



What is care in Engineering teaching?

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Work in Progress: What is Care in Engineering Teaching?

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Abstract

The concept of *care in teaching* has been associated with the development of supportive, personalized relationships between teachers and students, and with the development of an emotionally safe environment inside and outside the classroom. Care in teaching has been found to have an impact on the emotional health and on the intrinsic motivation of students. Thus, arguably it also has a positive impact on learning experience. Existing literature does not identify what attitudes and practices can be implemented in schools of engineering to promote effective care in teaching. This paper describes the progress of an ongoing research currently carried out at a large engineering school in Chile. The investigation has two main objectives. First, to understand what does it mean to care in teaching; second, to understand what is the influence that caring teaching has on the students' learning experience.

Introduction

From a philosophical perspective [1], the ethics of *care* involves attending to and meeting the needs of who we take responsibility for. It particularly values emotions such as sympathy, empathy, and sensitivity, and views persons as relational and interdependent.

The study of care has permeated other areas of knowledge, including education. Noddings [2] described the attributes of the *teacher as a carer*. In such a role, she proposes teachers should be *attentive* to the needs of students, responding always in such a way that the caring relation is maintained. She emphasizes additional attributes of caring teachers: the ability to *listen*, the ability to *empathize* with the student, and the ability to *reflect* upon the actions to be taken in case of need. Finally, caring teachers should also promote a caring environment, encouraging their students to read and respond to their peer's feelings. Gholami and Tirri [3] studied more than 500 primary-, middle-, and high-school teachers, aiming to explore the perceived dimensions of caring teaching. They identified four dimensions (1) *Nurturing of the student's character*, which are the teacher's pedagogical decisions that cultivate the student's character; (2) *Awareness*, which concerns with the teacher's involvement in knowing the student's personal problems, needs, and capabilities; (3) *Didactical bias*, which is concern with teacher's activities that avoid bias to particular students; and (4) *Respectful didactics*, which is concerned with the teacher's

ability to respect all students and avoiding the violation of their dignity as human beings.

A way in which care may influence learning is by supporting autonomy. Reeve [4] identifies a number of caring teaching attitudes that support autonomy, including the *nurturing of inner motivational resources*, the display of *patience to allow time for self-paced learning*, and the *acknowledgement and acceptance of students' expressions of negative affect*. Jang et al. [5] showed that students exhibit greater autonomy-need satisfaction, engagement, and conceptual learning when their teachers adopt autonomy-supportive practices.

While the importance of the ethics of care—specifically, empathy—in engineering practice has been emphasized by some authors [6, 7, 8, 9], caring teaching has received less attention. Indeed, to the best of our knowledge, existing work [10, 11] has given only a high-level overview of what is caring teaching in engineering.

This paper describes the progress of an ongoing research project currently carried out at the School of Engineering at Pontificia Universidad Católica de Chile (UC Engineering), a large and selective engineering school in Chile, with more than 160 faculty members. This research project is being conducted by the Engineering Education Unit (EEU) of UC Engineering and it has two main objectives. The first objective is to identify and describe caring teaching practices and attitudes. Our objective is to clearly describe the practice, so that it is easy implementable by any engineering teacher.

As a second objective, we want to understand what is the influence that caring teaching has on the students' learning experience. Since no progress has been made towards this objective, this paper will only report the progress towards achieving the first objective.

Methods

We adopted a ground theory approach to identify a set of caring practices and attitudes related to care in engineering teaching. In order to collect qualitative information, we interviewed a convenience sample of 11 full-time faculty members. Since UC Engineering has 10 Departments, we chose at least one faculty member per Department, and two of them were female professors. On average, our sample started their teaching career in 2005, and they have been positively assessed in student evaluations of teaching. Given their experience and their efforts in teaching tasks, we considered that they could facilitate the identification of practices in this exploratory phase of our study. Although the dean has motivated open discussions about 'the culture of care', most of UC engineering faculty have not been exposed to care-related literature.

We conducted semi-structured interviews that lasted about 45 minutes, and each interviewee signed an informed consent to authorize the use of their answers for research purposes. We used an interviewing guide with seven questions that started with a warm-up question (Q1) to know more about interviewees' teaching background. After that warm-up question, we asked them about the structure of their classes (Q2), and their use of teaching strategies (Q3). Then, we asked them to provide a detailed description of their interaction with students (Q4), and to describe their understanding of the concept of care (Q5). Finally, we asked them to identify caring practices in their teaching (Q6), and to add any further information that they perceive relevant for our study (Q7). With all the information collected, we performed a qualitative analysis by means of open

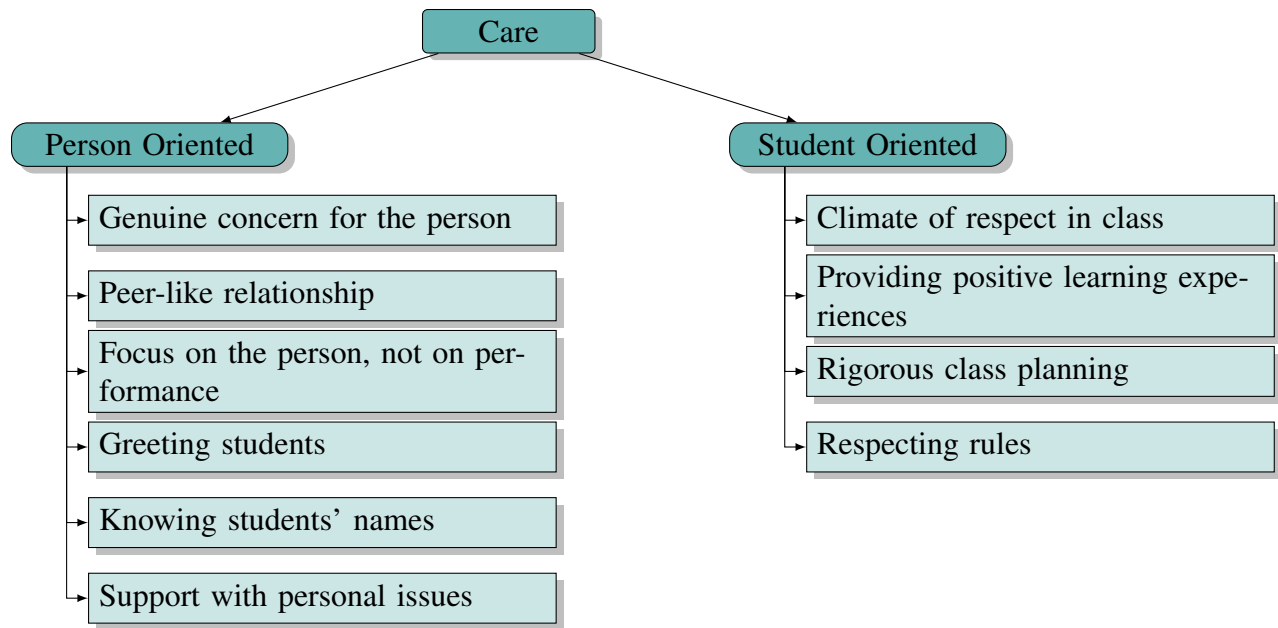


Figure 1: Attitudes and practices identified by the interviewed professors.

coding.

Results

Figure 1 shows a list of the practices and attitudes that were mentioned as caring teaching practices during interviews. The concepts observed that were more repeatedly mentioned were *confidence*, *a close and comfortable environment for asking questions*, and *focus on the learning process of the students*. For Q2, the concepts observed more repeatedly were *care for and within all members of the community*, *empathy*, and *focus on human aspects*. After a first round of coding, we found that these concepts could be classified in two distinct categories: (1) *personal-oriented care* and (2) *student-oriented care*. In the first category we include those attitudes and practices that are directed towards the student as a person, while the second are practices that promote a caring learning environment.

At first glance, the practices and attitudes may seem very high-level. For space limitations we cannot include the full details. Figure 2 shows excerpts of some of the interviews which shed some light into the details of some of these.

An interesting observation is that even though the interviewees were unaware of the literature on the ethics of care, they identified the most of the dimensions described by Gholami and Tirri [3]. Specifically, *Nurturing the student's character* is addressed by *genuine concern for the person*, and *peer-like relationships*; *Awareness* is addressed by *support with personal issues*; *Respectful didactics* is addressed by *focus on the person, not on performance*. We did not find any mention of practices related to Gholami and Tirri's didactical bias. We also did not find explicit mention of the ability to *listen* described by Noddings [2]. We did not find any practices that would promote

Person-oriented	<ul style="list-style-type: none"> ● “The way I relate to them, I try to make it as symmetrical as possible.” ● “Learn the names, look them in the eye, ask them how they are, greet outside the classroom, attend the activities of the student association” ● “One simple first thing to do at the class is say hello and genuinely ask them how they have been, how they have spent the weekend, and tell them something that happened to me.”
Student-oriented	<ul style="list-style-type: none"> ● “The care that one prepares his classes. For example, from the tests, from the class itself, the projects. It’s not an excuse I have to prepare the paper, I have to do this, so I can’t go to teach the class. In that sense you have to be super respectful, and you have to do your best in the class you do. ” ● “Order. Very orderly lectures, respect of all dates, respect of grading deadlines. The rules always have to be clear, I think that shows my concern for them. ”

Figure 2: Excerpts of Q3

student-to-student care.

Next Steps

What we have described above are only the first steps towards satisfying the goal of identifying and evaluating care practices in engineering teaching. We are currently in the process of conducting a second round of interviews to the same professors, in which we aim at coming up with a very precise description of the caring practices. For example, we want to understand multiple ways in which concern for student’s well-being may be expressed.

To evaluate the influence of these practices over the students’ learning experience, we will identify another group of professors who do not necessarily use these practices in the classroom and we will ask them to incorporate some of them. To evaluate the influence of the practices we will monitor the implementation, and use student written evaluations and other instruments we are still in the process of designing.

Summary and Discussion

We described the progress of a research endeavour whose aim is to identify, clearly describe, and evaluate the influence of caring teaching in engineering. We identified a number of high-level practices and attitudes after interviewing 11 faculty members. Our approach has a number of limitations. Indeed, some of the practices we identified seem to be related to the character of the professor and may not be implemented by any professor. The interview-based approach also makes it hard to extract practices or attitudes that are ‘obvious’ to professors, since they are not conscious of performing them. This may explain why we did not find any mention of the *listen* attitude described by Noddings [2] in any of the interviews.

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