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USING A DESIGN MODEL AS A SCAFFOLD TO CREATE LEARNING TOOLS: A CASE STUDY WITH WE! CONNECT CARDS

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This paper explores the development of *We! Connect Cards*, a card-based learning tool intended to support interpersonal relationships across various workplace and learning settings. The designed artifact is a card deck containing 60 cards with a question on the front and an action on the back. We discuss the development process of *We! Connect Cards* within the framework of a 5-phase design model. The purpose of our design paper is to share the design work of *We! Connect Cards* while exploring the utility of this model as a guide for creating and improving the design work. To understand the design case of *We! Connect Cards*, we draw upon relevant Human-Centered Design literature and concepts with an introduction to the chosen design model developed by the Stanford University d.school. Three test cases of the *We! Connect Cards* were conducted in a nonprofit, corporate, and higher education context. We include the scholarly discourse on the value of supporting interpersonal relationship development to situate the reader to the intended use scenario and learning outcome of this card-based tool. We organize the paper by the three iterative cycles of design, each within a nonprofit, corporate, and higher education context, to highlight the valuable insights and fruitful failures of each formative test case.

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INTRODUCTION

With a shared goal of creating rich informal learning experiences to support lifelong learning, we came together to develop the *We! Connect Cards*. Our goal was to create an easy-to-use, portable intervention that group facilitators could adopt to support the development of professional interpersonal relationships in both workplace and educational settings. Our project takes an iterative formative perspective to develop a tool called the *We! Connect Cards* (see Figure 1).

The team includes Chad Littlefield, who completed the design as part of his master's capstone project, and Heather Toomey Zimmerman, who was involved on the team as a "guide on the side" to support the development of the project theoretically and methodologically. As the *We! Connect Cards* were developed; we shared our ideas with colleagues to get feedback on the design, user interaction, and next steps.

The *We! Connect Card* Deck

The final *We! Connect Card* deck contains 60 cards, where each card includes a question on the front and an action on the back to support team-building and trust-building activities. Our paper describes both the development process of the card deck as well the use of the Stanford University d.school design model (Liedtka, 2014) to design, develop, and test three full iterations of this tool to support interpersonal relationship development in nonprofit, corporate, and higher education contexts.

FIGURE 1. The final iteration of the We! Connect Cards used by facilitator in team-building and trust-building activities in workplace and educational settings. Each card has a question on one side and an action on the other.

Using the *We! Connect Cards* within training sessions

The following vignette illustrates a typical *We! Connect Cards* activity called Question Swap whereby participants are instructed to choose a card, find a partner, and exchange questions and answers while performing the action on the back of the card.

The following observation is from Chad Littlefield who led a training session with 20 participants. The names of the participants have been changed to maintain anonymity:

> *I, Chad Littlefield, directed participants to select a We! Connect Card from the table. Ten small conversational groups form. Nate and Amy are one group that has paired up to have a conversation. Nate reads the question on his card to Amy, "What is something funny that has happened to you recently?" Amy sighs, looks up, and says, "Wow, that is a tough one." While Amy is thinking, Nate reminds her that they are supposed to both be doing the action on the back of his card. They both chuckle and begin the leg stretch depicted on the back of his card. Amy shares with Nate that she remembers a time recently that she poured orange juice into her cereal bowl. More laughter ensues. After this, Amy asks the question on her cards to Nate, "What is one thing you expect from a friendship?" Acknowledging that this question is "much deeper," Nate requests a minute to think. After Amy and Nate both share answers to each other's questions, they swap cards as instructed and begin looking for a new partner. The ten pairs of partners switch. The conversation and card swapping continued for between 10-15 minutes before I interjected and moved the group onto a new activity.*

CONTEXT: *WE! CONNECT CARDS* SUPPORT CONVERSATIONAL LEARNING

Our purpose for creating the *We! Connect Cards* learning tool was to support interpersonal connections and relationships since strong interpersonal connections relate to creating a collaborative workplace and educationally-oriented teams. Conversation, dialogue, and storytelling are an important link that helps to bridge individual learning with organizational learning because "people are the agents for organizational action and learning" (Sense, 2005). *We! Connect Cards* are designed to create personal connections and dialogue to fostering team-building and trust-building in work groups.

The design of *We! Connect Cards* was based on the philosophy that knowledge gained about another's' personal background can produce powerful learning and effective communication (Bransford, Derry, Berliner, Hammerness, & Beckett, 2005; Bransford, et al., 2006). Experimental research has shown that when knowledge of others' personal backgrounds develops over time into a friendship many benefits are observed (Bransford et al., 2006). In fact, when groups achieve higher psychological safety, they have been shown to integrate differences and affirm differences more successfully (Kayes, Kayes, & Kolb, 2005). Relationships of trust between group members and friends also contribute to the fact that friends are more likely to elaborate on ideas to their partners and even speak more, thereby providing a greater quantity of ideas (Bransford et al., 2006). Relatedly, Stewart, Courtright, and Barrick (2012) found that the peer pressure of pleasing people who mean something to them often serves as a stronger motivational force for employees than financial rewards.

One might expect that impacting relationships and communication in the workplace as far reaching as this would involve long-term strategies, yet the research shows that even short interventions can have powerful effects (Cable, Gino, & Staats, 2013). The research on the importance of short-term intervention is important because we developed the *We! Connect Cards* to offer a short-term intervention strategy to support relationship development through conversation, storytelling, and movement. Cable and colleagues (2013) found that when even one hour of a large, global company's onboarding and orientation process was dedicated to allow for self-expression and the sharing of one's individual identity, turnover rates were reduced by 27%. We took this to mean that the conversation and self-expression created by a card-based learning tool, such as *We! Connect Cards,* could have immense financial and social impacts on groups and organizations, including reducing employee or volunteer turnover, increasing the number of ideas generated, and serving as motivational tool.

We designed the *We! Connect Cards* to require facilitation by an instructor, who served in the role of team-builder.

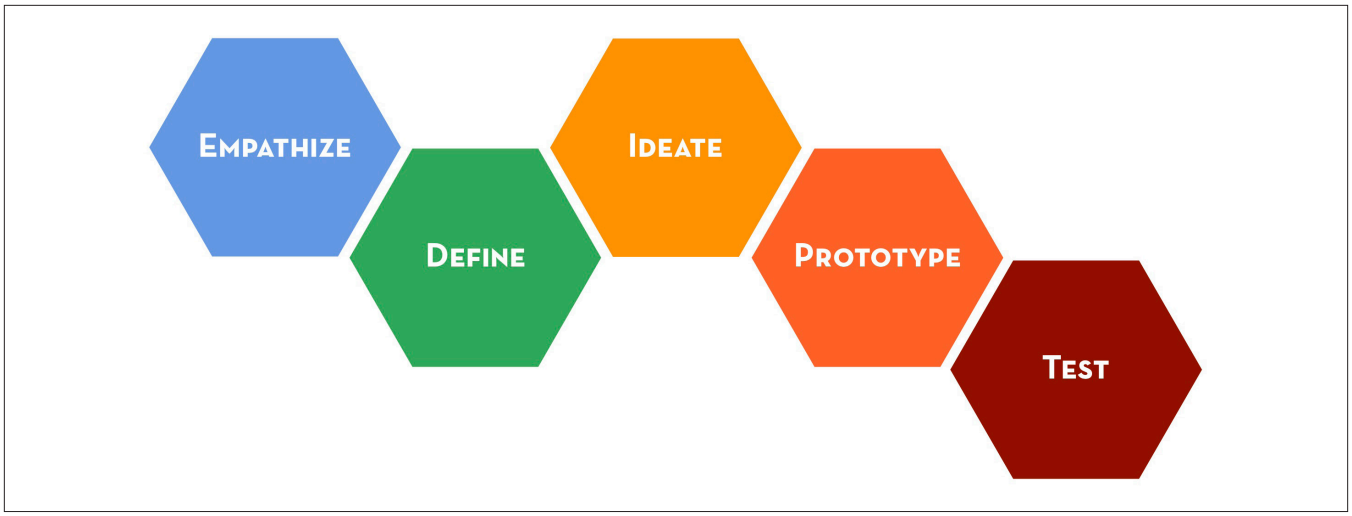

FIGURE 2. Stanford d.school Design Model. (Source: https://dschool.stanford.edu/)

Consequently, part of our design efforts was to write instructions on how these cards could be used in multiple settings, by multiple instructors. Sense (2005) also shared three valuable lessons about facilitating conversational learning that are highly relevant to the design, development, and implementation of *We! Connect Cards*. These three lessons provided a smooth transition into the theoretical framework section to follow. First, it is important to give participants sufficient autonomy and latitude of control in their conversations. Second, framing an activity within a social context is essential to encourage learning. Lastly, consideration about the contextual conditions around the learning space will support participants' choice and the frame within a social context.

PERSPECTIVE ON DESIGN

Cooley (2000) writes in his book about Human-Centered Design (HCD) that "the notion of design arose during the fourteenth and fifteenth centuries in Europe and connected the separation of thinking and doing" (p. 60). In more recent history, design was considered an afterthought to simply improve the aesthetics of a product (Brown, 2008). Now, designers are hired to better meet client needs and desires, which is a dramatic shift toward a strategic way of thinking (Brown, 2008). Currently, there are two discourses on design tools (Johansson-Sköldberg, Woodilla, & Çetinkaya, 2013) happening in two different places: (a) design-based, scholarly literature (e.g., Liedtka, 2014) and (b) popular business media (e.g., Bruce Nussbaum at *Business Week*, or Fred Collopy at *Fast Company*).

We adopt a third approach in our work. Liedtka (2014) reports, there is a "significant theoretical literature base [which] suggests convergence around the fundamental meaning of design thinking" (p. 3). This shared perspective on the theoretical foundations of design thinking seems to have three overarching stages: Stage 1 is data gathering about the users' needs, Stage 2 is idea generation, and Stage 3 is testing (Liedtka, 2014). We adopted Stanford University's model of design thinking as reported by Liedtka (2014) to guide Chad Littlefield's development of *We! Connect Cards*. This paper was collaboratively written as a design case to describe the cards and the three iterations of design and testing undertaken to create this card-based learning tool.

Stanford d.school Design Thinking Model

The framework we used to guide the development of the *We! Connect Cards* is a design thinking model offered by the Stanford University Design School, (d.school) as reported by Liedtka (2014). The five phases of this design model are: *empathize, define, ideate, prototype*, and *test* (see Figure 2). Information about Stanford's design thinking model can be found on their website (http://dschool.stanford.edu/). Due to the theoretical convergence of popular design thinking models, relevant and overlapping literature from Human-Centered Design (HCD) discourse is also added to complement each of the descriptions of the five design phases next.

Empathize. In the empathy phase, designers work toward reaching an understanding of people within the context of the use of the product. Brown (2008) adds that empathy enables a designer to see the world from multiple perspectives via observation, conversation, and feedback with potential users and facilitators.

Define. The aim of the define phase is to gain clarity on the specific challenges of the product by sorting through great amounts of information collected from the context and the user to develop a clear statement of the problem.

Ideate. The aim of ideation is to generate a large quantity of ideas without focusing on the ideas' quality. Typically, an important theme of this phase is suspending judgment to allow multiple, even contradictory, ideas to be generated.

Prototype. The prototype phase of the design process exists to answer questions that may start broad and get more specific as the iterative design cycle continues. Prototypes should be inexpensive and fast. Using post-it notes, storyboards, or hand drawn sketches can be effective methods for prototypes.

Specifically, our paper describes the use of rapid prototyping in settings that the *We! Connect Cards* would be used in the future. Rapid prototyping (Beaudouin-Lafon & Mackay, 2003; Tripp & Bichelmeyer, 1990) is a systematic development methodology, which is based on building and using a model of a system to design, implement, and test that system. In our case, we prototyped a version of our product in future places of use (Smith, 2014). Rapid prototyping has been used by companies and designers to quickly assess the utility of wearables such as Google Glass and smart watches (Billinghurst & Busse, 2015). This rapid prototyping process of design must be extremely quick in order to get immediate feedback from users, subject matter experts, and other stakeholders in a project. The concept is based on the idea that a designer cannot possibly account for the multitude of variables impacting a given design. After rapid prototyping, the designer moves into the test phase to generate data that will influence future iterations of a new prototype.

Test. The test phase is about gathering more data and more feedback. The fundamental difference between prototyping and testing is that by this point in the design cycle, the designer has (a) a more advanced working prototype and (b) a better sense of the user and the problem. Ideally, the designer tests the prototype in a real-life situation to learn as much as possible about actual use. Designers observe how users interact with the prototype over the period of time of typical use. At this phase, the designer focuses on deep level of use (i.e., learning, thinking), rather than on surface issues like just users' "likes" or "dislikes." The designer should aim to develop data that will help the team understand why a user likes or dislikes the prototype. Questions a designer would ask during the testing phase include: What features work well, which do not? Why do these features work well? Which features are confusing? Which features are helpful? Utilizing the rapid prototyping model described earlier, iterations of development of prototypes can be conducted in fast cycles.

DESIGN PROCESS

Our design case focuses on the development of *We! Connect Cards,* which took place from the summer of 2014 to the spring of 2015. Our design process was a complex, collaborative process influenced by many conversations, insights, experiences, and user testing over three iterations.

This section will discuss three iterative cycles of design tested with three unique groups—a nonprofit context, a corporate context, and a higher education context. Before delving into these design iterations, we share some of the design consideration from the intended context of use.

Physical cards. First, there are multiple reasons why we chose to use the format of physical cards to develop a tool to support interpersonal relationship development. Friedman and Hendry (2012) write that this "physical format allows for persistence and recombination of the discrete ideas represented on individual cards." As a facilitator and trainer, Chad Littlefield had facilitated multiple activities using card-based learning tools in the past. His prior experience has served as the starting point for the first prototype and iteration of the card-based learning tools. Heather Toomey Zimmerman used cards and games to facilitate interviews in her dissertation and found these as effective conversational tools.

Use of the cards with learners in trust-building activities. Our goal for *We! Connect Cards* was to create a physical format of cards that would create the opportunity for a facilitator to conduct multiple communication-enhancing and trust-building activities with the same deck of cards. Therefore, in addition to the cards, we hoped to create activities to turn the cards into multipurpose tools adaptable to various situations and audiences. For example, there are methods to use card-based activities in a large group auditorium with hundreds of people, and there are methods to create a card-based learning experience for six students in a classroom setting. Beyond that, the physical, printed format is a technology that does not require participants to have an electronic device or Internet access to use the tool. Using a physical, printed format increases the accessibility and affordability of the tool for individuals and institutions. The choices discussed earlier are design decisions that were made based on our professional experiences as well as our prior design experience. We adapted our initial ideas after beta tests and feedback from subject matter experts.

Design Model as a Scaffold For Our Work

In order to capture the complex design process in a cohesive manner, we used the framework developed by the Stanford Design School and reported by Liedtka (2014) as an effective scaffold and tool. This Stanford Design School design model consists of five main phases used throughout the development of *We! Connect Cards*: *empathize*, *define*, *ideate*, *prototype*, and *test*. Each of the three iterative cycles described next outline the design process as it pertains to three distinct contexts that had been designed and tested for *We! Connect Cards*: nonprofit, corporate, and higher education settings. We expand most fully on the first case to both show how our design changed and to illustrate how we used the framework in the design work. In addition, our first case involved the most unexpected failures that led to valuable insights later in the design process. To protect the identities of participants, these three groups have been renamed as follows: Study's Environmental Center

FIGURE 3. Original prototype of We! Connect Cards, which were tested at Study's Environmental Center.

(nonprofit organization), PPL Tech Co. (corporation), and People University (higher education institution).

Iteration 1: *We! Connect Cards* in a Nonprofit Context

Study's Environmental Center is an organization that offers outdoor education and adventure programming comprised largely of high school students. We had a strong existing relationship with this group so the Study's Environmental Center was an excellent first partnership. Our prior knowledge of the group allowed us to develop a learning tool to enhance interpersonal relationship development on the first day of a weeklong, intensive outdoor learning experience. During this week, students at the Center engage in weeklong adventures including rock climbing, mountain biking, caving, and canoeing. Since a foundation of relational trust is required to ensure students' physical and emotional safety while engaging in these high-risk adventure activities, the Center was eager to partner with us in relationship to the *We! Connect Cards*.

Empathize. Empathizing with students on the first day of their weeklong program was our first step toward designing an effective solution to meet the complex needs of the participants. In the summer of 2014, we held a three-hour team development program for a group of high school students that were participating in a weeklong, intensive outdoor learning experience at Study's Environmental Center.

The goal of the team development portion of the program was to create personal connections between people by increasing the comfort level of the students to build relationships that would contribute to a fun, effective learning experience for the remainder of the week. During one exercise, we invited students to pair up and ask each other questions to get to know one another. We observed closed off and uncomfortable nonverbal cues (e.g., putting hands in their pockets, swaying back and forth, and avoiding eye contact), which we posited as indicating a significant level of awkwardness. After observing discomfort among these students, we gained some empathy for their participatory experience; we were closer to identifying the learners' needs because we saw a need to create a comfortable environment conducive to conversation where students who did not know each other could engage successfully in conversation. Beyond observing the nonverbal discomfort, we also noted that it was difficult for students to generate open, thought-provoking questions on their own.

Define. Beginning with the core problem that students were uncomfortable physically and socially when asked to

start conversation with their peers without conversational support, we saw the need that the cards must assist in extracting the nonverbal element from conversation. At the same time, we wanted *We! Connect Cards* to support social conversations to address the issue that students were unsure of how to ask engaging questions without support. We aimed to address the need for social conversations with specific, open, and non-threatening questions that this group could not easily generate by themselves. However, as we discuss in the prototyping phase, and to save time, we generated questions too quickly since several of these were rejected by students during testing.

Our observational notes helped us define the problem because our observations showed that the students appeared to be uncomfortable with activities where they were asked to pair up with another student to talk without support for their discussion. In fact, it seemed that without clear directions, pairing students up might seem to have a negative impact on peer relationship development due to the observed discomfort and awkwardness that was created.

Ideate. After having identified the main problem as the awkwardness related to discussions with new people at the beginning of their weeklong program, we began to generate ideas about how this could be addressed. The list of ideas included options that would integrate mobile technology, for instance other activities involving more props, different prompting strategies, or card-based activities. At this early stage in the development of *We! Connect Cards*, the data supporting the ideation brainstorming sessions in this iteration were primarily based on the Chad Littlefield's notes and observations. This solitary form of brainstorming provided a starting point, but it proved to be a failure as significantly more creative ideas were generated socially in future iterations. After experiencing significantly more collaborative ideation phases with PPL Tech Co. and People University, we found that collaboration during early ideation and prototyping was needed.

Prototype. Based on the Tripp and Bichelmeyer's (1990) concept of rapid prototyping, we created a physical prototype (see Figure 3). The original prototype of *We! Connect Cards* was a deck of 40 small 2x2 inch square cards. The cards had questions such as "What is a fun experience you recently had?" and "What is something you do differently than most people?". The reverse side of the cards contained graphics of stick figures doing random kinesthetic, actions such as stretches or arm circles. The cards were printed on three random colors: blue, purple, and green. In the original prototype, the colors had no pedagogical significance and they did not signify any relation of the specific card to the rest of the deck. Instead, color choice was a stylistic, aesthetic design decision. The options we selected were to create 40 cards instead of decks of 60, 80, or 100. We chose the 40-card option on the basis of convenience to ensure the prototyping of the deck was made quickly and produced inexpensively. Any more than 40 cards would have slowed the development and added cost to the prototype. The choice to prototype only 40 cards in combination with quickly generated questions greatly impeded the utility and effectiveness of this tool. We discuss this failure and what we learned in the following section in the testing phase of Study's Environmental Center and the ideation phase with PPL Tech Co.

Test. Our first activity using the prototype cards at Study's Environmental Center was a question swap, which involved students having to find a partner, exchange questions and answers, and follow additional directions from the back of the card. Our first observation was the positive reaction from the students to the aesthetic elements of the design. They were drawn to the look and feel of the cards. This manifested as comments and questions to peers about the design. For example, one student exclaimed, "Wow, these cards feel cool! How did you make them?"

One design failure was that some of the actions that we included (i.e., stretches and other motions depicted by stick figures) on the back of the cards were quite difficult for the students to perform while holding a conversation. For example, one student shared that doing a particular arm stretch was "too awkward to do while answering a question," so he just stopped. It seemed that the specific actions (e.g., overhead arm stretch) actually increased nonverbal awkwardness. Early prototypes included the overhead arm stretch and the squat move that were deleted. Moves such as the quadriceps stretch were retained. Connected to our goal of decreasing nonverbal social awkwardness, we observed that participants reduced the frequency with which they performed the physical actions on the back of the card during conversation.

We also observed that some of the questions were not open and did not meet our goal of being non-threatening. In one instance, a student silently read the card that he had selected and immediately placed on the table. He said aloud that he was searching for a new card because the question he originally picked "was too hard to answer." Questions such as "What is the most serious time in your life?" were deleted from the deck. Our observation indicated a need for less threatening questions, which was crucial to our next iteration where we really worked toward creating specific, open, and easy-to-answer questions that invited the sharing of interesting stories and special moments from participants.

Iteration 2: *We! Connect Cards* in a Corporate Context

Our second iteration with the *We! Connect Cards* was held at PPL Tech Co., which represented a medium sized technology

company. They have 80 full time employees consisting of an engineering department, a sales team, a leadership team, and a production line. After mutually agreeing to a partnership, Chad Littlefield provided a series of experiential activities with *We! Connect Cards*. The goal was to create new interpersonal connections across management levels within the company. Within this second iteration, we hoped to refine both the quantity of cards as well as the quality of questions. We also wanted to determine what changes might be needed to make *We! Connect Cards* an effective tool for a workplace setting.

Empathize. To understand the users, a consultation was conducted with the Director of Human Resources at PPL Tech Co. This person was responsible for all training and development of employees. During this initial meeting, a second iteration of the *We! Connect Cards* was shared in order to receive feedback on how these could be improved for use among this group of learners, especially given that participation would bring a diversity of jobs, roles, responsibilities, and personality types. The goal during this initial meeting was to empathize with the employees of PPL Tech Co., which included talking to a member of the leadership who had a deep understanding of their employees professional needs. The Director of Human Resources shared an immediate reaction that *We! Connect Cards* would be a "wonderful tool to create and develop the relationships that promote cross-collaboration in a work environment." Based on this suggestion, the emphasis on cross-collaboration and developing relations was the focus of the second iteration.

After this meeting, a two-hour program with twenty employees was scheduled to pilot the revised *We! Connect Cards* at PPL Tech Co. Chad Littlefield facilitated two distinct activities and collected feedback on both. Employee feedback in combination with the leadership's perspective and feedback provided us direction on how to move forward in the design process. The vast majority of the feedback about the activities was positive in regard to cross-collaboration and developing relations. Employees shared comments with us such as, "it was hard to stop the activities," "I really enjoyed talking with people I had never interacted with before," or "I liked learning about my co-workers."

One of the most informative pieces of constructive and convergent feedback that allowed us to empathize with employees' experience was the suggestion provided from eight employees: reduce the number of repeat questions during the swapping activity since the deck has only 40 unique questions. This feedback highlighted a critical weakness in the design of *We! Connect Cards,* which we address in the Define design phase in the next section.

Additionally, to collect small group feedback to measure perceived question quality, Chad Littlefield led the PPL employees into a data collection phase where after participating in the team-building activities, the employees sorted cards into three categories, using a stop light metaphor: green, yellow, and red. Green represented questions that "should stay in the final design of *We! Connect Cards"*. Yellow represented ambiguous questions that "might need changes or edits to make them more effective". Red represented questions that "should be removed from the deck completely." Given the flexible nature of the *We! Connect Cards*, we collected our data via a card sort activity with larger green, yellow, and red construction paper sheets for employees to physically sort the questions. Each group went through the questions one by one to deliberate which category the question should fall into. This method proved to be an effective way for us to visualize strengths and weaknesses in the quality of question on each card quite quickly and easily as well as to hear what the employees said about each question.

Define. From the meeting with the leadership at PPL Tech Co. and the pilot program with employees, three distinct problems began to rise to the surface: card quantity, card size, and question quality. The main issue that emerged from the testing was that there were too many repeat questions showing up during activities. Upon further analysis, two main factors contributed to this. First, the original number of 40 cards in a deck was not enough to provide sufficient variety in learners' conversations. Second, when the group size was less than 20 people, the activity structure naturally facilitated repeat questions during the interactive swapping activity. Further, it was clear that as a participant, receiving a repeat question during an activity detracted from the overall utility and enjoyment of the experience.

The second design flaw highlighted by employees during the pilot program at PPL Tech Co. was that the cards were too small to hold and pass between colleagues comfortably. At the time of this iteration of the design cycle, *We! Connect Cards* were 2x2 inch squares with round corners.

The third issue regarding question quality was the ambiguity of some questions. After analyzing how employees had sorted their questions into the green, yellow, and red categories, it was clear that certain questions that lacked specificity were placed into either the red or the yellow category, which represented that these questions needed to be discarded or edited.

Ideate. During our formative design work at PPL Tech Co., we found that 40 cards per deck provided insufficient variety in conversation. For example, while participating, some employees reported being asked the same question earlier in the activity. We observed that smaller group size also contributed the same questions being repeatedly asked and answered by participants. Additionally, ambiguous questions (e.g., "What is one ingredient to happiness?") were not good questions in the eyes of employees at PPL Tech Co because they called for answers that were too general or broad. We

began generating ideas to address these issues by focusing on both the way a leader might facilitate the Question Swap activity and the design of the cards.

First, our idea was to introduce simple variations of the activity facilitation surrounding the cards to adapt to small group size. During an activity, if the facilitator invites participants to return their card and grab a new one, an entirely new set of questions from the *We! Connect Card* deck is infused into the group. This method addressed the problem discovered when working with small groups and informed the design ideas in the next section.

While changing the facilitation activity addressed part of the issue of a lack of variety among questions, we brainstormed how the *We! Connect Card* design could be adapted to accommodate more than 40 cards. This would require developing additional questions that effectively supported open, non-threatening conversations. It also required additional actions for the backs of cards. Based on our observations with Study's Environmental Center, these actions needed to be movements that could be completed during conversation. In addition to learning goals, we needed to consider how these changes would affect production costs. A decision needed to be made on how to increase the card deck size without making the cards cost prohibitive. For example, having 80 cards would double the quantity, yet it might also be more than was necessary for most team-building activities as well as making the cards too expensive for many non-profit or educational groups.

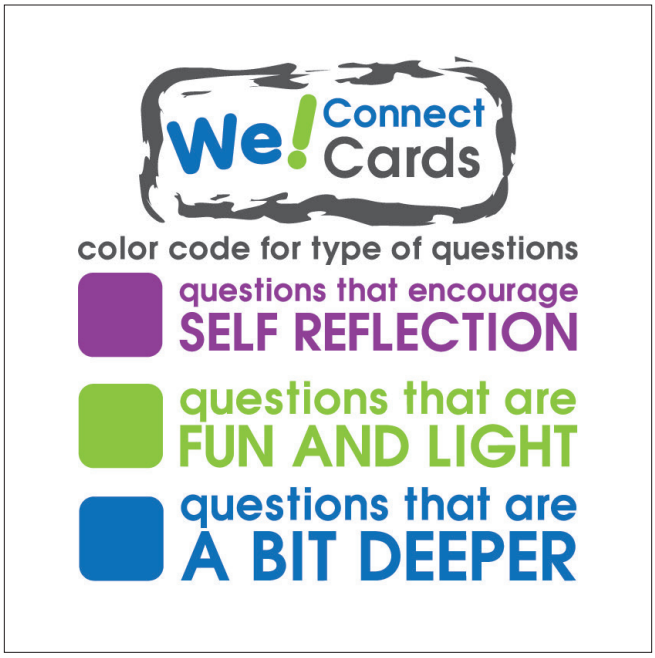

FIGURE 4. Color code describing the type of question on each of the three colors of *We! Connect Cards* where questions on purple cards encourage self reflection, green cards have questions that are fun and light, and blue cards have more thought provoking and personal questions.

Although we compromised and added 20 more cards (rather than 40), we found that when facilitating an activity with *We! Connect Cards* in a group of 20 or fewer participants, 60 cards would allow for three card swap rounds to occur. Having 60 cards, rather than 40 as in previous iterations, would allow for ample variation and would fall within production cost restraints. With these changes, we felt that the *We! Connect Cards* were ready to move from this second iterative cycle of ideation into the creation of a second prototype as indicated in the following section.

Prototype. To address the limitations of cost, quality, and time, we increased the size of the deck from 40 to 60 cards to allow for question variety and quality and to ensure each question was both open and non-threatening. Also, to increase the ease of use and readability, we increased the size of the cards by 25% to 2.5×2.5 inches. This decision was informed by informal comments made by a few employees that the prototype cards were too small to handle and read.

Based on question quality feedback from employees at PPL Tech Co., we sorted and color-coded the cards by question type. Purple cards included questions that "encourage self reflection." Green cards included questions that are "fun and light." Blue cards included questions that are "a bit deeper." See Figure 4 for details of the color code that Chad Littlefield developed for questions in the second prototype. Dividing the questions into three categories increased participant autonomy during interactive activities.

This iterated prototype of *We! Connect Cards* featured more cards, more questions, better questions organized by color, and increased card size. This iterated prototype also came encased in a top-bottom box featured to hold the cards together for the facilitator (see Figure 1).

Test. From observations, we found that larger cards were much easier to hold. Larger cards also made *We! Connect Card* feel like a better tool, according to learner feedback. Employees reported that the first prototyped cards were so small that they almost felt like they could be disposable. This prototype with larger color-coded cards and a 60-card deck that was used throughout the third iterative cycle of design with People University is described next.

Iteration 3: *We! Connect Cards* in a Higher Education Context

People University is a large institution of higher education containing serving over 30,000 students. The agreement within People University granted us access to a small group of graduate students studying education. The students of People University who were part of a graduate level research topics course participated and offered us feedback that contributed to the final design of the *We! Connect* cards. In the following section is a description of a complete design iteration that was implemented within this university group.

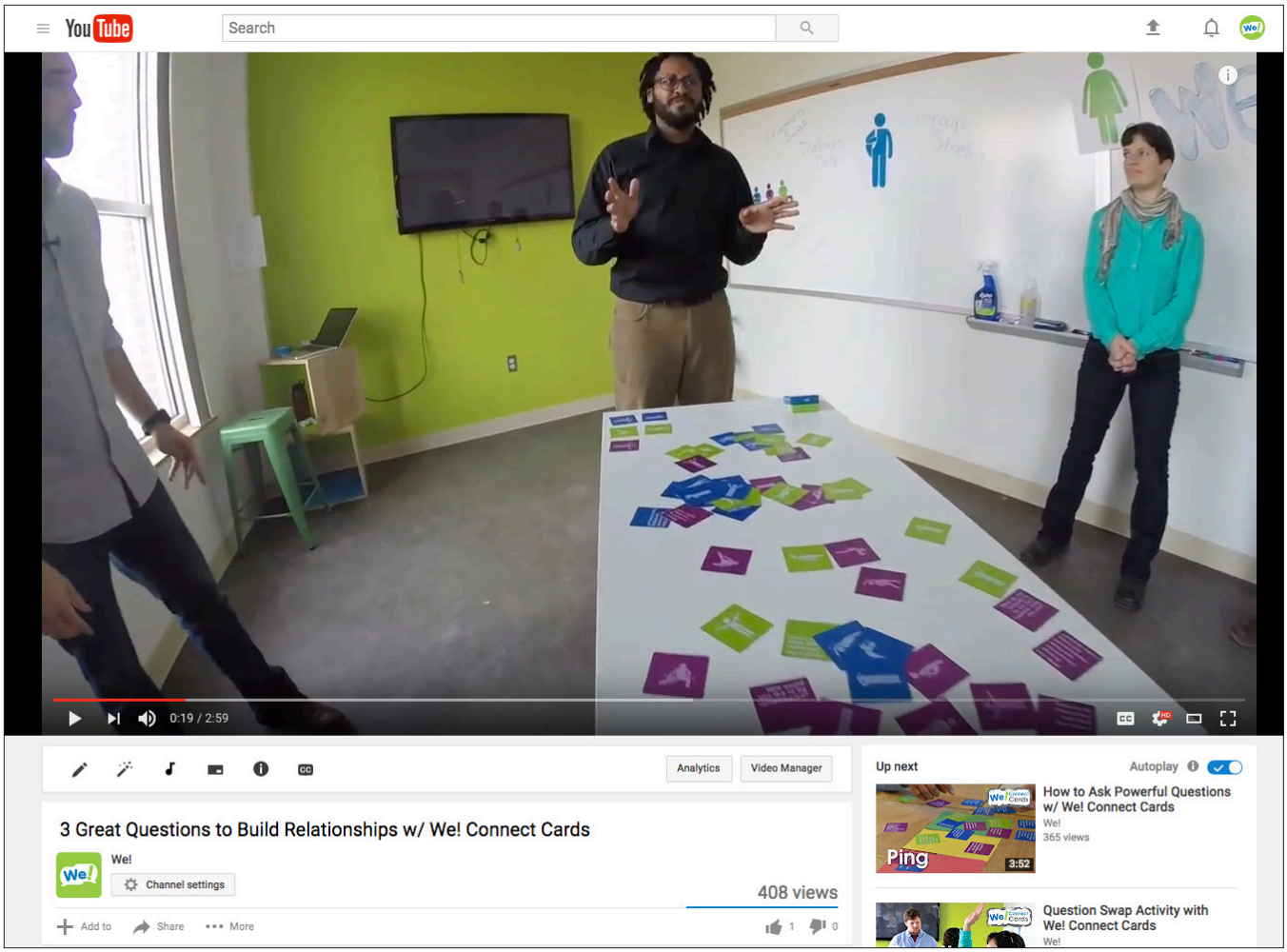

FIGURE 5. Screenshot of a video tutorial teaching an activity with We! Connect Cards called "Poker Swap" where participants are asked to choose three of the best questions they can find in the deck and pair up with somebody in the group they don't know very well.

Empathize. For the final iterative design cycle, we used a new method of empathizing to gain a new perspective. Rather than choose activities to facilitate and observe, written descriptions for 20 possible activities a person could facilitate with *We! Connect Cards* were given to small groups of learners. Small groups read through and voted on specific activities that seemed to be the most engaging and beneficial to participants. This process resulted in two new pieces of information that advanced our design.

First, we found that the written descriptions of these *We! Connect Card* activities were very difficult for a novice to understand. This was because each activity was highly experiential. We found that when people participated in an activity led by Chad Littlefield, everyone understood the directions very easily. However, when we handed a person a written description of the activity, it was difficult for them to comprehend the subtle nuances of the experience. Second, rather than relying on the management as with PPL Tech Co., the learners themselves picked activities that they felt were engaging and beneficial.

After participating in several *We! Connect Card* activities, Chad Littlefield distributed the cards to small groups and asked them to sort questions into categories represented by colored construction paper in the same feedback method utilized at PPL Tech Co. Green paper represented questions that "should stay in the final design of *We! Connect Cards*." Yellow represented questions that "might need changes or edits to make them more effective." Red represented questions that "should be removed from the deck completely." Green, yellow, and red construction paper was provided for each small group to physically sort the questions. Additionally, after engaging with *We! Connect Cards* in a variety of ways, written feedback was collected on 3"x5" index cards. The results from these feedback methods can be summarized as minor changes to the content of the questions and the descriptions of the activities. Both attempts to empathize with a different population in a higher education context led to new problems, insights, and creative solutions as described next in the Define and Ideate sections.

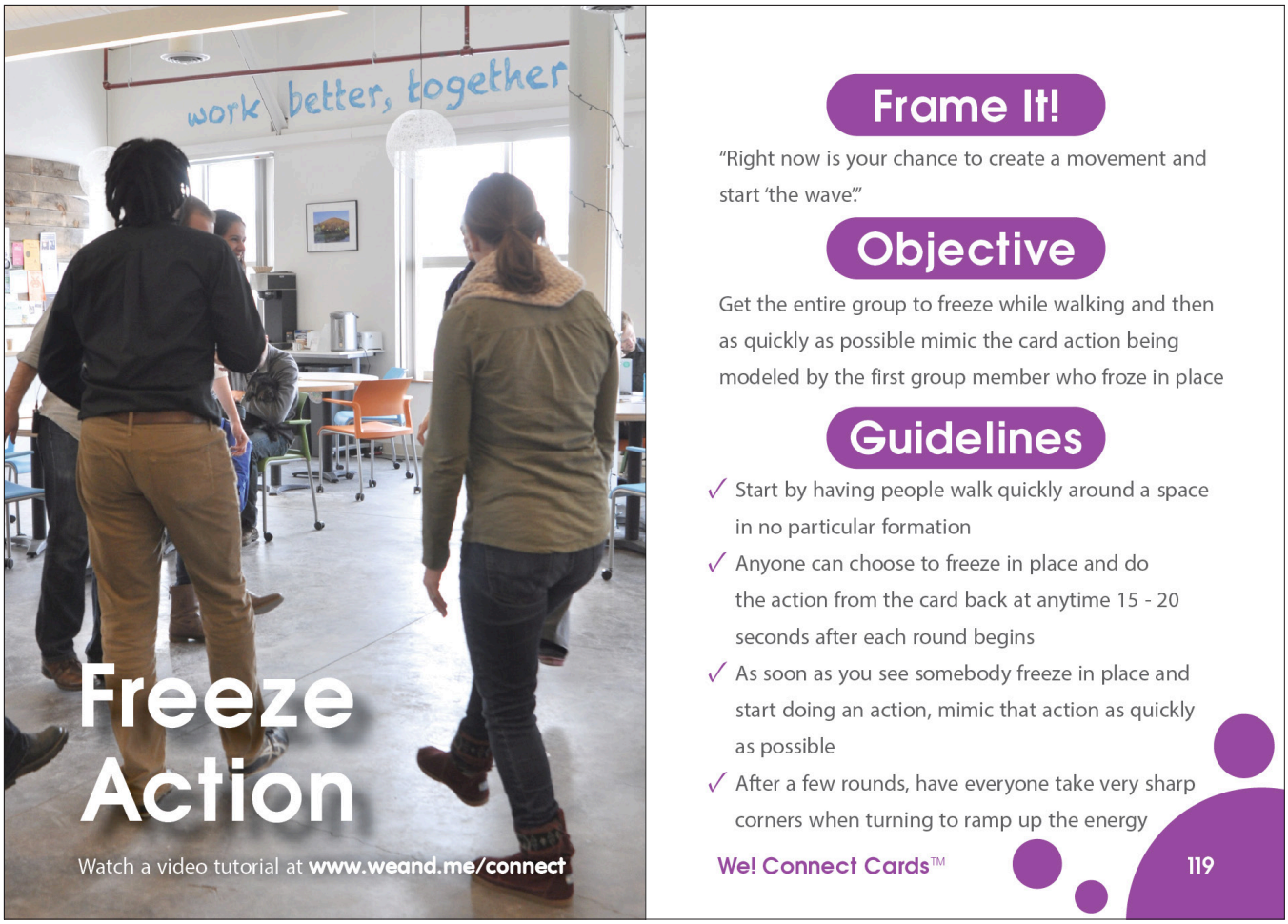

FIGURE 6. Screenshot of an activity write-up utilizing We! Connect Cards found from Pocket Guide to Facilitating Human Connections.

Define. After working with education students from People University, the issues related to using these activities with other learners were clear. Written activities were too difficult to understand how the cards should be used to achieve the desired outcome of open and non-threatening conversation to support interpersonal relationships. We believed that without using an explanatory booklet or further training, these cards would be difficult for someone outside the design team to use. Also, some of the questions that we included that were more personal and perhaps difficult to answer (i.e., blue questions see Figure 3), were framed too negatively such as "What is one thing you want to accomplish before you die?" This quick identification of the problem led us to rapidly progress into the ideation stage and to reword these questions more positively, for example, "What is one thing you want to accomplish in your lifetime?"

Ideate. Our intention for the final design of *We! Connect Cards* was always to make them available for sale to other people (i.e., leaders, teachers, and facilitators) who could use these within their learning groups to support interpersonal relationships by creating open and non-threatening conversations. We also believed that professional development and training about using the cards was important. After receiving feedback that written activity descriptions did not effectively communicate meaning, we decided to add photographs (see Figure 5). We went further and developed a new idea to film, edit, and publish video tutorials teaching and showing users how to use the cards (see Figure 4). Both of these ideas surfaced from conversation with subject matter experts (SMEs). The SMEs, including professional colleagues, facilitators, and teachers, provided input via email and offered new questions to insert into the deck in place of ones that students from People University suggested should be removed altogether.

Prototype. Swapping out the original questions for new questions that were more inviting took time, deliberation, and the opinion of five SMEs. After those questions were replaced, the issue of training was addressed further by organizing a workshop of volunteers to gather and film video tutorials. A screenshot from one out of 10 of these video tutorials can be found in Figure 5. Additionally, a new colleague, Rod Lee, and Chad Littlefield together decided to create a publication: a *Pocket Guide to Facilitating Human Connections.* Figure 6 shows a mockup of what one *We! Connect Card* activity

DESIGN PHASE	STUDY'S ENVIRONMENTAL CENTER	PPL TECH CO.	PEOPLE UNIVERSITY
EMPATHIZE	The nonverbal element of conversation can be awkward and impede effective relationship development	Tool is useful to develop relationships that enhances cross-collaboration Ambiguous questions were not effective	Students seemed confused when reading written descriptions of activities
DEFINE	A creative solution to remove the nonverbal anxiety in conversation could support relationship development	40 questions per deck was not enough to provide sufficient variety Small group size also contributes to repeat questions being asked and answered	Written directions of experiential activities are difficult to understand Some of the questions felt too negative
IDEATE	Lone idea generation is much less effective than collaboration ideation It is difficult to suspend judgment when generating ideas internally Card-based activities have many advantages	Increasing deck to 60 cards would allow for sufficient variation Color coding questions would increase participant autonomy A large size card would be easier and more enjoyable to use	Integrate into an activity book with short descriptions Video tutorials to teach leaders and facilitators how to lead activities with We! Connect Cards
PROTOTYPE	Progress is better than perfection during this phase Putting a graphic of an action on the back of each card opens the opportunity for several activities	Design changes are significantly easier to make when the problems are clearly defined	When prototypes include content development, SMEs are an effective method to ensure quality
TEST	Some of the actions on the back of the card were inconvenient to do during conversation	There are many ways to test prototypes, and the key is observation	Video is an effective tool to train a person to lead an experiential, card-based activity

TABLE 1. Summary of lessons learned from each phase of the design cycle for each iterative cycle.

descriptions looks like accompanied by a photograph of a real group participating in the described *We! Connect Card* activity.

Test. We collected feedback on the activity write-ups and the video tutorials both during and after their creation. Only positive feedback for the video tutorials was received, such as "these videos make various uses for *We! Connect Cards* much more clear." In summary, people said the videos helped transform abstract activity write-ups into an applicable guide for others wishing to use the cards. After showing additional colleagues the photos paired with the activity write-ups, the photos were determined to be effective at helping to support the learners' understanding of the intended activity instructions.

DISCUSSION

As a design tool, we found that the Stanford d.school's model of design was very effective at scaffolding the design process of *We! Connect Cards* deck for our team. To visualize the tangible impact of using this 5-stage model as a design tool, see the summary of lessons learned from each stage during each of the three iterative cycles in Table 1.

Across the three iterations (held in a different learning setting), a diversity of information was gathered at each design phase. For example, while empathizing with students from Study's Environmental Center, nonverbal communication contributed to increased levels of social awkwardness and apprehension. With PPL Tech Co., the most poignant lesson learned by empathizing with employees was that ambiguous questions were ineffective at invoking engaging responses aligned to our goals of team-building. By the third iterative cycle with People University, the development

phase had progressed beyond simply focusing on the content of each card to supporting professional development and training materials to ensure the cards' utility to leaders, teachers, and facilitators.

Of the many new insights gained during each iterative cycle of design, a pattern emerged that people using the *We! Connect Cards* liked questions that were both specific and novel. For example, questions that asked for stories or specific moments in a person's life were popular while questions that asked about a person's general beliefs were not. The second iteration of design with PPL Tech Co. mainly yielded insights about the content of the design. In the final cycle of design with People University, much of the learning about design related to the function and usage of this card-based learning tool rather than the cards themselves.

The final cycle of design was essential to answering the question: what would other people need to effectively use *We! Connect Cards*? Video tutorials and photo-enhanced activity write-ups are the current answers to this question. The origin of these supplemental materials can be traced back to the empathize phase with People University where our data illuminated that text-only activity descriptions were not enough to support participants' understanding.

CONCLUSION

The use of the 5-phase design model developed by the Stanford d.school (Liedtka, 2014) served as an effective tool for the design, development, and testing of *We! Connect Cards*.

Having brought together Human-Centered Design, relevant discourse on the value of supporting interpersonal relationship development, and putting the Stanford d.school design model to practice, we posit the following: the use of this design model as a scaffold for our work, in conjunction with multiple iterations of each phase in different contexts, yielded numerous invaluable lessons that improved the overall design quality in both form and function of *We! Connect Cards*.

With additional development, the *We! Connect Cards* could be adapted more comprehensively to meet specific learning outcomes. This paper's focus on the design process to create a card-based learning tool serves as a reference and a guide for practitioners and educators to design and test their own learning tools targeted to address their audiences' needs.

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