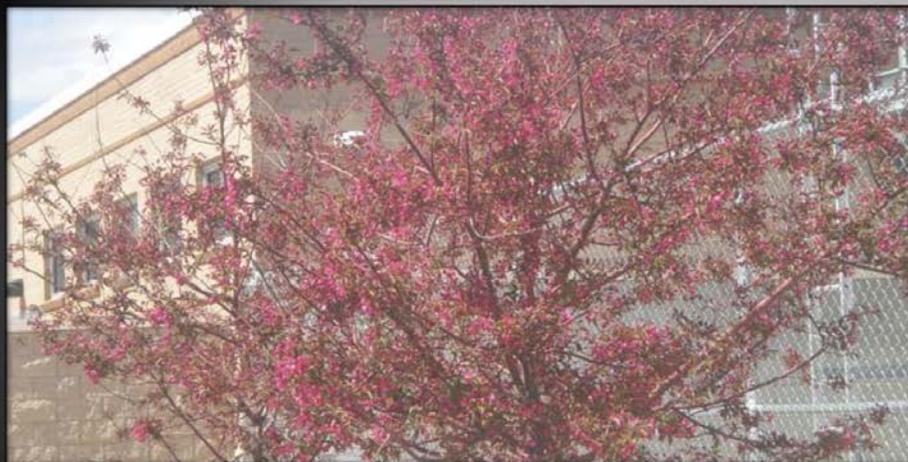
Landscaping »

There are lots of trees, to help us have fresh air. You can breathe easier. They are beautiful. We like to have pretty things around. It makes us feel happy. It can make us feel like we have more things. We feel proud when our school looks nice.

Fresh Air »

The air isn't smoky. Our air is fresh at school. We like being able to see everywhere. There's no pollution. We leave the windows open in our classrooms when we can. We like the windows open.

Vegetation »

Here, we can sit and enjoy fresh air while working outside. On Fridays, we have what we call responsible recess. Kids can finish their work here. We also have an outdoor classroom similar to this.

Recreation »

If there are trees, then there is fresh air. Trees clean the air. They are pretty. They give us oxygen. We have mountain views from our school. Mountains are beautiful and pretty to look at. Most of my family lives in another state, and they love going to the mountains. We go to the mountains to get away from everyday life. My favorite thing to do ever is to relax! We have stress, and this gives us a break. We can get away, and it's nice to go to new places. Also, mountains help block opposing winds. Mountains are majestic. Our state is safe. We are lucky. In the mountains, the snow rises and evaporates. Then, we get rain, and it keeps things moist and green.

White Board »

Usually schools would have chalk boards. We have white boards. This keeps kids from getting sick from the dust. Expo markers have low odor, which is healthier.

Wall Tinting »

This explains, or limits, where teachers put pictures on the walls. They allow things on the walls, but this reflects the light so we get more light. Also, darker colors absorb more light. We like the white walls, because it makes the room look nice. We have more light when we're working. We can focus more because it isn't distracting. To me, it's not like the playground where it's good to have bright colors.
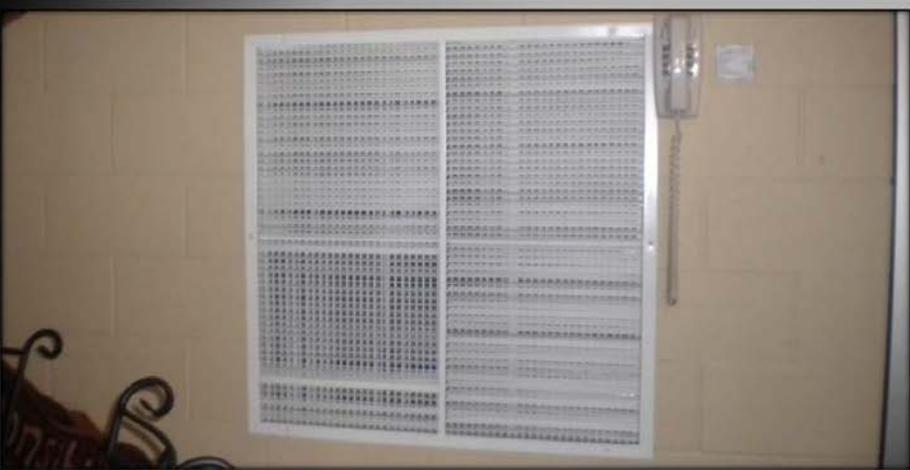
Ventilation »

This heats or cools an area. This one is close to the floor. It helps to circulate air. Hot air goes up the vent, and cool air comes down.

Gym Windows »

Some windows are tinted, such as on the south. This helps control glare, which could be dangerous, hurt, or distract us. The other window allows light to come in from the sky, but it's indirect.

Safety

"I go to school in a safe place where I can walk and be outside by myself." – Bethke student
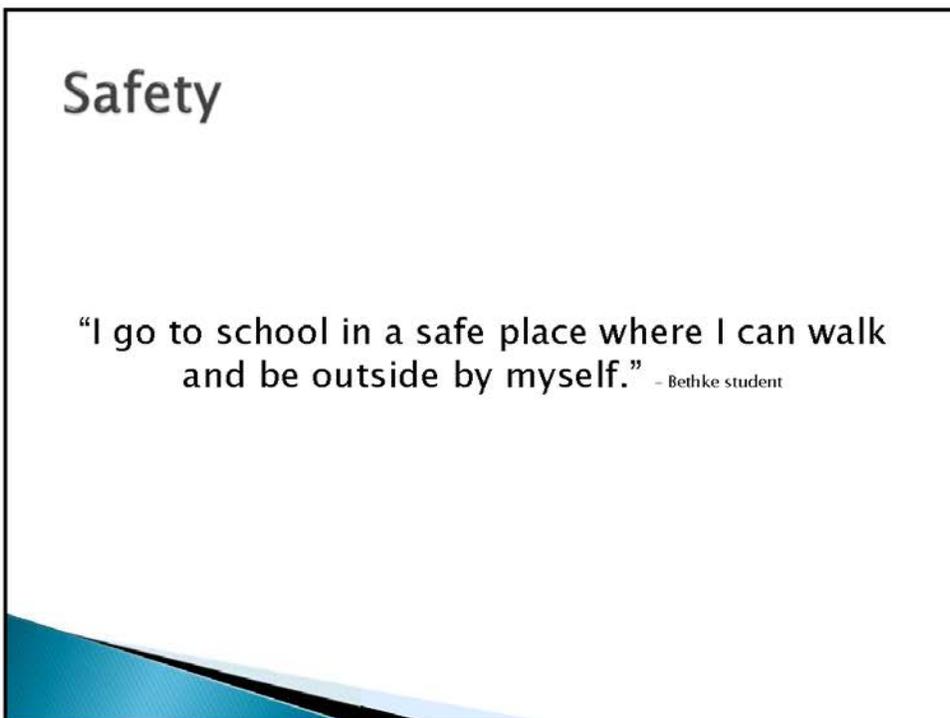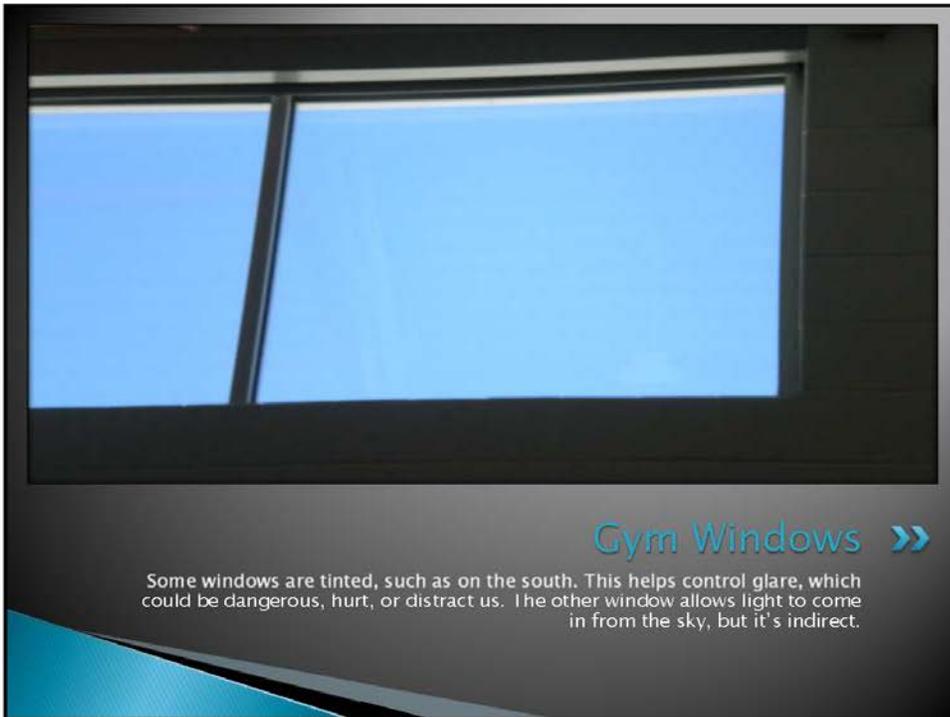
Mulch »

There's not black top on our playground. It's safer. And cooler.

Scanner »

This scans a teacher's card to give us security. Some rooms require teachers to scan their badge. It keeps us safe.

Elevator »

People with broken legs, crutches, or a wheelchair can move around the building using the elevator.

Hand Washing »

We have a lot of hand-washing stations. You don't have to touch the sink, so there are fewer germs. I am encouraged to wash my hands. There is a lot of space to wash. Everyone can get to it.

Mechanical »

This is our fire control system. It goes to the sprinklers throughout the building. It could put out a fire. The water would knock the fire down.

Flag »

It's good to know you're in a free country. It can also show which way the wind is blowing. We could have a tornado, and this tells us it's coming!

Stairs »

The holes in the stairs allow people to work under the area here with natural light. When you're on the stairs, if it were dark outside, you could see and not fall. The railing keeps you safe. Younger kids need this.

Map »

This photo shows a phone, a switch to control heating, and a map of Bethke. The map is for safety. It shows the best fire escapes, so if there's a fire, you can see where to go.

Fence »

The fence helps make sure kids don't run out and go in the street. It can tell which way the wind is blowing because of the curve. It shows us the school boundaries. I feel safe. A straight fence may be easier to climb than a curved fence. This looks friendlier. I like how this only has open views. You can see outside. It makes me feel like I'm outside, but I'm still in school.

Entry »

I would like to talk about this photo because the fire alarm is next to the door. When you have to set it off, you don't have to find the exit, because it's right there. I see the wheelchair sign. People who use wheelchairs don't have to struggle to open the door. It opens with one push so it's easier to open. When you open it, it closes slow. It opens out, so if there is an emergency you don't have to pull it open. If it pulled open, you'd have to step back and you'd lose people in the fire.

Pest Control »

Maybe it's a bee trap, but I think this is a wasp trap...so kids don't have to worry about getting stung. It attracts wasps or bees and they die in there. It controls the population of pests, and keeps us safe.

Communication »

This is how we communicate and get information. We can reach each other anywhere. It saves time. It also saves money.

Healthy Eating

By making wise choices in our eating,
we become geniuses.

~

Students become
as tall as a giraffe and
as healthy as an apple.

Poem written by the Bethke Elementary Environmental Club

GIRLS

Sanitizers ≫

When you come inside from the playground to the cafeteria, all kids are supposed to use this to clean our hands. It keeps germs from spreading.

Drinking Water »

You don't have to bring a water bottle to school. This keeps kids hydrated, so you can think better. They are in every classroom. Seeing this reminds us to stay hydrated. All you do is press a button, hold, drink. There's no knob. It helps younger kids and also me. It's easy to use.

Stewardship

We are healthy when we care for our environment and care for each other

– Definition used to explain "stewardship" during the research project

Recycle Container »

This photo shows that the recycling company knows exactly what to do to help us recycle. We use these a whole bunch to recycle.

Recycle Signage »

This sign reminds us to recycle. Recycle bins are different than trash cans. Our school likes to recycle. This is a big part of Bethke. Our building is made of recycled material. Some schools don't even have recycling. This surprises us. Older schools don't have this, but Bethke is new.

Garbage »

This photo is a smart genius. I would say this trash can speaks to me. It speaks to me that our school doesn't just throw trash around. If you're outside, you don't have to go in to find a trash can.
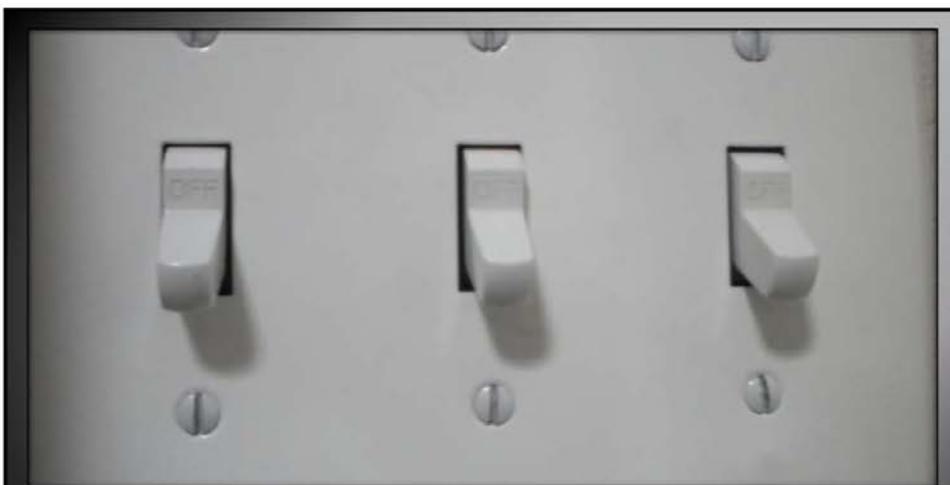
Switches »

In this photo, the switches are off.
We don't use a lot of electricity, but natural lights instead.

Recycled material »

This photo explains that Bethke doesn't just buy new things. We reuse things that other people don't need. I bet there's somebody's soda can in there!

Temperature »

The metal cover keeps kids from changing temperature, and it keeps the temperature the same. We don't waste electricity. We need to be comfortable because we can focus on learning. Not too cold or too hot, not stressed. We can change it if needed, but you have to think about it first. We can change the temperature, but the district can control it too.

Thermostat »

This is a digital thermostat, which is the type we have in our classrooms.

Saving Water »

Our saying is "If it's brown flush it down, if it's yellow push it up!"
When you push down it uses more water, and when you push it up, is uses less water.

Sensors »

This shows clean water...clear water. The sensor only allows water to come out for a few seconds. It conserves water. You don't have to touch it, so it helps prevent germs from spreading.

Lighting »

This photo is of a solar light. Tilting of the ceiling helps because the light reflects off the wall into parts of the room, like on the desks. Our classrooms are white. Colors distract kids. White is calming. Black absorbs light. White reflects the light. This photo also shows that our lights are off. Most of the time, our lights are off.
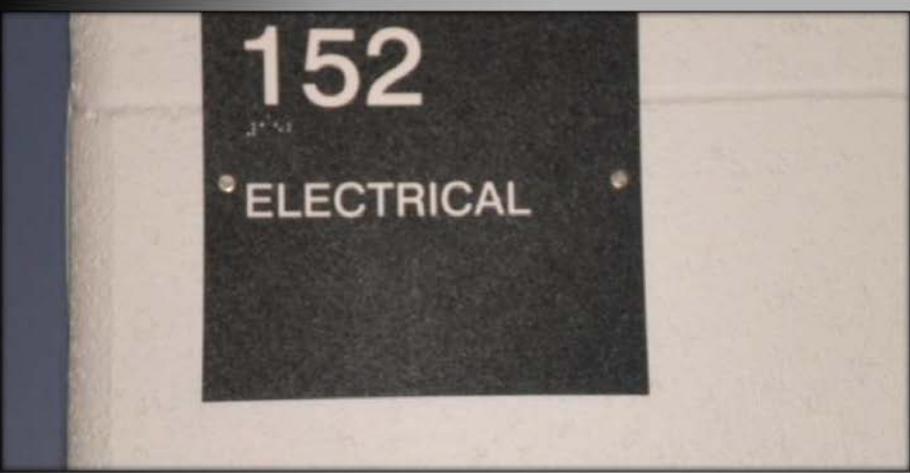
Signage »
Brail on the signage is important. It helps with safety. It helps because its good for students who are blind. This shows that we care about them. Signage helps new students and visitors know where to go.

Stuffed Animals »
Kids can play with these. Like if you're having a test, this helps reduce stress.

Open Space »

We have open space all around our school. There's a neighborhood close by so kids can ride bikes to school and use less cars. We have less stress about getting to school.

Purpose »

This gives our school purpose. It really shows that we are respectful, kind, and show a lot of integrity.

Literacy Event »

This was our school's carnival theme. It was fun, we had physical activities to do for fun. School is about learning, but our teacher's help us learn in a fun way. We raised money for respite care. We help our community.

Expectation Matrix »

This sign shows us how to care for our school. We know what the expectations are. It's laminated, so kids don't rip it up. It's above the sink, which is in the open and you see it right there. It reminds me to try my hardest.
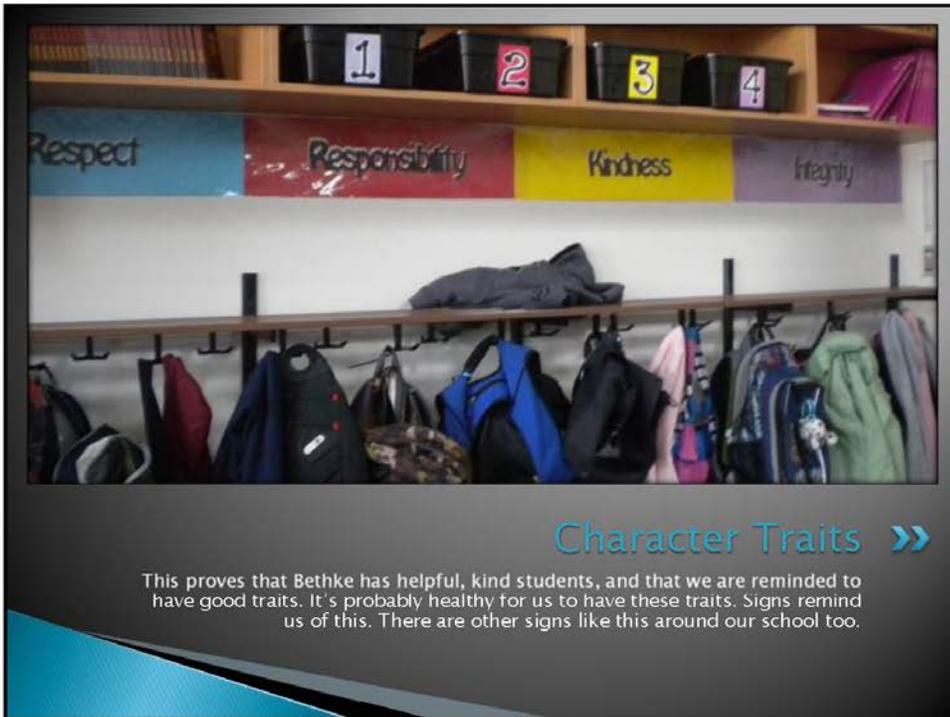
Character Traits »

This proves that Bethke has helpful, kind students, and that we are reminded to have good traits. It's probably healthy for us to have these traits. Signs remind us of this. There are other signs like this around our school too.

Water Fountains »

Little kids can reach the fountain. There is a size for everyone, of any size.

Physical Activity

"People need exercise to be healthy." – Bethke student
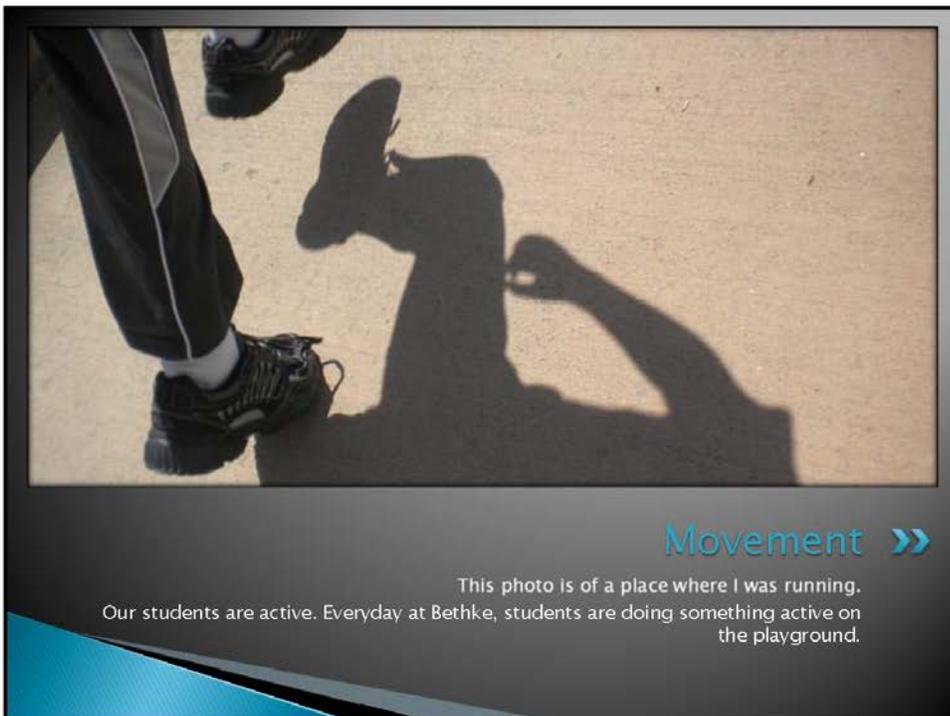
Movement »

This photo is of a place where I was running.
Our students are active. Everyday at Bethke, students are doing something active on the playground.

Swings »

The swings encourage physical activity. Everyone likes to play. It's fun. The seats are clean.

Activity Bars »

This encourages physical health because it shows that kids will go on bars. It's fun. Bethke won't have kids staying inside at recess. It shows health.

Playground >>

Like the monkey bars, this encourages physical health. In the background, you see the bike racks. You can also see the tether ball poles, and kids want to play with them.

Bike Racks >>

This photo makes me think of physical health. Bethke encourages kids to ride their bikes. A lot of my brother's friends ride their bikes. We have ridden our bikes to school sometimes. This photo makes me think of the ozone layer. Cars affect this, and weaken the ozone layer. The ozone layer is like sunscreen for the earth.
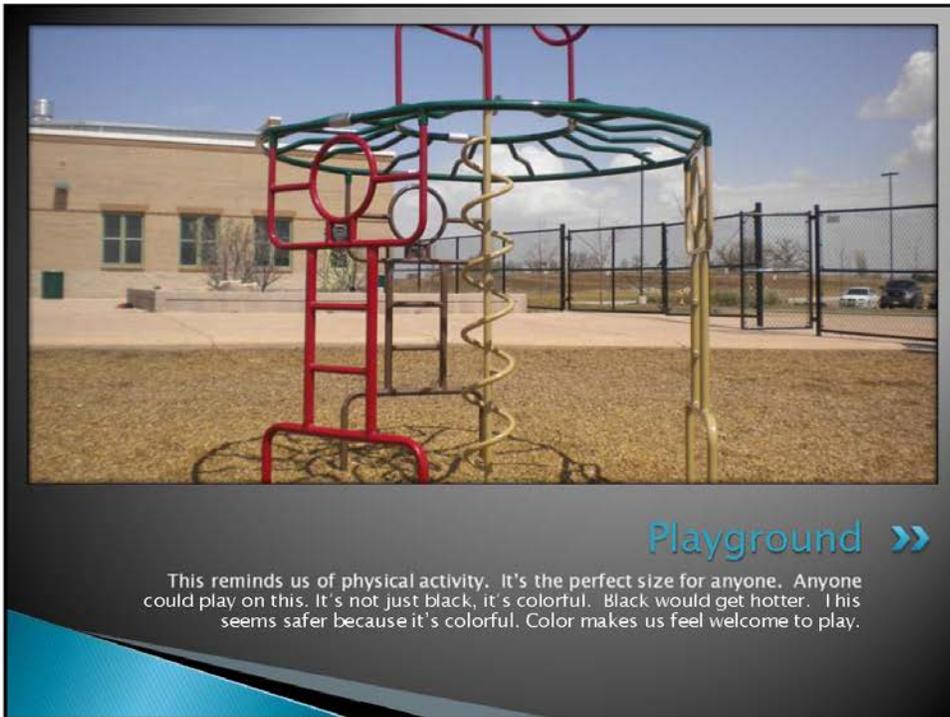
Playground »

This reminds us of physical activity. It's the perfect size for anyone. Anyone could play on this. It's not just black, it's colorful. Black would get hotter. This seems safer because it's colorful. Color makes us feel welcome to play.

Thank you to the teachers and students
at Bethke Elementary
who made this project possible!