

“Teaching people design-talk”: Critically reflective conversations on cultivating learner empathy in humanitarian engineering

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Brief Abstract

In this paper, we report on an academic staff development project, which we collaboratively commenced as engineering educators who shared an interest in humanitarian engineering education. The goal of the project was to commence agile, participatory peer-learning through critically reflective conversations, supported by a facilitator. As participants, we were also all co-researchers in this project. Our adaptation of Brookfield’s (2017) “critical conversation group” (p.115-116) discussions, and critically reflective processes, helped us to identify the following question: “How can we create connection and empathy between our students and the communities that they are designing for?” Subsequently, the method helped us to articulate a range of innovative teaching approaches for cultivating learner empathy. We describe several approaches that were in part synthesised from sharing our collective experiences cultivating learner empathy: (1) creating end-user profiles; (2) getting out of the classroom using an empathy quest and empathy mapping; and (3) mindfulness in contemplative pedagogy.

A key aspect of this report is that all the strategies described can be applied in local contexts with minimal resources. This paper will be of interest to engineering educators and education researchers, who could adapt and/or evaluate these approaches in their own practice; and for practitioners of academic development.

Introduction

Engineering educators support learners to graduate into a world of complex, global problems. This context presents challenges for supporting engineering educators’ academic development, where approaches can vary from providing workshops and accredited courses, to mentoring, to conducting research projects within the framework of the scholarship of learning and teaching (SoLT). One approach, critically reflective conversations, offers the benefits of an agile, inclusive, participatory method. This paper reports preliminary findings from a project using critically reflective conversations, where participants chose to focus on teaching strategies for humanitarian engineering from data that reflected broader themes.

Context

This project brought together five engineering educators who are employed at one public Australian university (with one also employed at an additional university), and one academic developer. The educators shared an interest in humanitarian engineering, illustrated by various involvements with Engineering Without Borders, Australia (EWBA). At this institution, units relating to EWBA are currently offered in two programs with distinct learning approaches. While detailing the learning approaches is beyond the scope of this paper, one program emphasises integrative projects, for example. Before the project commenced, educators knew staff in their own program, but no educator had met all other educators. For this reason, staff from the two areas were interested in joining together in critical reflection.

In the spirit of EWB's (2019a) strengths-based approach (Peterson & Seligman 2004), we include a brief overview of our backgrounds and strengths. All engineering staff involved support learning in either the EWB Challenge, or courses related to the Challenge. (Curriculum in one program extends on the EWB Challenge in subsequent units.) In addition, among the project team, we have recruited for, or led students on, the Design Summit; and we have forged industry partnerships with EWB, as well as serving on the EWB Board. In addition, we bring a depth of industry expertise to the project. In developing countries, we have practiced as an engineer for a non-government organisation (NGO), conducted teacher education, and performed research. This diversity improves the trustworthiness of our research (Walther et al. 2013), a point we explore further in the companion paper (Chang et al. (in press)).

In this project, we reflected on our experiences facilitating two learning programs provided by EWB: the EWB Challenge and the EWB Humanitarian Design Summit. The EWB Challenge is a first-year design challenge available to engineering educators in the Asia Pacific region. EWB (2019b) states that the Challenge "provides students with the opportunity to learn about design, teamwork and communication through real, inspiring, sustainable cross-cultural development projects" (para. 2). That is, the Challenge is oriented towards creating shared social value (Porter & Kramer 2011), and using problem-based learning as students design a solution for communities in a developing country. By contrast, the EWB (2019c) "Humanitarian Design Summit program is an educational study tour designed to provide students with professional work experience while allowing them to develop a deeper understanding of the role Human-Centred Design and technology play in creating positive change within communities" (para. 2, capitals in original). A key difference is that the Design Summit is an immersive in-country learning experience, while the Challenge is classroom-based.

Method

This is a staff professional development project focused on academic practice. We deliberately chose an exploratory, conversational method because it empowered us to drive the direction of the conversations and therefore our professional learning. The conversations drew on a critical approach to reflective practice (Schön 1983, Thompson & Pascal 2012; Brookfield 2017). To be clear, this was not an action-learning project (Revans 1982) or action-research project (Kemmis, McTaggart & Nixon 2013), by which we mean the project was designed to support professional learning, and *not* designed to enact and evaluate change. There was no goal to redesign curricula, nor to alter and evaluate teaching approaches in Stage One. In addition, the project used a participatory stance (ibid.), meaning that as participants, we all shared ownership of the project by also being co-researchers. As such, we will refer to ourselves as co-researcher/participants (CRPs).

CRPs employed a method of iterative cycles of critically reflective conversations, which were audio recorded. In practice, CRPs met face-to-face and via video call to engage in organic, exploratory conversations. After each meeting, transcripts were produced, which CRPs reflected on through a process of iterative analysis to inform the agenda for subsequent meetings. Each meeting, and the research process was facilitated by the academic developer (Rosemary Chang). In Stage One, reported here, we held three cycles of conversation. Stage One transcripts data totals 26,160 words. Transcript data was analysed using thematic analysis, which we have held over for reporting elsewhere.

While this project has affinity with the scholarship of learning and teaching (Boyer 1990; Felton 2013); with its strong grounding in the "practice turn", the project is a respond to Brew's (2010) call for a scholarship of academic practice. This may not be immediately evident due to the decision to report on teaching strategies, but the critical conversations expanded beyond immediate teaching considerations to structural and socio-political issues, humanist and philosophical implications, and academic practice.

To be clear, the EWB Challenge offered the disciplinary location for the practices explored in these conversations. However, it was not the CRPs' intention to reflect on any one specific EWB Challenge. For this reason, details of a EWB Challenge are deliberately omitted.

Cultivating learner empathy

A critical, participatory methodology is not consistent with a research question that is pre-set by an external researcher; instead, the CRPs followed an exploratory, open-ended conversational method (guided by the facilitator) to uncover a focus germane to their current academic practice. As such, the CRPs collaboratively uncovered the question for this paper: "How do we create that connection and empathy between our students and the communities that we're [learners are] designing for?" (Meeting 1, 46:18 min). This question reflects the main agenda item which was agreed on for the conversations in meetings two and three.

Although not a common technique in interpretive methodologies (e.g. Creswell & Poth, 2017), as part of the analysis we played with digital aggregation of transcript data, and ranked words for frequency. This revealed that among the eight most frequently spoken words in meeting three, appeared the sequence: "teaching, people, design, talk" (Meeting 3, frequency analysis). While this is an artificial arrangement of terms, in many ways it cuts to the heart of the discussions; this paper is about cultivating learners' empathy as they relate to others in human-centred design, or *teaching people empathetic design-talk*.

The tenor of the conversations was optimistic, as illustrated by the following reflection on pedagogical practice: "I think we can be creative both pedagogically and... with the resources in trying to get as rich a learning experience as possible" (Meeting 3, 31:45 min). Thus we are reporting examples of CRPs' creative approaches for cultivating empathy in learners, which CRPs delivered before or during Stage One of the project. These represent examples of co-creating knowledge in relation to academic practice. We prioritised examples with which we had experience in our academic practice, and which we determined to be of use to this audience. (In addition, we deliberately chose to keep the reporting in first person language of "I"/"we" to maintain authenticity within our chosen methodology. The name of each specific author who is reporting is included in each section heading.) We report on three approaches to cultivating empathy: (1) creating end-user profiles; (2) getting out of the classroom; and (3) mindfulness in contemplative pedagogy. Additional teaching strategies include an empathy quest and empathy mapping. Importantly, all strategies can be applied in local contexts with minimal resources.

End-User Profiles - Scott Rayburg

My team and I included a new assessment task to help students to empathise better with their prospective stakeholders, in the most recent delivery of the EWB Challenge (Semester 2 2019) in the first-year first semester unit titled "Engineering Design and Innovation". We called the task an **end-user profile**. (The unit is co-taught by staff from the Faculty of Science, Engineering and Technology, and from the Faculty of Health, Arts and Design, and so The teaching team includes engineering and design staff. Three members of this project are on the team, including Melissa Toifl and Mark Newbound.)

First, we identified a range of potential end-users. To provide breadth, we chose: a primary-school aged girl and boy; a secondary-school aged girl and boy; an unmarried and childless mid-twenties man and woman; a married, mid-thirties father and mother; and, finally, a mid-fifties man and women expected to be grandparents (so part of a larger family group). We created the first end-user profile (for the secondary school aged girl) to demonstrate what an end-user profile might look like, and to be sure that it was possible to create a detailed profile based on the many, but disparate, sources available to the students on the EWB Challenge

website. The assignment was then given in Week 1 (for completion in Week 2) to groups of 5 students (each group of 5 would do an assigned end-user to allow us to cover all possible end-users listed above). Once completed, the students shared their end-user profiles with the class in two ways: first in a short presentation during a tutorial session; and second, in tabular format uploaded to a shared online ideation platform (crowdicity.com). We observed that the students started to engage immediately with the EWB Challenge website (in previous iterations of the unit, many students still had not actively used the EWB Challenge resources on the website until Week 5 or 6 of the semester) and appeared to gain an early understanding of who they are designing for and why, which we anticipate will help them to come up with more appropriate design solutions.

Observations on end-user profiles - Melissa Toifl

Initially, as a member of the academic teaching staff, I wasn't sure that the end-user profiles would be successful. I was hesitant, due to past students' reluctance to find information that may not be readily accessible. However, in this case, I observed that once the project brief was passed on to the students in a workshop, many of them were very interested and immediately started to engage with the EWB Challenge website. In the following workshop where the end user profiles were presented, I found that many of the students had thoroughly explored their particular end-user, and had clearly engaged with material beyond that available on the EWB challenge website. As a result, they were able to present a very detailed profile that allowed them and the rest of the class to understand the particular challenges faced by various end-users. In a number of cases, I also observed students identify complex issues for some end-users, such as gender inequality. In a discussion with the class after the presentations, it was clear to me that there was empathy for the end-users and also a significant awareness of the often complex issues faced by the communities.

Further observations on end-user profiles - Mark Newbound

Also as a member of the academic teaching staff, I noted students gain additional learning benefits from their research by sharing and discussing the information gathered as a class. This appeared to help students as a group to identify and understand common themes in relation to the focus-community, and community member relationships, in the context of their project aims. For example, several groups with school-age children as their end-user reported that education often came second if there were pressing chores that needed to be done to help their parents. In turn, students who were presenting parents' profiles were able to illustrate the nature of their labour and time commitments. Through conversation as a class, we were able to draw out connections between these issues and implications for potential designs. So, students could begin to piece together how, for example, an intervention to reduce agricultural labour could then flow through to aid children's education.

There were several cases discussed that demonstrated similar interrelationships. I had observed that this more holistic comprehension was missing in the classroom in previous years, which did not include the end-user profile approach and classroom discussion. In the past, students had been required to write about the social consequences of their designs, and this work has not typically been done with the kind of clarity of understanding one might expect. The challenge moving forward in pedagogical terms will be to maintain students' engagement with these profiles through the design process, and into their reflections for the written report. The key learnings are gleaned by providing learners with a structured approach to researching end-users' lived experiences, which both informs professional practice and cultivates empathy.

Getting Students out of the classroom - Scott Daniel

I have facilitated a number of EWB Design Summits, in Cambodia, India, and Malaysian Borneo. The first few days of each program are spent building team rapport, orienting to the local context and environment, and in workshops on relevant topics such as language, culture, international development, and human-centred design. There comes a time though, perhaps in any design process, when you have to “get out of the building”, as one of my fellow facilitators described it. That is, you have to take your classroom learning and ideas out into the real world, start looking outwardly rather than just inwardly, and actually talk to people.

In the Design Summit program, this originally was in the form of the **tuk-tuk challenge**. The first Design Summit was in Cambodia, where the tuk-tuk (i.e. an auto-rickshaw, a 3-wheel motorbike with a covered carriage) is a common form of transport. In small groups, students were given an afternoon to approach and interview a tuk-tuk driver and discuss their work, challenges, ambitions, and life. Students then had to identify a design opportunity, and ideally prototype it and get feedback from the driver. At the conclusion of the afternoon, students would meet back together and present their prototypes and share their experiences. For example, one of the designs was a carabiner bolted on the floor of the tuk-tuk, so that passengers could quickly secure their luggage to the carabiner to protect against theft.

Through this miniature version of the human-centred design process, students would often report being surprised by what they had found out, or that some assumption they had made about the tuk-tuk driver and their life had been unfounded. However, by asking students to develop a prototype, there was the danger of reinforcing a view of engineering that is about physical outcomes, rather than emphasising the importance of empathy and stakeholder engagement.

As a consequence, the tuk-tuk challenge has developed into the **empathy quest**, where the focus is entirely on ‘discovering’ a context, and ‘empathising’ with stakeholders, those being the first two phases in how EWB Australia frames the human-centred design process.

Before going off in small independent groups, students are briefed. In this briefing, they are reminded of what’s involved in the discover and empathise design phases, and asked to consider who (given what they’ve learned so far about the local context) they would like to talk to in more detail---e.g. tuk-tuk drivers, waiters, small-business owners, market stallholders, or someone else. In preparation for interviewing, they are asked to conduct quick 1-minute interviews with each other in pairs, about their university commutes. Then we have a short whole-group discussion about what they found out, and what makes a good interview – e.g. building rapport, active listening skills, open versus closed questions, etc. Finally, students form small groups and are given some time to plan their afternoon.

Students are given 1-2 hours for this exercise, and then re-group all together. The ensuing discussion in part focuses on what they actually found out from their stakeholders, but also on what they found out from the experience (what was challenging, what was good, and what they would do differently). Many students find the exercise challenging, because of its open, ambiguous nature, but this is an important obstacle to overcome as the design process is not linear.

Empathy mapping is one tool to help students make sense of what they found. An empathy map has four quadrants, in which students record their recollections about what the person they spoke to *said* and *did* during the interview, and then attempt to surmise what they may have been *thinking* and *feeling*. From this analysis, they also can try to deduce some of the users’ needs, or record any insights they’ve drawn.

Such an activity could easily be adapted to the EWB Challenge, taught in Australian universities. The key learnings are not from the international context, but rather from the experience of interviewing strangers, and reflecting on different interview techniques, and how what they find out may challenge some of the assumptions they had inadvertently made. This is a direction we would like to explore in future reflective conversations.

Cultivating empathy through mindfulness - Claire Dixon

In Semester 1 2019, I co-facilitated a vertically integrated project (where first-year and second-year engineering students attended together) relating to communities in Timor-Leste. My co-facilitator and I noticed some students making a range of assumptions about the communities, the end-users of various designs, based on their own lived experience. At the same time, others were struggling to know where to begin, perhaps recognising the vastly different geographic, cultural and economic context, and therefore being reluctant to make any assumptions at all.

We were looking for ways to support students to relate to and empathise with the end-users of the designs. Empathising requires us to transcend ourselves and our own perspectives, to put ourselves 'in someone else's shoes'. This requires a degree of self-awareness and, we would argue, a mindfulness approach. In addition to a range of other activities, we decided to introduce **mindfulness exercises** at the beginning of classes. Mindfulness can be defined as "paying attention in a particular way: on purpose, in the present moment, and non-judgementally" (Kabat-Zinn, 1994, p. 4). A discussion of mindfulness definitions is beyond the scope of this paper; however, mindfulness approaches can form the basis of "contemplative pedagogies" that are designed to "enhance meaningful and transformative learning processes" (Ergas & Hadar (in press), p.2).

The aims of the mindfulness exercises were twofold; first, to centre the students, supporting them to leave everything else 'at the door' and fully arrive in the space, readying them to engage with the session. Second, to support the students to empathise with the communities for which their project work relates (see Barbezat & Bush, 2014).

The mindfulness activities that specifically focused on building empathy for the end-users involved visualisation. Students were invited to find a comfortable position and close their eyes. The guided exercise invited students to piece together information they had read and seen about the communities, and imagine what it might be like to live there. For example:

- *Imagine that instead of being born here in Australia (or somewhere else), you were born in a mountain village in Timor-Leste. You've grown up there.*
- *Imagine the place where you might live. What does your home look like? What materials is it made from?*
- *Who lives with you? Do you have any children? Who else lives around you?*
- *What sort of work do you do? Do you travel for work? Or do you work close to home?*
- *How far away is your home water supply? Who gathers the water and how is it used?*

I have used mindfulness activities as a companion tool for building empathy in classes throughout three projects over two semesters. Whilst I have not specifically sought feedback from students on the exercises, I have noticed that most students actively engage in the exercises and appear to respond positively. The key learnings from these activities lie in providing students with the experiential tools for imagining themselves into the communities for which they are designing solutions.

Conclusion

One outcome of our reflective process was our own growth as educators, through sharing and articulating our different experiences and approaches. A central point in our discussions was how to engender empathy in our students for the distant communities they were learning

about, given that “as designers, our engineers need to understand the communities for which they’re designing solutions” (Meeting 3, 14:21 min). In this paper we have described several such approaches that were in part synthesised from sharing our collective experiences. Our hope is that such approaches will be of benefit beyond humanitarian engineering to the broader engineering education community, triggering discussion, expansion and applicability, and in turn become a focus of evaluation and research. In addition, we believe that the richness of these outcomes speaks to the value of facilitated critical reflection in academic development.

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