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PERFORMING ETHICS OF TECHNOLOGY. USING IMPROVISATIONAL PERFORMANCE-BASED TECHNIQUES IN ENGINEERING ETHICS EDUCATION

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ABSTRACT

The paper explores the potential for improvisational techniques used in ethics tutorials with the aim of fostering moral sensitivity. Recently there has been an increased interest in researching how performance-based techniques can foster certain ethical competencies. In ethics education for engineering, role-playing games have been an example of performance-based technique successfully employed to help students understand the complexities of ethical decision-making. However, role-playing games have several limitations because of the rigid structure of the roles and of choices in the script, which may lead students to act detached from the situation. Based on the idea that we need to foster also practice-based skills in engineering ethics education, not solely analytic skills, we have encountered in the previous literature the hypothesis that improvisation games can help students rehearse what it is like to act morally in an engineering situation. To clarify what is the potential of improvisation in engineering ethics education, we observed and helped with designing a course centred entirely on improvisational techniques for engineering and science students. Drawing from this pedagogical experiment, we noticed that improvisational performance-based techniques managed to stimulate the student's moral sensitivity. This happened by two effects that we named the spectator effect and the shared space of vulnerability effect that we describe in detail. While role-playing has acquired the status of a "classical" exercise in engineering ethics education, improvisation still needs to be adopted by ethics teachers. Through our experiment, we hope to have shown that there is definitely an untapped potential in

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this kind of exercise for increasing student's moral sensitivity and engagement, thus making possible an increased moral agency.

1 INTRODUCTION. MORAL AGENCY AS A META-COMPETENCY FOR ENGINEERING ETHICS EDUCATION

A central question for researchers in engineering ethics education (EEE) is what learning objectives should form the basis of their courses towards developing the necessary competencies for future engineers. There are lists of such aspirational competencies to be found in various charters of engineering worldwide (such as ENAEE[2] or ABET[3] as most visible). However, what is actually taught in the EEE classroom is shaped by what teachers see as achievable in a limited time-frame and with a fixed repertoire of pedagogical methods. Thus, while ethical competencies for engineers are aspirational and ambitious [1], their translation into educational goals is done more concretely by breaking down the competencies into "behavioural" goals. For the competency of being a responsible engineer (which we would call a virtue), one needs to translate it into something measurable, such as "the student will act responsibly in situations X,Y, Z." However, since we cannot enact situations X, Y, Z in classroom to test the student's behaviour, we take as a proxy the explanation of how one would act if one were to be found in such a situation. From this, we test knowledge or understanding of how one should behave in certain situations and take it as sufficient knowledge to evaluate if specified learning objectives have been met. The mystery remains if our students - once out in the real world – will act in a way that measures up to their understanding of moral concepts and theories learned in class. What we seek to achieve in EEE – and probably in any other form of professional ethics education – is primarily instilling a sense of moral agency in a professional context: our students should feel called to act when they sense a moral wrong happening in their professional environment. However, teaching moral agency in a professional context is not a simple matter of describing it as a stand-alone competency and devising exercises for it. Rather, moral agency is a meta-competency, relying on the other competencies included in EEE [2] such as moral imagination, moral sensitivity, moral knowledge, and the disposition to act. We frame the specifics of this meta-competency as demanding both analytical skills as well as practice-based skills. In pedagogical practice, there seems to be a tension between teaching analytic or practice-based skills. For this distinction, we take our inspiration from Freiman's [3] work on ethics education for legal practitioners which, we argue, holds for most other professional ethics fields, including engineering ethics.

Analytic skills are those skills of manipulating information in complex ways such as understanding said information, using it to create new solutions, looking for missing information, performing logical operations on the premises and conclusions. In the context of EEE, analytic skills entail how to use correctly the moral vocabulary for describing the moral situation in the appropriate terms, and how to argue logically

[2] https://www.enaee.eu/
[3] https://ethics.iit.edu/ecodes/node/5693

about a moral issue [4]. What matters for our purpose is that analytic skills can be entirely learned in the classroom, since the intellectual operations entailed do not require the student to go out in the field. By contrast, the practice-oriented skills are not fostered by intellectual exercises alone, hence the classroom setting has difficulty in fostering these. The difficulty in teaching any form of professional ethics is that, as Freiman argues [3], we do not aim to teach students merely analytical skills but also action-oriented skills. Simply put, we do not want students to merely recognise that a moral situation is at stake, but to also to feel called to act upon it (Callahan calls this a feeling of moral obligation [4]) and to try to act even in conditions of adversity. However, in the EEE classes, we overwhelmingly teach analytic skills while hoping that these will somehow entail that our students act responsibly in the world as engineers. The overwhelming analytic skills focus in EEE is demonstrated by how, pedagogically, we favour assignments such as argumentative essays, discussing case-based exercises [5], or debating about moral dilemmas in a classroom. Analytic skills are great for structuring the student's thinking about open-ended problems, but in ethics education these skills are not enough by themselves. In an engineering context, analytic skills are a tool one uses "to solve unstructured engineering problems (i.e., those for which there is no single or ‘‘correct solution)" [6, p. 978]. If a problem appears in engineering practice, analytic skills help to solve it but only if one assumes that the problem cannot be simply bypassed by the engineers. However, the case is different with moral issues emerging in the engineering practice. There, one has the option of not addressing the problem at all, or of not using one's analytic skills and just following the majority decision. Thus, while analytic skills are precious and need cultivation in EEE, these are not the end-all of skills. In EEE, we are still confronted with the thorny issue of engineers acting based on the moral knowledge gained in classroom. And this is, empathically, not something one can learn by accumulating solely analytics skills.

How to foster moral agency in EEE? Moral agency is traditionally linked with embodiment and intersubjectivity [7]: whenever we exercise our agency, we do it in the world, as situated beings, in the presence of others. We need to understand agency as not an intellectual affair, in our heads alone [8, pp. 1392-1393]. The intersubjective aspect of moral agency means that we need to practice it in the presence of others, not in our heads alone (as an exercise of imagination or reasoning). This poses a problem for the EEE programmes that are inclined to teach only analytical skills. In order to realise moral agency as a meta-competency, we need to train our students also and equally in practice-based skills. Teaching practice-based skills requires a different kind of pedagogy since such skills are experiential. There is no intellectual and detached way of learning the practice-based skills: a major way to learn them is through practice, i.e. by actually experiencing a variety of moral situations as a first-person moral agent; the other way is vicariously (such as watching movies, reading novels and other texts that allow oneself to be absorbed in someone else's experience). Moral agency takes place in small moments and choices occurring in everyday practice, not only in the major decisions:

"Ethical agency does not realize itself in the instant" [8, p. 1386]. Rather it is a "sedimented" [8, p. 1391] practice, i.e. realised through countless instances and encounters.

2 ROLE-PLAYING EXERCISES IN ENGINEERING ETHICS EDUCATION AND THE ROAD NOT TAKEN: IMPROVISATION-TECHNIQUES

In order to foster practice-based skills contributing to moral agency, very few pedagogical methods are available. Following Freiman, only two pedagogical methods have been specifically devised to instil practice-based skills: clinical ethical practice and role-plays [3, pp. 1291-1292]. An already well-established approach in EEE towards instilling practice-based skills is the pedagogy of role-playing exercises. A role-play consists in acting out a controversial decision (such as launching the Challenger shuttle or not, deploying a controversial technology, etc.) in a kind of a classroom performance where students do not receive scripts, but role descriptions. Students are then free to improvise their lines in the ensuing play-debate, while making sure that they stick to the character description and embody the character's motivations and interests. In our classes at TU Delft, there is also an external observer to the role-play (usually chosen from the students) who is specifically paying attention to the different group dynamics and individual motives, thus facilitating retroactive reflection on how people acted in the role-play. The outcome of the role-play is usually a moral decision.

Role-playing has already shown its unique educational success in EEE in pursuing certain learning goals. As discussed by [9], the many benefits of using role-plays in EEE entail the active stance taken on by students, fostering creativity in problem solving, helping students inhabit multiple perspectives on an issue. When role-playing, students experience first person the institutional constraints and dynamics, or they feel enticed to redesign of artefacts, or to change the policy [9]. This is because students take an active and creative stance towards the case they enact, and therefore cannot help but feel implicated and personally touched by the matters discussed. At a more abstract level, role-playing helps educators pursue macro-ethical goals, such as introducing students to complexity and showing them that ethics is not just about individual decisions taken in key moments by human actors, rather that there are also institutional, political and social forces, arrangements and discourses that shape options for action. However, this macro-ethical outlook is not the standard way in which role-plays are deployed in EEE [9], where usually the role-play focuses around one clear decision ("to launch or not to launch") taken by one main actor with a supporting cast.

Role-playing exercises have multiple pedagogical benefits in EEE, especially for instilling practice-based skills. However, role-playing has also some limitations insofar as moral agency is concerned because the very idea of playing a role creates some limitations for the students, especially with regards to developing one's own moral agency. It has been observed that students tend to play stereotypical versions of their roles [3], acting out clichés about that role (the expert not listening to the lay

public, the manager ruling with an iron fist, the profit-obsessed shareholder etc.). While there is some improvisation in the role-playing exercise, as student-actors are free to improvise their own lines, there is the limitation of the set role, the character traits, and of the socio-cultural constraints with which it the role comes. Furthermore, the re-enacted situation is usually well-known, inspired by historical events, thus students do not feel called to change the parameters of the story. Role-playing can happen in a detached manner, especially when students re-enact historical decisions such as that of the Challenger launch - since the events they play took place more than three decades ago, in a different institutional culture. As Freiman observed, this detachment of the student from the role enacted in the role-play may undermine the pedagogical outcomes: “Students may perceive a role-play as requiring them to play a role external to themselves, and one in which they believe themselves unlikely to find themselves in the future; they thus may distance themselves from the experience even as they are engaged in it." [3, p. 1280]. Thus, one danger of relying exclusively on role-plays for practice-based learning is that it may not elicit the experiential learning we are after where students get to feel what it is like to act in the moment. To overcome this, we propose improvisation as complementary to role-playing in EEE.

Improvisation in the EEE classroom has the potential to overcome these limitations of role-playing while keeping intact the experiential aspect of practice-based skills. Improvisation is a performance-based technique that involves the performers inventing their own lines of text, actions, and characters. It is a horizontal form of creation, since “there is no script, no sets, minimal if any props, no predetermined roles, and a very different role for the director/producer" [10, p. 593]. Improvisational exercises in the classroom stir "spontaneity and intuition as two critical dimensions of improvisation" [10, p. 593]. The major difference between improvisation and role-playing is that role-playing makes students conform to a role (often stereotypical) and focusing on how to play it well. Improvisation, meanwhile, allows students to access their past experiences in order to make sense of the new situation. Since there is no clear role to play the students revert to creativity and will be more present in the pedagogical situation [3, p. 1280].

> Improvisation,' by contrast [to role-play], does not connote performance or otherness. To the contrary, we all improvise when confronted with difficult situations, cobbling together prior experiences to craft an appropriate response to a new situation. Using such a description may therefore make students more likely to be present during the exercise. [3, p. 1280]

Freiman theorised improvisation as a way of learning practice-based moral skills starting from the observation that, in order to acquire practice-based skills, one needs competence and confidence, which can be only instilled through repeated practice [3, p. 1297]. To provide practice-based skills, students need to rehearse the morally problematic situations one may encounter and thus to build resilience to tackle those in a safe environment. Improvisation, alongside role-play, is the main way to practice a skill by enacting it. There is very little literature on improvisation in

ethics pedagogy, and as far as we know none dedicated to improvisation in EEE. For this reason, we designed an experiment to test how improvisation could work in a classroom at TU Delft.

3 A CASE-STUDY ON IMPROVISATION IN AN EEE CLASSROOM: GIVING VOICE TO A TECHNICAL ARTEFACT

In the autumn-winter semester of 2020, our colleague Bauke Steenhuisen created a course for honours-track students centred entirely around learning theatre skills and using improvisation to tell a story involving a technology. The course was guided by the question: what can we learn about technology and about being an engineer through theatre? The students were bachelor's and master's level coming from multiple faculties of TU Delft, all of them having had little to no prior ethics training. We gave some input into the designing of this course by proposing the case study (augmentative and alternative communication (AAC) technologies4) and providing the theme for the improvisation (what happens if an artefact had the power to speak? What does an artefact have to say?). The students were trained by two professional acting coaches, who introduced various performance-techniques during six meetings. The first two sessions were not yet focused on the AAC case, but primarily on getting familiar with improvisational techniques. The following four sessions were dedicated to students writing and rehearsing a short scene in groups of three, while being coached by the professional performers in every session. Students were free to write a scene about any aspect they considered relevant in the AAC tech usage, the only requirement was that the AAC device needed to be acted by a human actor. This requirement was added to grapple with the (pseudo)agency of technology and to open up the ethical issues, while letting students discover these issues on their own. The students received no hint of the possible ethical implications of using an AAC device nor did they receive any instruction in ethics during this course. They were explicitly asked to act out a scene where the technology plays a role, but not necessarily a morally problematic scenario. All teams of performers were made up of three students who all performed a sketch (there were three roles in each sketch: the patient, the expert, and the AAC device). There was no director, they all co-wrote the scenes, helped by a theatre coach only for the performance part. After rehearsing their scenes with the coaches, in the last meeting of the course (the seventh and final class), the students played their improvised scenes in front of their colleagues and of several external guests. After every group's performance, there was a plenary discussion with feedback and questions. Because of the Covid-19 restrictions, the entire course took place over Zoom although it was initially planned to be an in-person course.

[4] "Augmentative and Alternative Communication Technology, or AAC Tech, is a relatively young, multidisciplinary field aimed at developing technologies for people who are unable to use their natural speaking voice due to congenital or acquired disability." [11, p. 1].

4 METHODOLOGY

In order to better understand the potential of improvisation in EEE, we provided some specific input for designing the requirements for the scene, but we did not intervene in the actual teaching and we did not appear in classroom during the six sessions. We observed the final performance (seventh class) and took notes of the discussions. We hypothesised that if students would be asked to improvise a scene where a technology comes alive by acting, they will stumble on their own on moral issues and that they will recognise such issues as moral. Our hypothesis concerned primarily the moral sensitivity of the students which we hoped would increase. To check this hypothesis, we performed two sets of interviews with six students (out of the total of 21 participants) who had volunteered to take part in these interviews. The first set of interviews happened in the first week of the course, where we asked students how they see their roles as engineers, what are the expected moral and societal responsibilities of an engineer. The second set of interviews happened right after the final performance, when the course had ended; we asked the same questions as before, but, in addition, we asked students to comment on the ethical aspects emerging in their previous performances. The interviews were semi-structured, with open-ended questions, recorded audio only. We coded the interviews manually using thematic analysis (we looked for words and strings of words representing responsibility, moral problems/ dilemmas, and societal role of engineers) and we interpreted the themes using hermeneutic analysis [12].

5 FINDINGS AND DISCUSSION

5.1 The spectator effect and moral awareness

We were hoping that students untrained in ethics would start to notice on their own the various moral problems arising when a technology mediates communication between human beings. AAC devices are a relatively new technological innovation used for non-speaking persons. These devices were designed with the stated purpose of enhancing autonomy, safety, well-being. However, like many other technological developments, AAC devices can raise serious ethical concerns such as constraining the user's range of expression, making their disability more visible and exposing them to social stigma, having one's authenticity as a speaker questioned etc. (for a more complex discussion on this, see [11]. However, we were surprised to find out that the students, both when writing, rehearsing and acting the sketches, did not see any moral issues with the AAC device. In their scenes, most students saw AAC primarily as a technology for doing good, thus implicitly affirming the ethos of technological enthusiasm predominant among engineers [2]. Students worked hard to make their sketches interesting, funny, insightful, but with little concern for the power relations or injustices that a technical device can generate.

> *D: "during the course I didn't really directly think that it had an impact on my thought on that subject, on what it means to be a good engineer. It was more just how to be a better person I think in general. And my opinion also just hasn't changed"*

> *C: "To teach ethics in general, I think it's not only [about] ethics but some kind of like a perception about the word. I think they lie in our understanding of the world, and so I think that's not what we can teach others... So we can for sure apply our own understanding to certain fields. But to teach it, I don't think it's possible. But at the same time I too I think like the course tried to stimulate us to think about our thought. So and to formulate our thoughts. And I think that it can somehow boost our awareness about those issues, but not to teach us."*

During the final performances, several morally problematic issues emerged for most of the spectators – as evidenced by the questions and the discussions. We were hoping to observe a change in moral awareness for the students we interviewed. What we found was, instead, that students were struck by the moral issues at stake only when seeing them acted "on stage" by others. Seeing others play-act created a distancing effect that allowed students to notice the presence of moral issues in other's scenes. Meanwhile, in their own scenes, students had difficulties in conceptualising the moral issue at stake: in the interviews, they mentioned the ethical issues as relating to emotions, shame, empathy, and creating artificial relations, and machine bias - and while these issues are indeed morally loaded, the students could not articulate what exactly was the problem there.

We have called this the spectator effect. It was in seeing others perform, and not in performing one's own improvised lines that a distancing effect was created which allowed for moral awareness. Contrary to our expectations that a first person perspective coupled with an embodied experience would yield a morally sensitive and complex judgement, this aspect of improvisation did not play a major role. This indicates for us that there are other aspects of improvisational performance worth exploring for EEE besides the first-person engagement highlighted by the literature. Does this mean that watching others play theatre is enough to raise moral awareness in the spectators? Not necessarily. The improvisation exercises played a significant effect because one watches and criticises differently the scripts written by one's peers, as equals, than the script written by authoritative figures such as teachers or scholars. It was precisely because of the perceived equality among the student-performers (who took turns between acting and being spectators) that they engaged so fully with the other's representations. We speculate that the educational effect emerged because no one wanted to teach anyone anything in particular through their scripts. Students mentioned the lack of teaching as one of the main virtues of this course:

> *E: "...the lack of information, so we turned really everything from practice, and maybe that's a good thing. And maybe I am only saying this because I am I'm used to ... learn from articles or books or lectures ... It was a really a change to get information from only by doing it."*

5.2. A shared space for vulnerability

The acting exercises contributed relatively little to promoting moral sensitivity, yet these did seem to contribute a great deal to students' embracing a more vulnerable exposed and empathic way of being and co-creating together. All team members were equal. All interviewees spoke fondly of the camaraderie that developed among

them, not just in their own team, but in the entire class, of the kind and encouraging feedback that they received and that stimulated their creativity.

> *A: "You see I think people really transform through the course. Also, because me from like normally I'm an extrovert person so normally I don't really have a lot of problems with expressing myself, but also in the beginning you see a lot of people who do and I think it definitely helps."*

The students had the courage to try nonconformist lines of action or words precisely because they felt free to improvise, to express themselves since there was no judgement. The encouraging atmosphere was actively imposed by the theatre coaches from the first session. Instead of becoming detached from their roles and playing in a caricature-like mode their sketches, the students put out there their own personalities and dared to be vulnerable. This is in concordance with the observation made by Freiman that, in order to achieve practice-based skills, we do not want students to detach themselves from the situation, they need to be emotionally and (we would add) bodily involved in the moment. This means that the situations improvised by students were closer to what they would actually do in a real life scenario, than to the idealised projections or stereotypes. However, contrary to Freiman's work [3], in our study we did not find any evidence of students play-acting their own values or beliefs. In trying to come up with interesting scenes, students wrote scenarios aimed at being captivating for the spectators, often with punch-lines or situation reversals.

> *C: "But then we improvised a couple of times to figure out what kind of interaction we wanted to do and then one of them was that she started flirting with me. And we thought that was really funny and we left it there. So initially it was put there as a joke (...) I think the ethical aspect that at first it was more about how can machines help you? But then in in in the end it escalated to an extent that there was like a relationship and we thought it was it was a really exaggerated help"*

Thus, we have no indication that the students play-acted their own moral beliefs or values. Meanwhile, what they achieved still has significance for EEE, namely collectively building a common space of shared vulnerability, out-of-the-box thinking, and co-creation. This kind of space has educational significance because in real life it is very hard to achieve such a space safe for speaking one's mind and noticing moral issues. Perhaps the absence of this space explains the passivity of many engineers in their own workplace whereby they do not speak about nor perhaps even notice moral problem. To achieve moral awareness, one needs not only to notice that something is at stake morally, but also to have the space to express it in a way that will not immediately lead to being silenced or isolated socially. Thus, the creation of such spaces for noticing and exercising one's moral sensitivity is important for EEE in a procedural sense.

Improvisation entailed, in our experiment, two aspects: improvising the acting and improvising the lines which were then chiselled out through rehearsals. Since the students as actors-writers could not take enough distance from their own creations, the improvisation did achieve that experiential effect of being immersed in the situation we were looking for in the beginning of the paper, yet they needed to take some distance from this experience to be able to investigate its moral connotations.

It was the role of spectator and commentator of other's sketches that allowed for creating this distance needed for the moral awareness that the situation played on the stage had some normative undercurrents. To come back to the practice-based skills that we were after, we think that spectatorship is an important experiential situation that one can often come across in engineering practice. It is not always that the moral dilemma happens to the engineer herself, she may be exposed to it by looking at the struggles of one's colleagues. Being a witness for a situation unfolding in one's work environment entails also moral sensitivity and judgement (to intervene or not). This skills of witnessing and then becoming aware that something important morally is at stake is seldom if ever referenced in our EEE teaching. We seem to assume, in our building of case-studies and role-plays, that the student actors are always at the centre of the moral dilemma, that they need to take action. However, many morally problematic situations arise because the by-standers do not take an attitude or are silently complicit. In learning to notice that something morally significant is at stake by watching the scenes of their colleagues and then speaking up their minds, students are able to practice a skill often needed in the engineer's workplace but hardly if ever theorised. These two findings suggest an increased moral agency from the part of the students through the combined effects of witnessing others act and of the creation of a collective safe space for speaking and acting. However, our experiment was limited in scope and duration, and more iterations would be needed for us to confirm the moral agency hypothesis. By comparison, Freiman's course in improvisation for legal students lasted an entire academic year and yielded much more visible results [3].

6 Conclusions

For the teachers wishing to introduce improvisational exercises in their EEE classes, we sketch several recommendations. First, it is advisable to involve professional theatre coaches, such that they can teach the students basic acting skills but also, and more importantly, to impose a certain safe space by encouraging a respectful and open atmosphere whereby students can take the risk of being themselves in front of others. Secondly, while improvisation in the classical sense is about coming up with words on the spot, on the stage, participants noticed an increased sophistication in their scripts once they could rehearse these and rewrite their own scenes. Thus, we recommend that students come up with a script on their own, and then refine the lines in subsequent rehearsals. In the final discussion surrounding the performances, the participants noticed that their most brilliant ideas came in rehearsals. The rehearsal makes possible repetition and gives students a chance to change their mind about the topic at hand. Thirdly, an atmosphere of collegiality, equality and positive support must be fostered from the first session onward because moral awareness thrives in shared spaces of vulnerability. The teachers and trainers should lead by example with positive feedback and support such that students learn to use this tone when they comment on each other's performances. Most of our interviewees commented on how much this supportive atmosphere helped them try out and experiment with new ideas. We hypothesise that a hostile and competitive

atmosphere can only annihilate the pedagogical potential of improvisation for allowing the students to engage with a situation from a place of vulnerability and openness, thus leading to disengagement and showing off.

We realise that most teachers working in EEE are not trained to use theatre techniques and will see improvisation as a sophisticated and perhaps too unpredictable type of exercise to even try. However, considering that we use role-play in most of our ethics teaching without prior training in the performance arts, a step further on this path should not be seen as a radical change of method. We see role-playing and improvisation on a continuum of performative techniques that can both be used successfully in the ethics classroom for engineers. While role-playing has acquired the status of a "classical" exercise in EEE, improvisation still needs to be adopted by ethics teachers. Our study was exploratory and did not confirm our initial hypothesis, while it did generate interesting directions to be explored such as the spectator effect and the meaning of shared spaces of common vulnerability. A future direction for research would be then to discover how many classes of improvisation are minimally needed to achieve practice-based skills in the moral domain and how can these be best combined with the other ethics classes focused on the analytical skills.

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