Teaching Engineering Ethics With Drama

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***Abstract*—In this Work in Progress, we present a new, simple, and fun way of incorporating drama into engineering ethics education with students producing, performing, and watching drama. The method differs from more established drama-based pedagogies in engineering ethics education, such as role-plays. We argue that this method can contribute to learning by stimulating moral imagination, empathy and sympathy, which balances the otherwise cognitive focus in engineering ethics courses. The component has been tested in practice three times in 2019-2020 in the Engineering Ethics course at Uppsala University. Student feedback is used to illustrate how the method has been perceived by students.**

***Keywords*—engineering ethics, ethics, drama, performance, pedagogy**

I. Introduction

"Today's touch-a-cock day!" exclaims a woman walking into the lunch-room. Her female colleagues laugh and start up some coarse banter while the male minority sit quietly around the table and try to ignore them. In the next scene, a young male employee complains about the sexism at the workplace to the female manager who tells him that it's not serious, quite natural in this industry, and something that needs to be accepted.

What's going on here? These are not professional actors, this is not students watching a play at the theatre. It's an engineering ethics drama session where students are performing a scenario/drama they have produced based on their own previous interview study about ethics with professional engineers. In this particular scene the students very creatively made their own modification to the real-life case, they switched genders, which led to … shock, fun, interest, excitement… We believe that what we have just told about is a quite unusual scenario in university education, at least when it comes to engineering ethics education.

While we have never met any other teachers who use this kind of drama for teaching engineering ethics, it seems to be quite common to use role play methods to teach ethics. In such role plays, students play different roles, which are scripted by the teachers or a third party in advance. An example is one which we use ourselves, which concerns a technology assessment of a new technology - an active learning management/surveillance system for use in the university. Quite naturally it involves a range of stakeholders where some students play the role of a company representative of the system, while some other students play the role of the student union representative (fighting for a good psychosocial milieu), an ethics professor (bringing the debate to a more intellectual level), a high-performing and perhaps too results-oriented student (needs no further explanation), a teacher (who is concerned about the impact on his teaching and student relations) and the university management (who want to use the latest educational technology, but of course not run into ethical quandaries). In such role plays, the students learn the role, make it come alive, and also practice improvisation, argumentation, and communication real-time. To repeat, while such role plays are quite common in our experience, the proposed method in this paper - teaching engineering ethics with drama is much less common. A recent review of engineering ethics instruction in the U.S., does not mention drama, but does mention role-plays (however, role-plays too seem to be marginal within engineering ethics courses) [1]. However, that our approach is uncommon does not make it innovative and valuable.

In this paper, we will try to argue that drama can be an interesting and potentially important teaching form in engineering ethics education. Such arguments have been advanced in the past, but only in a few papers. And we have not found any articles about student-produced and performed drama, and the associated effects on learning. We will argue that such drama can help stimulate moral imagination and creativity, that it evokes emotions, and that it is fun and engaging. After a literature review section, where we survey what has been written about drama and how it could contribute to ethics education, as well as how we think we differ from the existing literature, we will present how we have incorporated student-produced and performed drama into an engineering ethics course. The drama module is given at the Dept. of Civil and Industrial Engineering at Uppsala University. We will return to a tentative comparison between our way of teaching ethics with drama and our view of role-play in the discussion section.

II. Literature Review

The connection between ethics and drama is of course ancient but the idea of incorporating drama into the teaching of ethics has received an upswing over recent decades. In the Hastings report, which has had a wide influence on ethics education across the world, we read that "The emotional side of students must first be elicited or evoked - empathy, feeling, caring, sensibility" but that the "cognitive must quickly enter", an analytic perspective. The report proceeds to state that "The use of novels, plays, and films… often far

more successfully stimulate the imagination than can be done with ordinary reading fare in philosophical or theological ethics" [2]. The identified learning goal of stimulating the moral imagination in the Hastings report was picked up in the seminal engineering ethics paper by Harris et al. [3], but subsequently transformed to ethical sensitivity in later papers [4] [5]. The point of that learning outcome is to train students to become aware of the ethical dimension of their engineering practice, to teach students to "see" the world also taking ethics into account. What we can learn from our reading of engineering ethics education literature is that while the Hastings goal of moral imagination has lived on, the methods for stimulating moral imagination seldom draw on novels, plays, and films. Most often, cases are important means to achieve ethical sensitivity (and other learning outcomes) [1].

There are exceptions though. Sabine Roeser is focused on arguing for the importance of emotions in engineering ethics research, practice and education. Roeser argues that there is a focus on argumentative and reasoning skills within engineering ethics teaching and that engineers should also be trained to develop and to use their empathy and sympathy. This is connected to imagined role-taking and that role-playing games can be a way of developing empathy and sympathy. Roeser concludes that courses should be designed that "enhance the emotional and imaginative capacities of future engineers" [6] (see also [7]).

William Frey has explored related concepts. Frey [8] discusses how cases can dramatize a situation helping students internalise ethics. In a later publication Frey proceeds from the learning goal of stimulating moral imagination in the Hastings report to discuss what moral imagination is, that moral imagination can be developed, and can thus be taught. Frey concludes by stating that teaching moral imagination involves teaching three skill sets of role-taking, multiple framing, and dramatic rehearsal. Role-taking involves "empathic projection", being able to view something from another person's perspective. Frames filter our understanding but can also be restrictive, so multiple framing involves the ability to recognise frames and be able to construct other ones and is something that we also connect to critical thinking. Finally, dramatic rehearsal is playing out particular scenarios in your mind [9], see also [10].

Frey outlines a performed drama that allows students to practice these three skill sets. Students in groups work with a specified case which includes established "turning-points", events where things could have proceeded differently. The students then explore "what if?" and perform these alternative futures in front of the class. Various connected activities encourage reflection [9].

Doorn and Kroesen [11] discusses the use of role-play. Role-play can assist in helping students to understand multiple perspectives which can be compared with multiple framing discussed above and that active, collaborative pedagogies are most effective [12]. This collaborative, group based approach also mimics real-life engineering work practice since ethical decisions are usually made in this context [13]. A central argument for Doorn and Kroesen is the need to shift from an individualised micro-ethics to a macro-ethical or institutional context and that role-plays are a suitable way for students to discover these broader contexts or frameworks [11]. There is also literature that explores the use of drama in teaching but not specifically for ethics, this extensive literature has not been reviewed for this paper

An example of a very sophisticated role-playing game is used to teach engineering ethics at Worcester Polytechnic Institute [14]. This role-playing game was designed in conjunction with the humanities faculty and is an immersive experience set in 19th century Worcester and its waste management challenges. There are performative aspects, including professors giving lectures as historical professors. However, what we present in this paper is a very simple method that requires minimal resources.

Another approach using drama in the teaching of engineering ethics is to ask students to watch drama. Monk describes four different plays, from the ancient to the modern, and how these can be used to teach engineering ethics. They are used to illustrate and reflect upon ethical problems and an aim is to broaden students' understanding of the contexts in which ethical problems arise [15]. A similar approach, for business ethics, is outlined by Garaventa [16]. Middleton used an alternative approach – to professionally produce original drama and use it to teach research ethics with the aim of turning teaching a subject that was regarded as boring into a more enjoyable experience, for both students and lecturers [17].

To sum up, what we can learn from reviewing the literature is that there are only a few sources that mention drama as a way of teaching engineering ethics. We believe in line with Roeser [6] that this lack of attention is because of the "cognitive dominance" in engineering ethics education, where much focus is put on two other learning goals in Harris et al. [3], namely moral knowledge and moral reasoning. We concur with Roeser [6], and with Callahan [2] that we should mobilize emotions as well as reason when teaching engineering ethics.

A relevant drama-based approach in relation to our own is Monk [15], but here the focus is just to watch drama and reflect about it. Our approach is also focused on producing and performing drama. Frey [9] also discusses dramatic rehearsals within some turning points of a scripted case. In relation to Frey, our approach is more open with agency granted to students to imagine a scenario more freely. In Middleton's case, the teachers script drama which is then played by professional actors, and used for making research ethics teaching fun [17]. This is a much more resource intensive approach than ours. When it comes to role-plays, for example as described in Doorn and Kroesen, students are performing roles, and not producing the script [11].

III. Performance Seminar

The performance seminar which is outlined here is a part of the course Engineering Ethics at the Dept. of Civil and Industrial Engineering at Uppsala University. The course is given in English in the spring with around 100 students as an obligatory part of Master's Programme in Industrial Management and Innovation. During autumn the course is held in Swedish for other engineering students, approximately 70. The performance seminar has now been held three times and is held as the final seminar in the course. Prior to this students have studied cases, learnt theory and decision-making models and also taken part in a role-play. Immediately prior to the seminar, they have handed in an assignment which will be the basis for the performance.

The performance is based on this previous individual assignment, an interview study. This tasks students with interviewing an engineer about ethics. They ask the engineer about how they think and reason about ethics and how ethics matters in the workplace. They are also encouraged to discuss ethics with the interviewee. This general interview and discussion about ethics, along with analysis with theoretical perspectives forms the first half of this assignment. The second half of the interview study is built around the engineer describing a critical event that they have been involved with in some way during their career, perhaps an ethical dilemma of some sort. They are also asked to describe how the situation was handled and how the engineer and perhaps others felt about what happened. Students are asked to forewarn the interviewee about their desire to hear about the critical event, to help ensure that this part of the assignment is successful. The students then hand in their assignment where they are also instructed to analyse the interview material including the critical event with the help of the theoretical perspectives that they have learnt in the course.

The critical event from the interview study is what will be considered for the performance. The participants in the course are then requested to form groups, approximately six in each is what we have generally used. The groups need to be quite large since there are usually several roles that are acted out in each performance. Smaller groups force participants to adopt multiple roles, something which the audience finds confusing. They are subsequently asked to arrange a meeting where they discuss each other's critical events from their respective assignments with a view of selecting one of them to perform. They prepare a script and rehearse the performance. Their performance is only to be brief, approximately 10 minutes with a subsequent 10 minute where they make connections to ethical theory and the seminar leader and other students ask questions. The students are only given vague guidelines about how to proceed, on the whole, they are left to their own devices on how to prepare. For example there is no teacher input into the selection of the critical event. There is also only a brief period from the time that they have handed in the interview study to the performance seminar. Less than a week, usually only a few days, depending on the scheduling that particular term, so they have little time. Students are also instructed that while all must participate in producing the performance, it is not mandatory for all to perform. Surprisingly, we find that almost all do.

For the performance seminar the class is divided into seminar groups, usually with four performing groups of approximately six students. The setup is that one group starts, performs while the rest of the seminar watches. This is then followed by a discussion and then the next group takes over and the process repeats. At the end of the session the seminar leader will wrap-up with final remarks and the participants invited to make some final comments. We have found that every session has been highly enjoyed and also that the effort that has been put into the performances has exceeded all expectations.

IV. Student Feedback on the Performance Seminar

This section summarises some student feedback from the seminar. A single question was asked concerning the seminar as a part of the general and optional course evaluation on the first two occasions that it was held (spring 2018 and spring 2019). Feedback, albeit with a relatively low response rate, was highly positive. The fact that it was all a lot of fun was remarked upon by most. Isolated examples of negative criticism include that the seminar is irrelevant and also one case that it was stressful.

For the most recent semester (course held in English, spring 2020) students were asked after the course was concluded to anonymously answer five questions with a view to the results being used in this paper. Only the first three questions will be discussed here. The response rate was relatively low at 20%, possibly due to the COVID-19 pandemic breaking out, people had other concerns. On the other hand, this response rate is not substantially lower than the question that had been given previously as a part of the course evaluations. However, the answers are interesting but can only be regarded as indicative. The questions were designed to on the one hand assist the further development of the use of drama in the course as well as a way of identifying themes for further research:

1. How did you personally experience the seminar? For example, was it stressful, difficult, fun, boring, inspiring or something else?

2. Did the Performance Seminar contribute to understanding something about Engineering Ethics? If no, can you briefly explain? If yes, can you briefly explain what that might be?

3. Did preparing for the Seminar (e.g. meeting group members, choosing a critical event, preparing a script, rehearsing) contribute to understanding something about Engineering Ethics? If no, can you briefly explain? If yes, can you briefly explain what that might be?

The first question aims to capture the overall experience. The second the pedagogical value of *performing* drama while the third attempts to do the same for the preparation and *production* of the drama. The responses are summarised below.

A. Summary of the answers to Question 1.

Almost all respondents noted that it was fun, some noted that they loved it, one that it was a "good opportunity to be creative and dramatically passionate". Another that it "Fosters creativity and something new besides normal teaching". Also that it was more "laid back" and a change of pace from ordinary seminars. A few noted that it was a little stressful but were generally positive. One noted that it was interesting but also a challenge from which you grow. Another noted that the critical event that they were performing was of a difficult nature and something difficult to discuss publicly, but that they could "put it in a comic way" which enabled the subject to be broached.

B. Summary of the answers to Question 2

Several interesting themes emerged. One was based on watching the other groups perform, it "helps me see better that ethics lies everywhere" and that it is helpful to have the events visualized. This might suggest that the seminar assisted with awareness. Another theme was based around that it was "real life", something that some students clearly appreciated, it made Ethics "less abstract", something which is highly desirable. An interesting comment was "It's hard to say exactly what, but I got some kind of feeling for the situations that happened". Another interesting answer was "I

think trying to act as a person doing something questionable, you are forced into trying to go into his or her mindset. Which I think is an unique thing about this". This can perhaps be linked to all three of Frey's skill sets for developing moral imagination: role-taking, multiple frames and dramatic rehearsal [9]. A few respondents mentioned the value of the discussions that emerged, one also that "the subsequent discussions between students were pretty cool". One respondent noted that while the seminar didn't teach anything new, it did however consolidate it. Another that "it put the whole course material together". A few were less enthusiastic, one noted that in terms of learning it was the same as written assignments. Another that "Unfortunately, not so much of learning about Ethics, especially about the relevant theories".

C. *Summary of the answers to Question 3*

Question three concerned the learning from the preparation phase, the production, prior to the seminar. A few respondents noted that the process was fun. Generally, the answers were quite varied. A few respondents noted that their preparation was limited, just focused on the practicalities of preparing the script, and did not give much. Others noted that it was very useful, even "contribute immensely" to hear about the critical events narrated by their fellow group members, to "listen to their stories". One noted that "performing the rehearsals made us involved in the situation". One expressed admiration for the way the engineer in their performance acted in the situation. The practical context was noted by a couple of respondents as was that the process assisted learning to apply theory.

V. DISCUSSION

In our approach to drama-based teaching, the students produce their short drama, they perform it, and they also watch the drama of other students. Given earlier research as well as the findings from the qualitative research, we believe that this kind of drama can contribute in different ways.

When producing drama, students need to collaborate and choose one critical incident from their interview studies, and then develop the drama based on the critical incident. Since it is almost always the case that the critical incident is under-narrativized, students practice their moral imagination by trying to imagine how the situation played out. They also train to identify different stakeholders are involved in the critical incident and imagine how they feel and think about the situation. Depending on the kind of drama the students choose to perform, for example a drama that creates awareness of an ethical issue, a drama that shows how an individual actor solves a dilemma, a drama that shows how collective effort is necessary, there are additional learning outcomes that could be addressed when producing drama. Furthermore, when the students rehearse the drama, it is possible that they empathise with the role they play, and thus "get a feeling for the issue".

When performing the drama the students are on stage, and other students and the teacher are watching them attentively. Perhaps they act with even more emotion than during the rehearsals, and that they could even be moved by the whole situation (similar to how the authors feel when they do mini-concerts for their friends at home). This can perhaps make the students identify with the roles even more. We believe that the effect reached here is similar to that of more regular role-plays, since role play is about performing a pre-defined role (of course with the students' own take of it).

If the drama is sufficiently well-executed and understandable, students who watch the drama can empathise with the different roles, and get a more "real life" feeling of ethics. In our set-up where the students watch several dramas in the same class, the student is exposed to a variety of situations, which also can enhance awareness of possible ethics issues that they can face in their professional role. Here, we believe that we can achieve the reflection, increased understanding, and emotional connection that Monk discusses in his text about watching (professional) drama to study engineering ethics [15].

By producing, performing, and watching drama, we believe that we can offer a different perspective both to role-play and to Monk's idea of watching drama with students. In our own role play we do not really have an audience that is supposed to watch the situation from the outside and reflect about it. Thus in comparison to our version of role-play, where all students are either playing (or being moral support for one particular role), our drama component involves a dimension of watching and reflecting. In relation to both role-play and Monk's idea, our drama approach makes students produce drama, thus training skills of imagination and creativity.

This teaching component is also quite straightforward to introduce. There is actually no need for an interview study, but the students could freely imagine a critical incident that they could perform, perhaps a critical incident from their student lives. We have not asked how much time students spend on preparing, but perhaps it is at most one day. Perhaps, it might also be the case that students perceive less anxiety in the drama component in contrast to role play, where you need to play a scripted role (often distributed randomly amongst students). In the drama, the students can freely create the roles, and assign roles depending on each group member's willingness and ability to act.

It is of course important to point out that the drama based teaching should complement other approaches of studying engineering ethics, for example learning to create awareness about ethics, understanding one's responsibility for ethical issues at the workplace, critically thinking about how to solve ethical issues, and learning how to act in line with our reasoned judgment [18].

As a final note, we want to stress that many students (and us, as teachers) actually think that this is fun! Although this is an elephant in the room in earlier engineering ethics research [19], there are quite many indications that engineering ethics can be seen as boring and uninteresting to both students and teachers. We hold that teachers should thus be creative in not only finding ways of reaching the desired learning goals, but also to find serious fun ways to do so. We try to incorporate many fun elements in our course, which we will write about on another occasion, and a major motivator for developing this drama session was because we thought that it would be much more fun and that the students would learn something more than would they discuss critical incidents from the interview study. Future directions in this study include looking at other fields that use drama pedagogically as well as gaining a deeper understanding of student's perspectives on drama-based ethics pedagogy.

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