Voicing the Indescribable - Using Photo Elicitation as a Method to Uncover Belonging and Community

Dr. Nicole P. Pitterson, Purdue University, West Lafayette

Nicole is a postdoctoral scholar at Oregon State University. She holds a PhD in Engineering Education from Purdue University and other degrees in Manufacturing Engineering from Western Illinois University and a B.Sc. in Electrical and Electronic Engineering from the University of Technology, Jamaica. Her research interest is eliciting conceptual understanding of AC circuit concepts using active learning strategies.

Mr. Juan David Ortega-Alvarez, Universidad EAFIT, Medellin, Colombia - Purdue University, West Lafayette

Juan David Ortega Álvarez is an assistant professor at Universidad EAFIT and served as the Head of the Process Engineering Department from 2010 to 2014. He holds an MS in Process Engineering and Energy Technology from Hochschule Bremerhaven (Germany) and is currently enrolled as a graduate student in the Engineering Education Doctoral Program at Purdue University. Before his full-time appointment with EAFIT, he served as Engineering Director for a chemical company for 7 years. His research interests are focused on the practice and teaching of process design, simulation and control and also on faculty and institutional development through engineering education research.

Dr. Ruth A. Streveler, Purdue University, West Lafayette

Ruth A. Streveler is an Associate Professor in the School of Engineering Education at Purdue University. Dr. Streveler has been the Principal Investigator or co-Principal Investigator of ten grants funded by the US National Science Foundation. She has published articles in the Journal of Engineering Education and the International Journal of Engineering Education and has contributed to the Cambridge Handbook of Engineering Education Research. She has presented workshops to over 500 engineering faculty on four continents. Dr. Streveler's primary research interests are investigating students' understanding of difficult concepts in engineering science and helping engineering faculty conduct rigorous research in engineering education.

Dr. Robin Adams, Purdue University, West Lafayette

Robin S. Adams is an Associate Professor in the School of Engineering Education at Purdue University and holds a PhD in Education, an MS in Materials Science and Engineering, and a BS in Mechanical Engineering. She researches cross-disciplinarity ways of thinking, acting and being; design learning; and engineering education transformation.

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Abstract

Eleven years ago two NSF-funded programs aimed at fostering the development of a Community of Practice (CoP) among engineering education researchers, the Rigorous Research in Engineering Education (RREE) and the Institute for Scholarship on Engineering Education (ISEE), were initiated. Both programs ran from 2004 to 2006 and, although independently, were highly complementary in terms of goals, design and impacts. The RREE and ISSE programs involved approximately 200 (147 RREE and 48 ISEE) faculty members in workshops and other professional development learning experiences that helped them become aware of and learn how to navigate the nuances of conducting engineering education research (EER) that met the standards of any scholarly field.

While big-data analytics can be applied to show evidence of a developed and existing community of practice among past participants of the RREE and ISEE programs, individual stories of "becoming engineering education researchers" are impossible to capture using such techniques. In order to gain insights of the lived experiences from some participants after more than 10 years since their experience in these programs, we took a qualitative approach and conducted semi-structured interviews using photo elicitation.

So far we have collectively interviewed a total of 37 past participants, 21 for RREE and 16 for ISEE. This paper focuses on the results from the RREE past participants. We used a protocol that was divided into two main sections: I. eliciting engineering education research stories and II. becoming an engineering education researcher. This paper will report on section one where participants were asked to submit three photos or images that they felt were good representations of: (1) themselves before participating in the workshops, (2) where they see themselves presently and (3) where they hope to be in the future.

Of the 21 participants that were interviewed for the follow-up to the RREE project, 18 provided the solicited photos/images and discussed their rationale for their choice when prompted in the interviews. The photos/images spanned the range of personal life events or interests to career and research endeavors.

In this paper we will describe the common themes associated with the photos/images in terms of how participants identified with the photos/images and their justification for choosing them. The idea behind this approach is that through the selection of photos/images participants are able to not only produce a visual progression of their identity since the workshops, but to also serve as a starting point for verbalizing connections in their experiences they may have long forgotten existed. This paper will add to the body of literature that seeks to uncover stories or information that might be difficult to voice or describe.

Introduction

At the beginning of the 21st century the landscape of engineering education research (EER) started to change. Recommendations to increase engineering education research standards, embraced by scholarly venues like the *Journal of Engineering Education* and ASEE's Year of Dialogue, called for new and improved skills beyond scholarly teaching [1–3]. These recommendations saw the emergence of NSF-funded initiatives such as the Institute for Scholarship in Engineering Education (ISEE) and Rigorous Research in Engineering Education (RREE). These programs were aimed at helping engineering researchers develop skills to conduct scholarly research on the teaching and learning of engineering. The goals of these programs were to intentionally build and foster research communities among their participants. In their development and subsequent execution, the ISEE and RREE followed the design of communities of practice (CoP) as formulated by Wenger, McDermott and Snyder [4]. To explore the impact of the ISEE and RREE workshops, studies have been conducted to explore participants' lived experiences from multiple perspectives. Some of these studies were done immediately following the workshops and others carried out some years later [5].

Photo elicitation is one of the various investigative techniques used in interviews to elicit deep underlying beliefs about the topic being explored. Photo elicitation uses photos and/or images as prompts for the individual being interviewed [6]. Using photo elicitation in our study, we invited all past RREE and ISEE participants to provide photos/images they felt represented them at different stages of their engineering education research journey. This approach was aimed at providing participants with the opportunity to select, organize, and connect events from their experiences into meaningful accounts of their conceptual, community and identity trajectories.

This paper will focus on the RREE participants' journey to becoming engineering education researchers and more specifically how they use photos to chart their journey. The purpose of this paper is to answer the following questions:

- Is photo elicitation a viable method to be used in this context? Are participants willing to expend the effort to find images prior to an interview?
- What do the images tell us about the participants' journey to becoming part of the engineering education research community?

Literature Review

Our literature review is structured to provide background necessary to put our two research questions into context. First we will discuss the photo elicitation method. Then we will discuss models for what the career journey of engineering education researchers might look like through the lens of Parker Palmer's movement approach to change [7].

Photo elicitation in qualitative research
Research conducted on the use of photo elicitation as a data collection method speaks to the benefit of using this approach to uncover hidden stories and or memories participants might not be aware of [6]. Since "photographs are artifacts of what people see and experience" [8(p1)], photo elicitation use in reflective studies can provide rich information about deep underlying

perceptions or personal recollection of specific events. Hatten, Forin and Adams [9] also discuss the opportunity presented by photo elicitation when the focus of research is to uncover stories of becoming and identity development. The use of photos, these authors posit, creates a setting whereby participants can access their "tacit knowledge or what they might be hesitant to share" (p. 4). In addition, since "lived experiences can be difficult to articulate because it can be an unconscious process" [6(p9)], the photo elicitation process can be used to initiate the participant's narrative as it creates, for both participant and researcher, a common starting point [6].

In most cases, photo elicitation interviews are initiated with participants being tasked with selecting photos to answer a particular question after which they are given the opportunity to discuss what meanings the photo holds for them. In doing this, the researcher allows the participant to have power over how photos are selected, what aspect of their lives they choose to share as well as to provide the participants with the ability to engage themselves in the research far more than a regular interview would have allowed them to. From this standpoint, photo elicitation is a collaborative, interpretivist approach that balances the distribution of power in the researcher-participant relationship [10]. Additionally, "[p]hoto elicitation may overcome the difficulties posed by an in-depth interviewing because it is anchored in an image that is understood, at least in part, by both parties" [6(p10)]. The five benefits of self-selected photos in photo elicitation studies as expressed by Hatten, Forin and Adams [9] are:

- photos acts as metaphors thus providing participants with the ability to articulate abstract concepts,
- photos act as a bridge between identity and conceptual understanding,
- photos build connections between how participants view themselves and what they do,
- photos reduce the power dynamic between researcher and participants, and
- photo elicitation provides the opportunity to observe progression in participants' ability to articulate identity.

Palmer's movement approach to change
Change literature often times discusses the process of eliciting any kind of organizational change as difficult because of the various levels of structure that exists [11–13]. Smith and colleagues [12] discuss the benefits and challenges typically associated with implementing or effecting engineering change, especially on the part of engineering education. The development of the field of engineering education research and the decision made by engineering researchers to forge into this new arena illustrates the role of reformers in creating or initiating change. One change model discussed by Smith et al.[12] as comparable to engineering education is Palmer's movement approach to change. Parker Palmer [7] developed a model to represent organizational change spurred by reformers who use "resistance as merely the place where things begin" (p. 12). The model consists of four definable stages that are not mutually exclusive in that these stages normally overlap and can possibly be cyclical. The four stages are:

1. Choosing integrity - isolated individuals decide to stop leading "divided lives". At this stage, individuals make a personal choice to no longer deal with the tension of ignoring their inner desire for change and the resistance of the greater organizational structure to accept this kind of change.

2. Corporate support - reformers discover each other and form groups for mutual support. Through collaborative initiatives reformers come to identify a community of practitioners with similar interest. From this community these reformers are able to build their own network and skill set.
3. Going public - empowered by the community, these reformers learn to translate "private problems" into public issues. Having found a community to which they can belong and the support such a community provides, these individuals are able to start the dialogue of how this change can be beneficial by publicizing their efforts.
4. Alternative rewards - new ways of rewarding effort emerge to sustain the movement's vision that may force the conventional reward system to change (p.12). At this stage the work of reformers are seen as valuable and is therefore acknowledged by the larger organization. In addition, more avenues emerge for new members to join the community.

In an unpublished work investigating the impact of the RREE workshops and the overall growth of the community, evidence of all four stages of this model was found in participants' responses to how they became members of the engineering community. Through a second phase of data analysis Palmer's model was used to code participants' responses of how they became interested and subsequently involved in doing engineering education research. In that work is was found that most of the participants who attended the RREE workshops felt the inner desire to study issues that were at that time new and involving in a way that went against the grain of the structure of the engineering community. Participants' responses also revealed that through attendance at the RREE workshop they were able to experience, for some, all the other stages.

Method

All 147 participants from the RREE workshops were invited to participate in this follow-up study. The participants were invited to consent through a Qualtrics survey after which an interview was scheduled at their convenience. From the survey, 21 participants consented to be interviewed. In the interview request participants were instructed to search for three photos/images that could be photos of themselves, hand drawn pictures, or images copied from the internet. Participants were also instructed to either bring these photos/images with them to the interview or to share with the interviewer prior to their scheduled interview. Of the 21 participants, 18 provided the requested photos/images.

In this study our intent was to encourage participants' narratives of identity trajectories by using photo elicitation techniques. Participants were asked to identify three photos or images that represented (1) their past "you" (about 10 years ago when they participated in the RREE), (2) their present "you", and their future "you" (the next 5 years). Elicitation questions were focused on asking the participants to describe the picture and rationale for selecting that picture, the meanings the picture represented, and connections from past to future pictures that map EER trajectories including hurdles and changes in perspective and engagement in EER. Clarification prompts emphasized the influence of people, experiences, or circumstances that contributed to an understanding of EER or development of an EER identity.

The participants' narratives of the photos/images they provided were independently analyzed by two researchers using Palmer's four-stage movement approach to change model to create a priori

codes. For each participant's thick description about their photos/images, a summary was written to show the progression from their past to future representation highlighting stages of Palmer's model that were explicitly discussed. To check for inter-rater reliability, the two researchers each summarized and categorized into Palmer's stages half of the participant list separately after which a sample from each opposite set was checked for agreeability and differences were negotiated. The same researchers had the opportunity to previously calibrate their views by applying the same lens, Palmer's model, to the aforementioned impact project. Using the individual summaries showing the stages identified for each participant we created a summary matrix (Table 1). In addition, we found two distinct emerging themes across some of our participants that were outside the scope of Palmer's four stages used to categorize the photos/images.

Findings

Alignment of participants' narratives with movement approach model
From our data we found evidence of all four stages of the Palmer's model. In Table 1, the summary of the stages and the participants who demonstrated these stages through their photos/images and narratives is illustrated. Of the 18 participants who brought images to their interview, 17 described at least one photo that was categorized as falling into one of the stages of the movement approach.

Table 1. Palmer's stages and participants' representation

| Participants* | Palmer's movement approach to change stages | | | |
	Choosing integrity	Finding support	Going public	Alternate rewards
Janet	YES	YES	YES	YES
Sarah	YES	YES	YES	YES
Edward	YES	YES	YES	NO
Savannah	YES	YES	YES	NO
Aaron	YES	NO	YES	NO
Carla	NO	YES	YES	NO
Donald	NO	YES	YES	NO
Jenny	YES	NO	NO	YES
Lorna	YES	NO	NO	YES
Lynn	NO	YES	YES	NO
Michael	NO	YES	YES	NO
Megan	YES	YES	NO	NO
Molly	NO	YES	YES	NO
Renee	NO	YES	YES	NO
Ralph	YES	YES	NO	NO
Marie	NO	YES	NO	NO
Sandy	YES	NO	NO	NO
Kevin	NO	NO	NO	NO

TOTALS	10	13	11	4
PERCENT	55.56%	72.22%	61.11%	22.22%

<center>* pseudonym assigned by researchers</center>

From the table it can be seen that the most common stage represented is *finding support* (13 instances), the next highest stage was *going public* with 11 instances and *choosing integrity* with 10 instances. The *alternative reward* stage has the lowest representation (4 instances) though this is not surprising as the nature of the reward system in the field of engineering is not likely to have been changed drastically in 10 years. While we found representation of Palmer's stages in all but one participant's images/photos, there were combinations of the four stages in all other participants. However, only two transcripts evidenced all four stages of Palmer's framework. Most transcripts (15 out of 18) provided evidence of at least two stages. This is remarkable especially taking into account that we only summarized the discussion of the pictures, which averaged no more than two single-spaced pages of each interview transcript.

In Table 2, examples from the participants' narratives about their photos/images are provided to illustrate how photos were categorized.

<center>Table 2. Examples of participants' discussion about their photos/images</center>

Palmer's movement approach stages	Example from participants' narratives
Stage One – Choosing integrity	*Before the intervention I was still an assistant professor I was trying to figure out what my niche would be, I was still doing the traditional work but I was really dedicated to teaching and so when I went to the workshop I was able to understand how you can really do really good engineering education research—Sarah* *I think it was just kinda what it felt like, this whole new world there's so many, there's all these methods out there, there is risk associated with this new field of research out there and, but I kinda felt like it was just getting started at that time but building on other fields—Megan* *I think that represented me when I first got started with RREE in that I had a rather simplified idea of what it was to cause change right? that I was going to come in and disrupt things at least things I was gonna learn, things I was gonna do was going to make a difference it was essentially open up space and I think that leads to a certain level of excitement a certain level of engagement, a certain level of you know I'll make a difference in the world – Aaron*

Stage Two – Finding support	*The setting that I'm in the same way I kind of do about the research community, when I go to a place like ASEE meetings I definitely feel like I am home with colleagues, people who understand what I am doing or interested in what I am doing, people I can talk to about what I am doing and what they're doing, and find collaboration of things to do—Edward*
	So that was very exciting that you know there were people at the workshop and people at this conference, this type of conference that had similar interest so kind of a nice resonance, you know of people that I could really talk to and understand that you know were maybe excited about what I wanted to do or I was excited about their projects—Molly
	The time I attended RREE was pivotal for me again because it was the first real exposure that I had to people who were doing this well and who were promoting this as a true field of research and I started to see the possibilities for me and started to see things that I would really be passionate about doing –Renee
Stage Three – Going public	*I chose a picture that shows a whole neighborhood with a lot of kinds of houses because I feel one of the roles that I play in moving forward is helping other people use their toolboxes to create their own projects or houses so basically helping the community broaden the work that they do and create their own projects– Carla*
	I guess you could say listening to what is going on and I see myself in five years as not intimately involved in the day to day activity of research in this area but someone who can guide those who are in it from a far, not like I am doing now where I am intimately involved but from a far and hopefully be a sage type of guide to give someone advice on directions they can take with their work—Lynn
	I think I have the collaboration one that was really shows a big part of what I do now is that I do have a much bigger network. I've worked several different NSF funded things with different persons in the community and feel that collaboration of working together is one of the parts I enjoy the most –Savannah
Stage Four – Alternate Rewards	*It's disruptive and that's where I want to be in five years where what I am doing is disruptive, it's pushing us to think in ways we don't think now and from the reactions I get to some of the conversations that I have I think I am on my way, I am still figuring out how to--how to get that beyond, how to get the disruptive side of what I do beyond the conversation, the individual conversation, into the discipline as a whole but disruptive is where I hope to head—Jenny*
	That basically just looked at all the work that I had done as an engineering educator, the studies I had done and what I do for my university and so I was really proud of the fact that it was national recognition, ok yes people really appreciate the things that you're doing and the contributions you were making—Sarah
	I personally have had a lot of struggles getting my career moving forward, not because of my research but because of the political environment and administrative issues that have really hampered my development—Lorna

The photos/images selected to represent "the past" were often times associated with choosing integrity or finding support. Similarly, photos/images representing "the present" were often used to tell the story of being at a place where participants found support and felt comfortable. This may explain why *finding support* was the predominant stage.

In some of the transcripts there were references to recurring topics that, although not in contradiction with Palmer's stages, are not readily assimilated under the lens of change. For instance, the idea of reaching balance is present in three of the transcripts (five if we extend the idea to include feelings of being at home or peacefully walking a path). Another recurring theme demonstrated by four participants' photos/images was noting a personal change as a shift from naivety (being clueless) to a more mature, realistic view (becoming more like an expert).

Participants' reaction to photo/image request

Participants were instructed to provide photos/images after they had consented to participate in the study. The email that was sent to participants to set up a time to be interviewed included the instructions for the photos/images mentioned in the Methods section. Only a few participants requested additional information about what photos/images they should provide. Five participants discussed the usefulness of requesting the images in helping them to reflect on their progression in engineering education. In the following excerpt from Janet, she talks about the level of difficulty she experienced finding images but that the difficulty was self-imposed:

So this was not an easy exercise but at the same time it was a good exercise. I went through many iterations, I --- there was a point in time where there were garden themes, there was a point in time where there were water themes but none of [them] quite felt right and none of them worked as a theme and I know theme was not part of the assignment but in my head in order to get all three places I, because I am still me through all of this I needed to see an arc.

Below is an excerpt from one participant, Renee, who admitted at the end of the interview the value she found in searching for the requested images:

I'd like to share and that, that even this was a learning experience because I, as you know from my email that this was the most ridiculous thing that's possible to ask for those three different images, but it was actually a good evaluation technique, a good advance organizer to get you thinking about the impact of these experiences so even though I hated the idea I thank you for it.

Overall, although participants' initial reactions to the use of photos and images varied from curiosity and sincere interest to blunt rejection, most of them agreed to cooperate. During the interviews, most of those who submitted pictures fully engaged with the photo elicitation activity and many acknowledged its usefulness.

Discussion

This study adds to the body of research that uses photos as a stimulus to prompt discussion of the impact of change on the experience of individuals. That 18 of 21 interviewees were willing to comply with the request to bring photos or images suggests that photo elicitation *is* a viable method for gathering data about participants' experiences and identities. Thus the answer to our first research question is, we feel, a resounding "yes!" Moreover, the collaborative nature of photo elicitation allowed us to honor and respect the individual stories of becoming that our participants shared. The participants' narratives about their photos/images indicated that by using the method of photo elicitation our participants engaged in the process of self-reflection. Photo elicitation has been noted to be a viable method when analytical thinking and reflection on

a particular phenomenon is being studied [6]. One benefit of photo elicitation that was highlighted by our study is the level of autonomy that is fostered by this method. Our participants were in total control of what photos/images they submitted and as such the photos/images submitted spanned a wide range. However, in their description of the photos/images, participants discussed what their needs were before RREE and how these needs were met upon attendance or through subsequent interaction with other participants they met at RREE.

To address our second research question regarding the content of the images, we argue that Palmer's movement approach to change reasonably describes the participants' trajectory as engineering education researchers. The stage movement approach defined by Palmer [7] is intended to demonstrate how reformers move from a place of dissatisfaction to feeling empowered to facilitate change. The use of the term "stages" was meant to construct the idea that for each individual there is a place at which they start. Palmer explains that "different people will find themselves at different stages of a movement. Some will want to make a decision against dividedness, some will need to join with others for support, some will have to learn how to "go public", and some will try to find alternative rewards. Every stage has a contribution to make – not only to the cause, but to the person" (p.17). Based on Palmer's description of the movement approach, we can compare the sentiments shared by the RREE participants. At the time they attended the RREE, many participants described feeling conflicted, somewhat dissatisfied with their current situation within their respective institutions or curious about this new area of research that was slowly catching on. The RREE provided the opportunity for participants to find the support of other like-minded individuals. By finding strength in numbers they were then willing to "go public" with their new interests. This is a tale of isolation being overcome through discovering and becoming part of a community. As mentioned earlier in the paper, evidence of Palmer's movement approach being a useful description of change within engineering education has been found in a previous project (unpublished) using more traditional (text only) interview prompts. In both studies, participants expressed statements reflective of every stage usually from the standpoint of the positive impact of such stages on their careers but sometimes also to describe the difficulties encountered in navigating them. An excerpt from Lorna's interview evidencing stage four depicts this situation (see Table 2). Unsurprisingly, most statements regarding difficulties were found in this stage.

Interestingly, one participant (Kevin) agreed to submit pictures, but his discussion of them yielded unexpected findings. In the images submitted by Kevin and his subsequent narrative we could not find any explicit association with the movement approach used to categorize the image narratives. However, in the three images provided, he spoke about the progression of his involvement in engineering education as learning a skill and getting better at it over time. While this finding did not align with the framework used for this study, it captured the purpose and overall goal of the RREE project: to expose engineering faculty to the concept of educational research. From their participation in the RREE workshops these faculty members were expected to build engineering education research agendas using the tools learned. The images supplied by Kevin portrayed this evolution from novice to expert educational researcher. This indicates that a model of epistemological development may provide a complementary view to Palmer's framework that could be used to explore the relationship between identity and epistemological perspective.

In summary, this paper describes the use of photo elicitation in interviews. We feel the results are encouraging and suggest that other researchers consider its use. We also note that the images were used to describe very sensitive topics. Isolation and finding support are not the easiest topics to discuss but were mentioned frequently in our interviews. This suggests that photo elicitation may be particularly useful to broach potentially uncomfortable areas in interviews.

Acknowledgements

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