Focus group on the Nature of Engineering Ethics

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Transcript of two focus group recordings happening at the same time, in parallel, in different rooms.

# Focus group 1

Facilitator: Lavinia Marin

Note-taker: Taylor Stone

People speaking:

Lavinia Marin, TU Delft, the Netherlands

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Esther Giménez Carbó, Universitat Politècnica de València, Spain

Diana Martin, TU Dublin, Ireland

Taylor Stone, TU Delft, the Netherlands

Gunter Bombaerts, TU Eindhoven, The Netherlands

Steve Bullock, Bristol, UK

**TOPIC ONE:**

0:00 - Lavinia

So at this point I think we only have 20 minutes per question. Because at 5:20 we have to be back in that room. So I am just going to straight jump into the questions and let’s brainstorm together. So the first question I am going to ask you, what do you think is the goal of engineering ethics education ? So I am going to start with the question of what makes an engineering ethics course or seminar be successful for you. How do you gauge or understand that you actually succeeded ?

0:42 – Rosa

For me when the students participate and ehmm… communicate… show what kind of communication… or I am to communicate something or to share something with me as a professor. That it is not a lecture that they are in complete silence or talking between them without any, nothing to say or nothing to share. For me this is the maximum ehmm… signal of success.

1:25 – Lavinia

So you would say student engagement and specifically when students have questions and ask instead of just staying silent?

1:30 – Rosa

Questions and share problems or share issues that concern them related with ethics but also related with their own profession, or you know, vision of profession.

1:50 – Esther

For me a main signal is when they realize that ethics is important for engineers, then I think it is a success. But with me it really relies, they need to be an ethical professional .

2:06 – Lavinia

So how do you see that they realize that?

2:10 – Esther

When they ask things that before the course they never think about this. When they think in like a project that changes like things around the place were they grow up is developing and when they realize that there are people that will be affected with the decision. It is not necessarily that they know how to improve the people or how to improve the ehmm… for me only it is when they realize the problem and they fix the things related with ethics, it is a success. Because we have a very low level of ethics in Spain at university.

3:02- Lavinia

Okay, anyone else?

3:07 – Diana

For me I am happy at the moment I am reading the report and I see that they have put some time thinking at the topic. That they came up with an interesting original idea and read a lot of material, policy making documents and technical articles that are maybe quite advanced for first year engineering students. And when they try to come up with a more entrepreneurial solution in the report they have to write. When I see this amount of deep and original thinking or that they have reached to external stakeholders by themselves with the problems to tackle (3:50). And maybe some time later when students reach out to me and say like you know I did not like the course then but now I apply things in my current project. Specifically the fourth year students, that ehmm… come back and some even came to some seminars and say I want to sit again in this seminar. Not a whole module but one or two courses.

4:28 – Lavinia

Anyone else?

4:30 – Gunter

Ehmm.. for us it when they ehmm… we have 8 learning objectives, I brought them with me haha, knowing them by heart is difficult. So for me this question is a mixture between what do we want and what is realistic? And when are we sufficiently satisfied with goals somewhere? We have 8 learning objectives for the entire program of TU/E, so that is 4 courses. The first one, I will read it: Notion of user society enterprise in relation to technology. So that is the awareness we mean with that. The second one is having knowledge of some of the concepts, tools and methods of the humanities. So we bring in ethicists and other social scientists and they must know something on these different disciplines. That is really the idea, they come from another discipline and they learn a discipline in the human sciences, ethics or another. We ethicists or human scientists want them to learn a little bit about this other discipline as well. The thirds one is: able to apply to the design, development and evaluation of the technology. So it is not only knowing but also applying this in the design. So the course I talked about today is about applying this. And: Are able to take a well-argued stance on user society enterprise. So they have certain idea on ethics and can apply it, but they also have a certain argumentation of why they think it is more ethical to do it in this technical way than in another technical way. The fifth one is able to reflect on this and also on their own responsibilities in their engineering profession. So we make a jump ahead and ask if you are an engineer what do you think are your responsibilities? Sixth one is working in multi disciplinary teams, ethics is in all of these project-based and challenge-based learning things. And to be able to communicate is also important for others, so I think that is also an academic skill. For the ethics course we make a specification to the societal stakeholders. So in most cases they learn in courses to be able to communicate with colleagues in their own discipline. Here it is the societal stakeholder. So if they have developed something on risk, they must be able to talk to politicians and to citizens, next to be able to talk to engineers. And in our new approach we can also test this because they talk to stakeholders, societal stakeholders. And the eight one, we discussed a lot about this, this is not measurably formulated. When students are motivated to take these (use?) aspects into account when developing technologies. So this is really an attitude, this is the only attitude we put in it. It is not measurable and for me the highest aim is that it is not only for now but also when they are engineers. So that is the eighth one. So in your question, what does make an engineering ethics course a success?

(08:00) So I think it is really difficult to measure the success of one course, it is always embedded in a whole curriculum. So in these eight, we bring in elements but it can never be a success if in another course a teacher…,we discussed this this morning when talking about culture. In our university we have a saying: use is useless. So in MIT they have hass is a hassle. They have this hass program and with use they sad use is useless. And sometimes students tell us that the staff of other departments support this view. So if we try to achieve these 8 learning goals and staff is telling other things, they will definitely listen to their staff and not to us. Because it is the zone of proximity, so they relate to them and far less to us. We have less influence. So we can never be successful without the help of the other staff.

9:10 – Lavinia

But wait, you just set weight into our second question about the learning goals. So would you then say that your own views on engineering ethics education are in line with the official learning goals that your university requires? So this is a question for everyone. But maybe Gunter can start because he already told us his learning goals.

9:30 – Gunter more talking about part 2

Well I also have a head responsible of the USE courses. Ofcourse we had a discussion but I was also heavily involved in writing them down. So it was my task to collect them and to make the link. Ofcourse I, in the process, I was really striving to put the eighth one in there even if it was not measurable. I think this could have been broader as now its motivating to take USE aspects into account. For me if I am really honest, then I see okay, the entire education including the ethics education of an engineering program should lead to an engineer that is a strong person and when he/she comes in a certain situation has a kind of moral compass to decide okay, I want to go this way even if the firm I am working in wants to go that way. And clearly knows okay I am an individual that works in Volkswagen and all these things are happening here, what should I do in an ethical perspective? Should I be a whistleblower, should I be somewhere in between and making some comments and try to change the situation from within or do I go for my career? And we do not say what the students have to want but we make them strong in knowing what they want and staying to their decision.

11:22 – Taylor

Just a quick comment even though I am the note taker. But it is really interesting to listen. Your comparison between these competencies and number 8, I guess, which falls in line more with earlier comments from Rosa, Ester and Diana. When you are talking about success that is more of an individual question of participation and engagement. It sounds that that is more about the experiences and interactions versus the, let’s say, the acquisition of specific knowledge. And in the way that you were just describing it, it seemed to me that that is something you in the end see as most successful. Something about a way of thinking, experience, engagement versus specific learning exterior why theory (12:11). Is that a fair generalization to say at this point ?

12:16 – Gunter

I could be a bit provocative. That is always good for a focus group. So we did a lot of research on motivation and then we looked at motivation, deep learning and engagement and I think that it is crucial to have deep learning. So the thing that you want to come across, that it really happens. What we see that often they are not motivated, but sometimes I think and that is my ‘I want to think positively all the time’ too. But there is something, and I want to do research on that, and that is the part of frustration.

So many students really have a much more rational world view. Here they have to follow 4 courses on humans sciences and they really do not like that and feel a lot of resistance. And we fight that and they say okay, we do not like that. And for me that is the first step, not liking it is the first step of resistance. Saying I feel confronted with something I do not feel familiar with. So if they feel they don’t like it, I interpret it as we are doing well. So if they say they do not like it there is at least a part that is saying we are really doing bad things or there is a part saying we are now reaching that resistance and that is a first step of the process.

13:52 – Lavinia

Yeah, thank you that is very interesting. So actually you answered the first question in reverse now, how do you know that you as teacher have gotten success. Students feeling certain resistance?

14:00 – Gunter

Well, that is a hypothesis of course because if they say I don’t like it’, it will be too easy to say: It is because we are so good and they are all in resistance and now in six months they will be perfect engineers. That is not true of course. But at least there is a part. And I think that this is something that we should research more to say okay, what does it mean if they say I don’t like it. So one of the things we want to inquire into, is the epistemic cognition, so that some students really have a cognitive view on things and we as philosophers often have a more constructivist point. Like you have facts, but they are interpreted and in a political way they are debated. That is how we see it and we want to bring this to the students. But the students have this realistic view of that are the facts and the things besides the facts are emotions and are irrelevant. We bring something else and there is resistance, but we see this as one of the ways how this transition from one of the more rationality to constructivist way goes.

15:19 – Diana

So I think about the resistance, in our second seminar students receive a text about the new engineers, which is a more holistic (15:27) and well-rounded engineer, and they have to present some ideas about it. Some of the student come in really negatively charged with this and say: I don’t agree with this, I do not like this, I do not see the role of ethics and they say all of this. And then you say okay, let’s argue. And I am not arguing in favor of ethics, I am trying to see it from their point of view. And first they are a bit surprised, but I am not there to indoctrinate them or, let’s say, be a lawyer for ethics. And I say: I think you are right in regards to this point that you made, but try to see it from their point of perspective. Then I see a change in them, at first they are surprised because they probably expect me to be shocked or upset of their reaction to ethics. But I say okay, that is cool, and from some of these students I remember some of the most interesting final projects where they have to come up with this, let’s say, proposal that combines a technical and societal and ethical dimension of a problem related to climate change. From this point, that is when I think the course might be a success. So I think you can’t reach to everyone, but there is interest in having this debate about ethics and the presence of ethics and allowing them to be angry with having to study ethics, I think thar does something to them.

17:00 – Lavinia

Coming back to the question for everyone else, you have learning goals in your university right? Personally as a teacher, and not as a researcher, how do you relate to them ? Do they fulfill your views of ethics education for engineers.

17:26 – (Rosa?)

I have here one remembering of this resistance. After six years of teaching ethics at my university, in the first semester for communication students and for engineers in the second. Last year the communication students wrote an evaluation of my work BBBAT(?). After that is was shocked because for me it was a really good course because we discussed a lot of things on fake news and freedom of speech and I enjoyed this course a lot. When I saw this evaluation I was shocked of how the students interpreted this ethical discussion as an ideological discussion. Because now in Spain we have a repression/special (18:20) moment with Catalonia, all this kind of issues that are translated to ideological discussion and not an ethical discussion anymore. So I have to change my vision and think how my own university has established their own official learning goals. We have to change. I was talking with my rector in this way, because we have a problem here. If we cannot discuss in the classroom this sensitive questions, like in other ways as the last years, we have a problem. But with engineers it was the best course ever. Maybe a merch from this resistance, from this deception from my young. That I can teach for engineers the best way, I try to do my best in this way. Trying to avoid this kind of questions and looking for others ways. But out of the official learning goals, I try to do things in other way. And now I have to inform to the rector and say that I want to change this. But it is a challenge.

20:10 – Taylor

Another interesting question too is: how much these sort of official learning goals, whether or not you are immediately involved in the curation or not, form how you structure your course learning objectives, readings, assessments and so on? And if there is a strong connection between these two things ?

20:30 – Esther

In Valencia on the Universitat Politècnica de València, the ethics education/ engineering ethics is a growth of soft skills across the whole curriculum of the bachelor degree program. Three or four years ago we started with this program, but in every bachelor degree the master of the degree chose two or three subjects to introduce these soft skills. And sometimes ask to the teacher do you like to be point of permits (21:14) for the acquisition of this competence for the degree and sometimes they say okay and sometimes they say no. But we don’t receive anything related to engineering ethics, it is a lot of civil engineers or mechanical engineers trying to do something related with engineering ethics. It is very difficult. And then finally when the schools do the grades for the acquisition of these things, teachers say 80 % of my students acquire an A for this soft skill. But we don’t know where they teach it or where they do the assessment. The (?) has started a project two months ago where we have to collect the evidence and the research for each subject that is counterpoint (22:16) during the curriculum, trying to know how these things are in the program. But now a lot of teachers that we asked for the evidence, that assessed the soft skills, say I don’t have anything. And then we ask why did you put an A,B or C and then they say: oh that depends on the participation of the student in the class. But not for things related with ethics. So in my university they have very well defined the learning goals, but nobody checks if they are achieved or not. It is a problem.

23:15 – Rosa interjection

You have a specific course of professional ethics ? We have.

23:20 -Esther

No, no. In many schools they have. For example (Felice? 23:21) they have for mechanical engineers. In my school it is not a mandatory course. The name is engineering ethics but it is taught by a civil engineer. Who never read a book related with ethics. And in other schools like informatics, or aerodynamic engineers there isn’t a course.

Rosa : So this is more related with normative … (? 23:55) something like that?

Ester: No, it is more like maybe if you are teaching a construction, they just say during our classes: When you make a construction you have to see that all the people working in this construction have to wear a hat and something like this. And then, what do you think ? Some things that are very difficult to separate are safety and ethics. The student mix it completely. Maybe next conference we have results from working on this and maybe we can share them with you. But for now it is very dramatic.

**TOPIC TWO: (24:50)**

24:50 – Lavinia

Yeah, that is interesting, the many diverse approaches to learning goals and how much is missing or not. But I have to step into the next question. So I am going to ask you about effective teaching exercises. What would you say is the most effective teaching exercise that you as a teacher have and would you say it is because of its form or because of its content?

25:11 – Steve

I am not actually an engineering ethics teacher so I have got polyformed comments. I don’t have a teaching exercise to get across, well I did a very light touch thing to our students where we went through some of the classic scenarios like Ford Pinto stuff and MIT’s moral machine and stuff like that. Which certainly was engaging, but I don’t think I got anywhere near the depth that I would want to if I was doing a whole course in it.

25:51 – Taylor

Within your experience did you find it to be effective in terms of, because we heard about these different criteria on whether it is engaging or helping different skills, did you get a sense that these…

26:03 – Steve

Yes, so I think that my takeaway from that was that asking questions that students can answer and have an opinion on, maybe can make them feel uncomfortable. So like the trolley problem kind of thing, are you going to let these people die or live?

Taylor: Yeah, that is similar to this confrontation.

Lavinia: Anyone else wants to volunteer on their exercises?

26:30 – Estjer

I have a lot of experiences of bad things haha, having the second year of the Bachelor’s degree. In the beginning I start with moral dilemma’s. It was a disaster because it was the first time the students did something related with this. They did not understand what happened with this and I do not have the tools to conduct the dilemma in the correct way. Some dilemma’s are really difficult and you have to have a philosophical instruction to do this. So I think my students and I are not prepared to do moral dilemma’s in the classroom. My class is about construction materials. Now I use a very easy thing that is very quickly and I think that it is fine. It is that the students have to look in the newspapers or on internet and find something bad that is related with civil engineering. Then they have to make a little presentation of only 5 minutes in class. But the more important things is that they have to identify the bad action, the people who or person who made the bad action and why they do this, their motivation. It is very interesting because I have realized that sometimes it is not so easy to identify the bad action. More difficult is to find the person that acted in a bad way and why. Then we talk five minutes more about this. It worked because they like it and because it is very easy and it takes not a lot of time, only to read and realize what happened. I do this, I think the last three years. And I have never used moral dilemma’s anymore.

29:00 – Rosa

My question is effective for whom ? Because effective for them is to pass the course as well as possible. Effective in the way that I can understand that they can pass the course is related to how they can identify these values or virtues, without now using the name of the virtues or some values. But in first person, not saying people is very bad. People take bad decisions. The bad engineers. I force them to think about to use of my or I. An example of one of my questions is: How many lies do you tell during the day? Because lying is a good tool to maintain this civic society. They think what are you talking about haha? Because today the class of ethics is not about Catharism or moralism it is about what happens in the world. What is the right, the wrong or the good or bad or fair or unfair?

We have to discuss and to enjoy and to find these kind of questions. When I can read some essay in the exams related with these kinds of…, the things are able to be put in another seat, move themselves or himself from their one unique point of view. For me this is an effective way and I think these kind of confronting questions force them to assume this first person. To confront them.

*31:39 (Lavinia interjection)*

And to follow up on this, did you invent this exercise of putting them in the first person or was it inherited from other colleagues?

Rosa: Haha, no my colleagues doesn’t.

Lavinia: Oh, so you invented it ?

Rosa: No, not invented it but I probably read it in some way. But not in my university it is, my colleagues are more comfortable with using this kind of third person. Not yeah I lie you know. I ask: if your mother calls what do you tell her about last weekend? Something like this haha.

Lavinia: Interesting.

32:35 – Taylor

Just a quick thought. In connecting this with the first point, it is really this idea of taking ownership that is really interesting. Both in terms of being an effective exercise and potentially also another criteria for success, I would say. Just a quick thought. It was a really interesting point.

33:00 – Lavinia

Yeah, I mean this is a method to make them take ownership because they don’t want to take ownership. But then this I, I did this. And your method of asking them to look for news from your profession. That interests you, it is another way of taking ownership. So I think this is very interesting. So you also use this?

Rosa: Yes, I also use this.

Lavinia: Any more thoughts ? Interesting exercises that you really like? That really work?

33:30 – Diana

Effective in a way that students are having fun and being engaged. I think some of you know, it is a role play exercise based on a scenario that I redesigned. Not in a way to avoid the dominance of the person or I would say perspective and how uniform that single perspective can be. And it is a scenario that closely mimics a situation that is happening now in Dublin. But happened in Dublin with a reconfiguration of public transport. So a scenario where there is a situation where there are three parties involved and there is a decision whether to cut trees and expand the road or an other solution in order to press the problem of on-going traffic, of increased traffic. I try to bring in these three stakeholders and their voices and perspectives and the students are split into groups and are each assigned a perspective of a junior engineer, of a senior manager or of an environmental activist. And they had to come up with a joined decision. They had to reflect on the values of each stakeholder and how to reach a successful compromise.

What does the compromise mean and what kind of pressure comes from the other sides ? What is the challenge to getting the preferred solution for your character? And I think this was engaging for them and I think that it also let them see that different stakeholders have different interests and this gives different ideas and outcomes on the final decision related to an engineering product. Maybe that as a junior engineer you have a manager who might have the value of profit as a more important value, or the value of public image. Then there is a pressure of this environmental activist, who is an actual concern nowadays. I think it helped with seeing a problem from different perspectives rather than the way in which the exercise was originally developed. That was only out of the perspective of the engineer that thinks for an ideal way, but can be diverse from the compromises or impediments that existed in daily life.

36:20 – Gunter

Yes, for me the answer is challenge-based learning. And why? Because it starts from what is closest to what students are. So I think a good method, a method that works, is close to who the students are. Our students really like to build things and they look at the world and say: oh, there is a problem and I will come with a technical solution that is better. And I don’t agree with that at all as a philosopher, but you can say that if you start with that you have lost them. So you could say: okay, start building things and then they come across all kind of difficulties and then I can say: here is the ethics part, now lets discuss the relevance of it. And then I think that is a way to reach them. I think in our experiment we reached the easy students and it was a bit of a natural selection that it was the first time.

It was Industrial Design students, Architecture students and psychology and technology students that went to this course. They are trained to bring the human into technology and there were less chemistry students or bio-medical technology students or informatics students. That is what we want to do next year. And I think we then even have to go three or four steps back to really start where they are and start from that. So next year we will focus on two groups, that are the bio-medical technology students and the computer science students, because they are scoring our course the lowest all the time. But I think that is because they are the furthest away from us as philosophers. So we should really go to them and then take them into philosophy. We did interviews and it was really shocking. So the BMT students I thought there are talking about health, they will love ethical issues, but they consider themselves as technicians in the back-office. So they make, I don’t know, new legs for people but they are working with building materials. So they gather the question from doctors and from other people and they build what is asked and will give it to the doctors. The doctors will treat the patient. So they don’t consider themselves as being involved with the user society and enterprise. So we have to go much further back and then go back to ethics.

39:00 – Gunter

For the ICT students it is even worse. There is a big problem with language. So we once did an exercise with them. It was 2,5 years ago when the Cambridge Analytica was really hot and was all over the newspapers. And we wanted to test for this course whether our cases worked well. We gave the case to them and they said: no, it is not interesting. I said how can this not be interesting ? It is all over the news and everything on the radio and internet is on this case. No, no, we do not think it is interesting. And the issue was, it was one page of text and they just cannot process the information that is on this text. If you put it in a table, you say three things hop, hop, hop, they can read the table but not the text. They even almost did not know anything about Cambridge Analytica.

They heard that there had been a problem with some informatics using and influencing the American elections. But they didn’t really now about this case because they just are in a parallel universe. And with one group two students didn’t even know Silicon Valley. They were so nerd that they really live in their own world. Then we had an our to discuss our case and after 10 minutes we said: okay, that is it. We went out with the teachers and said what should we do ? Okay, lets explain what the case is about and then we explained them for an hour okay this is what happened and why. After an hour they said: oohh yeah then it is interesting. So what we learned there is that we should not go three steps back but like really big steps. And when we bring in text, that is why we start with youtube movies, because on the level of reading it is already problematic. So I think student diversity is really, really important. If you have the architecture students or the industrial design they really like this course and they really get what it is about. But for them it is actually not necessary because they already know it. For the ICT students you really have to do completely other things and that is the challenge we will face this quarter.

41:54 – Taylor

When you say go way, way back in time, can you give sort of an example of what you mean ?

Gunter: Yeah, the example that I gave with the Cambridge Analytica. So that was, I think, march and the course starts mid April. So if you then send an e-mail to the students with in three weeks time we will start the course with some practical stuff and by the way we are going to talk about Cambridge Analytica and bla bla. They do not read the e-mail because it is all text. So we really have to understand what is this ICT student. So now we send them tables and information and youtube movies in order to reach them. That is the experiment we will do in two months time and we will do it parallel with a course that is called visualisation of data. So our topic will be on the visualisation of data. So there is this ICT teacher and we bring him into the ethics course as well and say: it is really about you see it. So really making really small steps, but to really put al the effort in and really get them into this ethical thinking. So many steps back and then start from there and we will see where we get. But I think that then you are doing relevant steps and in the end it will still be no ethics what we do but will make them do some steps. That is our idea.

43:40 – Diana

Sometimes before the semester starts, I say I am the parent of 90 children and I have to give them a medicine they don’t like, it is bitter. So I have to coat it in chocolate and convince them to take it. This is ethics and I dress ethics in these kind of ethics role-play exercises in projects that are related to climate change that also have a little technical aspect. I don’t give them the ethics directly because they will run away haha.

**TOPIC THREE: (44:20)**

*Lavinia explanation*

44:16- Lavinia

So yeah, we discussed how do you see that the students are engaged at the individual level and our education is geared at the individual. But lets go to the third question that is about the micro- macro- ethic divide, which Janna presented already, and this is the idea that usually it is in the literature that we teach individual cases but the problems are systemic. And I want to ask you do you agree ? That the way that you see engineering ethics that it is micro- macro- divided. Do you see this distinction as useful?

44:50 – Steve

Yes, it fits in really well with my naïve perspective. I think that coming up with things to talk with students about is all about the micro but it definitely needs extrapolating into the macro at least. I think that it is a good route in, from the micro. Because it is accessible and you find some interesting stuff. But then you need to start talking in the abstract and make sure that you leave them something that they can apply in every context.

Lavinia: So you would say that actually this distinction informs teaching in some way?

Steve: Ehm, yeah..

Lavinia: So you would find it useful ?

Steve: Yeah, this certainly measures with my understanding of the field at the moment.

45:40 – Rosa

For me it is on the contrary. I try to deconstruct this kind of separation of this kind of say of: this is my opinion or this is my point of view. In great discussions and debates ethics is always about a social issue, it is not for an individual, you know. So we need to take into account the other. Okay, I can talk about my I, I think, I perceive. But with all of this I it should be taken into account that in front of you there is another I that is thinking, perceiving and reasoning in the same way. And this is ethics. This exchange is ethics. It is nothing else you know. How Joanni (?46:50) said something related with this etymological aspect of ethics, the habitus you know. But ethics is the habitat, how we construct or how we build our own space of communication and our own space for living together. Here we have an habitat, we are building or constructing something that protect us, you know. This is this first ethos, no? That protect us.

Lavinia: But then you would go more for the macro-ethics that you actually want to discuss this?

Rosa: For me it is the same, it is not possible to separate because we are constructing the habitat and we do that in the same way.

Lavinia: So you would not separate the individuals from the habitat and from the system? This is why this distinction for you is not informative ?

Rosa: No, not so much.

Lavinia: Okay, because this is what we want to find out also through this focus group. Because we see this distinction in literature and want to ask okay, but in teaching does it pop up ?

48:20 – Steve

Are you saying that it is a continuum and then the same thing, but that you can still approach it from one end or the other end? Or do you have to look at the whole the entire time?

48:30 – Rosa

Okay I never, I can read these in this way in these columns but not related to micro-ethics or macro-ethics, this is ethics. It is only one. Maybe with these different boxes, but not micro and macro. Because it is as if you differentiate between personal and social ethics. For me this is not possible because we are the same in our own intimacy and in the public space. This is related with these problems of communication.

Lavinia: Anyone else?

49:20 – Esther

I am thinking now when we are talking about this topic that when the students have exchange with different universities, then they have to convalidate/participate (? 49:35) courses like chemistry or construction materials. What happens they then want to participate in ethics groups. It is the same in every university and in every area and I think one of the problems is when a. agreement about what you want to teach. Because we are doing and trying a lot of things to improve the ethics development of our students. But is it related with micro- and macro-ethics? I don’t know. In my school this question, the teachers say what is this? Because they are civil engineers, there is no philosopher in my school. It is impossible. So I think the ethics contradict (?50:50) ethics. I think it is not a personal thing. When the students say it is something personal, I say no because we have a autonomous car and we are training this autonomous car to have ethics. So if we can train an autonomous car, we can train engineers to be ethical, no? The problem is what are we teaching ? We don’t know we can convalidate the courses, but when one of my students go to another university the content is the same but the need is the same too. The students need ethics to be a good professional, to be a responsible engineer. But there are a lot of different ways that we are teaching this subject. And in some universities this is a lot for the commission/permission (?51:50) of the teachers, because in my school civil engineers have to give this. I don’t know

52:05 -Lavinia

So you also do not find it informative for civil engineering professors or not trained ethicists? It is too abstract in a way.

52:15 – Esther

It is for engineers in bachelors, for an engineer without training in philosophy or ethics this is so much. They don’t ask if it’s a micro or macro ethics, they don’t know this. Maybe they know nothing about the authorities or virtues, but it is difficult.

Lavinia: And any more thoughts on this ?

52:50 – Gunter

For me it is definitely also a continuum and there is a MESO level as well. For me it is, you can look at the individual, you can look at small groups and look at what happens in small groups like the social psychological experiments that have been referred to. You have much bigger groups, you have institutions. Then you have countries and you have societies. That is really a continuum and if you talk about ethics on micro and macro level I see this as a continuum and some people will easily think about micro or about macro if you also talk together with engineers. So I think it is a relevant one, but I would make a broader distinction than the two fields of the continuum. But I would see this as one dimension. For me there are also other dimensions. An important one is the thing I also mentioned, the rationality versus constructivism. That is also very important certainly when you talk to engineers.

So for students there is also this discontinuum that is also a continuum. And then we wrote a really nice article also about different ways of…, so for me this is really fundamental it was a volume on world philosophies, where we used a model of a Belgian philosopher Libbrecht (54:43). Who says okay you can take all the philosophies in the world and I see three groups there: there is a rational group, there is what he called the emotional transcendents, that are the more Buddhist and much more religious approaches, and then there is the imminent philosophies, which are much more related to Taoism and Gaya theories that are more relating to nature.

And for me that is also a way of opening up a debate where engineers are always more in this rational. When you talk about Taoism and say if there is a problem an engineer would solve this by more science, but the Taoist will say you solve the problem by not making it a problem for yourself anymore. So if you are a little bit cold, just train yourself to not have a problem with cold. Instead of working really hard and constructing universities with a heating. And the Buddhist will much more go into feeling and this transcendence and how it feels to be connected with the world. So these are three ways, and according to this philosopher also three relevant ways, of looking at things and engineers are all really in this one corner. So you can probably use also more dimension where you can split up. So I think this is a relevant one but surely not the only one.

56:30 – Lavinia

So then this is not the only approach and you sometimes find unuseful, even if it is useful for students but more methodologically, that is how interpreted it. But I am just going to bring in my own example because, how do macro-ethics look like? I had a seminar on the Ranaplaza(?56:55) collapse, so it was a sweatshop where people saw the cracks but were forced to go in and work and then it collapsed. So then I asked my students who is responsible for this collapse? And then they make a nice table of stakeholders, always of individuals or groups. And then they point at one, the boss who told the workers to go in. But then I already showed them there are like, a whole H&M that are buying these clothes and the clothes have to be cheap and then there are the consumers. So I show them the map but they still point at this. And the exercise is made in such a way that.., I don’t know if it is them who want to see the individual level or if it is the way we ask the questions. And this is my personal question, could we actually design the exercise in a better way to actually make them think about the macro-level, the system level? This whole circle of consumers want cheap clothes and companies put pressures. So this would be the question, how to design an exercise to get the more systemic approach and where do your exercises fall ?

58:00 – Rosa

It is a good point. For me the only problem is the ethics, where do you put micro-ethics. The point you make is very good, to analyse the case I liked. But this is micro-level/ macro-level but not ethics.

58:20 – Gunter

Maybe what you could do is first come up with a case where they are the one who are guilty. If for example you have a situation where there are four exams in a week and there is a lot of pressure because there also are three assignments and you invent something that is parallel to the other one and then you say now the student fails, who’s fault is it ? They will automatically say it is not my fault, it is the university. So then you say: okay, that is good, I see the point and now lets go to another case and then you present the same case and when it is clear that there is a parallel they have much more resistance in pointing at the individual.

Because they see that if I say it is the individual here I at least have to find a reason why it is different from this one. And then you start already a debate. You can say here it is the individual, but here it is not because this and this are the difference, but then you are off in okay what are the systemic differences then?

59:34-Taylor

Sort of in terms of thinking about other dimensions or facets that sort of circles back to your earlier point too when you start to take ownership in a sense, right ? And see it from you own perspective. And it ties back maybe to this earlier discussion where we asked questions about emotions and empathy perspectives that are incorporated and if we can shift their thinking, or at least there openness to alternative views about the responsibilities. And I also have a hand up because I think we had to at 5:20 and it is now 5:22.

1:00:17 – Lavinia

Thank you so much for this we got a lot of valuable ideas and we hope you did too and yes the recording will be transcribed and you will all get it. Thank you so much!

# Focus group 2

Facilitator: Janna van Grunsven, TU Delft, The Netherlands

People speaking:

Nick: Nicholas Lieven, Bristol, UK

Paulan Korenhof, Tilburg, JADS Den Bosch, the Netherlands

Angeles Mendoza – Sammet, IHE-Delft Institute for Water Education

Giovanni Frigo, KIT, Karlsruhe, Germany

Rafaela Hillerbrand, KIT, Karlsruhe, Germany

Roland Tormey, EPFL, Switzerland

V-2: Tom Staley, Virginia Tech, USA

V-1: Laura Cabrera Trujillo, Michigan State University, USA (?)

Mandi Astola, TU Eindhoven, The Netherlands

Tijn Borghuis, TU Eindhoven, The Netherlands

*Question 1*

00:00 – Janna

All right, so thank you all very much for participating in this focus group on the nature of engineering ethics and the best practices of engineering ethics education. The first question that I wanted to discuss with you, or the first topic is: engineering ethics education the goal. And the first question that I wanted to ask is: What makes an engineering ethics course or seminar a success for you and how do you gauge whether you have indeed succeeded ? So what makes an engineering ethics course a success for you, lets start with that. And then we will get to the second part about gauging how it is achieved. How do we determine success ?

00:57 – Nick

Ehm… this almost pre proposes that is has to be delivered by a course or seminar.

Janna: Sure, so it can also be stand-alone lecture or some activity.

Paulan: Okay, a way of then fusing it into the curriculum.

Janna: Yeah exactly, just thinking about ethics education in general to engineering students what is a moment, a particular moment, of success but also how do you define this success. So what is successful? Is it when you know that students have learned a concept? A topic that keeps popping up is that they have been moved. What would you say ?

01:42 – Paulan

For me it is when you notice a change in what they want to do. So that doesn’t mean that they always have to oversee all the consequences of what they are doing, but that there is a will to implement certain ethical principles in their design.

Janna: Okay great, and do you observe that through dialogue that this change is taking place or ?

Paulan: Sometimes, I am not really sure yet how to assess whether it succeeded or not. It is also a very long term goal, I think, it is not just the course. I am also fine if, how do you say this in English, the quarter doesn’t drop in the course but later on. So for me it is not a short time frame goal.

Janna: Okay, okay. Great.

02:30 – Angeles

For us, our program is very short and we started this year by introducing a lecture for engineers, especially for the two programs where we have engineer students. So we tried to engage them in discussion to see how they captured the concepts and situations that we were presenting. And one thing they have to do for their thesis is to write a statement on how they integrated principles of research integrity in the research for their thesis. They still have some questions because they don’t know how to do it. We try to give them some guidance, but we can’t really measure until we have the declarations. So it is difficult to think on success and how to measure it. Because now our program does not have enough time to stop and look at okay, how has this worked. So we just started this year and there were pressures of the institute on just start it now, however. We tried to do the best we could and still some people, instance we have another program on management and there they just have to sing a checklist. And I didn’t agree with that because from what I have been reading that doesn’t reflect any internal knowledge.

So I decided that no, they have to make a declaration and write material. So it is just trying to push that. But it is like a big question, how we will measure that. But for success something that we were discussing, success for us is that they understand more thing(04:55) implications, so that for every decision that they make not only for the big decision but for the whole, every day tasks might have ethical implications. So that is what we try to put in.

Janna: Okay, clear, thank you.

05:16 - Nick

The asset test is when they have an awareness beyond the product. So when they start to talk about societal impact or policy impact. And the measure of success is when it is self-generated. Because we are very good at teaching the techy stuff, but it is when they say: oh, as you would do that…, the impact beyond their immediate environment when they independently raise it, then I think okay they got it. And is quite hard to define that and say that that is the learning outcome. You know it when you see it.

06:02 – Giovanni

I have experience teaching also engineers, but not only engineers. So mixed classes of different under-graduates. And I asses success as basic achievements with what they sometime call click-in moments. When you see that really in the relationship, in the eyes of the other person something happens. And one thing that happens in the first week for many people is that they realize this inescapability of ethics. So that whether if you want to think about it or not, that just by doing that choice of renouncing or rejecting you are making an ethical choice. So you are trapped into thinking about it in some ways because it is part of your life. It is not just a thing that you learn about that is connected to something, which we said earlier as well. And then another click-in moment happens when they are able to, similar to what Nick said, apply something by themselves. It can be a concept, can be notion, can be a case study and it is correct. And they are able… They think oh, it is so simple now. Maybe two or three weeks went by and I know that these are more basic but this are ways of assessing. Because it turns out that in my experience 40% of the people don’t have these click-in moments, it just enters and goes out. Because they are young as well and I was even worse than them, so I understand that.

07:50 - Nick

Sometimes it isn’t even correct. It is just the fact that they then straighten their thinking about it. That is the registering that they have absorbed somehow. Frankly, at 17, 18, 19 I couldn’t tie my shoe laces, let alone come up with correct ethical decisions.

So actually just the fact that they are thinking about it, whether it is wrong or right I am not too fuzzed about that, it is just the thought process that is starting to bed in. I would like if you didn’t quote my saying that I couldn’t tie my shoes.

Janna: Haha, I won’t. Rafaela.

08:40 – Rafaela

For me it is hard to understand, so I hope I don’t repeat things. But for me it is mainly three things. And one is…, and two are not even ethical, but it is more a reflection. One is that the students can distinguish an argument from a statement or an opinion. Because they quite often come with very strong opinions on yeah, in Germany nuclear power is unethical and things like that. And the second would be to be able to reflect on various levels on what it means to argue for a statement like this and to know a solution, at least argue then to stop this for the questioning of one’s assumptions.

And the third is one for the students I instruct, is to distinguish a normative from a descriptive argument. And I am not super much into saying that that is a really strong separation one can make, but I do think that it makes sense to sometimes take the lense. And I think this is the three things that I like to see when the students have taken the course.

Janna: Okay, great. So there is sort of ehmm… slightly different takes on success in engineering ethics education so far. Emphasis on argumentation or instilling a kind of transformation in students, thinking through the implications of one’s actions and then some, largely I think intuitive, strategies for gauging whether these kind of transformations are taking place. Detecting something clicking or through conversation. Or do you also have exercises build in to your curriculum to sort of test progress in these areas in these students ?

10:53 – Roland

For me, I mean, I think I would, following on what Nick said, the core idea for me is responsibility. That they feel more able to take responsibility. For me if I was to break that down, part of it is about sensitivity. It is about seeing problems that they might not have seen before. Either because they know more about, you know, social connections in terms of where do raw materials come from, or because the have new procedures, different ways of thinking about things, asking themselves who is the end-user. So sensitivity is part of it. Reasoning, you know this thinking in terms of what sort of reasoning process they have. That is part of it. And then some of what we do is about: I am realizing virtues and character. So we do work around their working groups. And about what happens when they come across micro-aggressions or discriminatory speech and how they respond to that. And we do role-plays with them, which following on my conversation with Aram (12:25) I am now going to be labeling virtue. So that’s kind of the goals. In terms of how we measure it, there is the intuitive kind of feel that you get when you are in the room, in terms of watching groups after you have done a workshop with them and seeing people say: No, we agreed that we have 3 minutes to talk and this is my 3 minutes now. And you can see that the practices that we worked on, that they are using and they are using those tools. That is partially where you see it. We have also tried to measure it in more systematic ways. Either through using existing tests like the engineering and science issues test that was developed in Georgia Tech that we talked about earlier on. Or through tests that we have developed ourselves. Which looks at ethical sensitivity as one aspect of interdisciplinary group work. So we do try to have some more objective measures as well.

Janna: Do you find those pretty insightful ?

Roland: Yeah, hugely insightful. I mean to take the engineering science issues test as example, when we first introduced this big course in the first year everyone was so proud of it and, you know, I think a lot of work had gone into it and people were really proud of what they had achieved and there was no doubt about that. And we were ready to talk it up and then we got the results in terms of students their moral reasoning and discovered that it did not have the impact that we certainly would have… You know it would have been really easy to go up there and say: Hey, look at what we are doing and this will certainly change students’ lives in the way and which people often do with their own courses.

Janna: So the transformation didn’t take place?

Roland: No, it did not take place, no.

Janna: Did the test sort of reveal why or was it …?

Roland: So the test cost us to go back and ask ourselves why. And I think part of the answer comes back to this culture question, that students are at that stage in phase where they are highly, highly competitive, they are about to face a selection exam and they are also trying to fit in, they are trying to adopt the engineer identity. And actually asking them to make independent judgements about what’s the right thing to do, kind of interferes with both their identity formation process but also with the individualism that every other course was actually invocating into them. So for us that was a really, really interesting insight which we could only have got by virtue of collecting, you know, systematically hard data so to speak. We could have easily told the story about what a wonderful job we were doing with this super new course. Which, you know, a lot of institutions do right ? But then don’t actually measure the impact. And so for me measuring the impact was verynvaluable.

Janna: Which you will maybe go to talk about tomorrow as well or no?

Roland: Well we will be talking about impact and how they measure impact. I will not talk about that particular example, that was a few years ago. But that then fed into us then re-designing the course and the course did become better. Because we found out that is wasn’t as good as we originally thought that it was.

Janna: So you try to find different type of exercises that targeted specifically these issues about wanting to fit in and competition ?

Roland: For our exercises we focused it more narrowly in terms of some of these team work, you know, ethical leadership and team skills that we talked about. And we focused it more narrowly and then we did a better job around that. Than rather to having this kind of general sense of we’ll do everything, we focused it and targeted it more.

Janna: Thank you. Virginia Tech.

16:55 - V-2

Yeah, hi. So I know Rafaela just had to leave, but some of the things I am going to say are going to add on to what she was going to say anyway. I guess when I first heard the question you posed, I hand an instinctual answer. What I am looking for is straightforwardly just engagement, a willingness of the students to recognize and work or play with the body of knowledge of ethics. But there are two other levels to this, because obviously, since we are trying to do some kind of measurement process of our curriculum that kind of answer is insufficient. So we have spend a lot of time here developing rubrics to try to answer the question that you posed already. And luckily I ended up being the person who wrote most of the university language here.

So the things that we had in our rubric say things very similar to what Rafaela had said. We are looking for students to develop nuanced and multi-facted arguments, that we are looking for them to be able to identify and assess value issues with multiple dimensions independently. That we are looking for them to engage with established knowledge and principles and elaborate and extend it. So that is the language that we have developed for what it looks like to have successfully conveyed ethical education to the student. The third answer I have is that another thing that we are trying to do, specifically in our project, is develop some kind of measurement of fluency in ethical topics through a kind of vocabulary bank that we can use to do textual analysis. We’re on the fence of how precise that can be but it is the same sort of approach that is used to assess the level of writing competency of the students, just on a specific subject matter. So I think there is three different ways of thinking about this. That depending on who is asking the question the answer comes out differently.

I still go back instinctively to the: I am in the classroom and looking for engagement.

Janna: Okay, great. Any other thoughts ?

19:20 – Giovanni

Yeah, I don’t want to downplay the desire to evaluate these absorption of ethics in this formal ways or hard data ways. But I think it is overly ambitious to like… It is very, it makes sense…

V-2: I share that fear.

Giovanni: It makes sense, but I am totally into the first thing he said. Which is getting a little bit of engagement, a little bit of engagement with people who are overly stressed, especially in the US, and overly competitive as he said, very individualistic doing their other things, just to get them… I understand that it is important to improve a course, to find a way to evaluate, but a good simple thing that I happened to be doing randomly is: you meet other students that you are having in your classes that year and many of them have no idea of what that class was about. And that is the truth, so you need to realize that you are sowing seeds and that many are dispersed. And it is very difficult, in my opinion from a epistemological stand point, to have a matrix or some kind of evaluation tool that after six months or four months of you trying to talk about stuff. Some people, for example …(20:53) students who after three years got into environmental studies all because of some ethical issues raised three years before, that came out when they were 25 not 22. So not the one to downplay the ambitions of measuring, but it is good to at least engage with them personally. And class size, for instance, in my experience, was pivotal. If you have more than 15 people in a classroom you cannot learn names, first thing, and you cannot have that kind of understanding or so instinctual click-in.

(Nick?) 21:33

Can I just challenge you a little bit on that ? Because part of it is, I think, about the different bodies of expertise.

Janna: Can I make a quick proposal, because there is one more follow-up question that I kind of want to get in before we move on to topic 2. And maybe I throw in the follow-up question and see if it aligns with that you… because it also follows up on what Giovanni is bringing out. Which is: do you think there is discrepancy between your own view or intuitions’ about what makes an engineering ethics course or seminar or an activity a success and the wider university or department established learning objectives or learning goals that students supposedly will have acquired after they, right. So to give an example, at TU Delft we have 6 ethical competencies or skills that students will have allegedly internalized after walking through the ethics learning line, or taking a semester or even a quarter long ethics course.

It is things like moral sensitivity, being able to identify that there is even an ethical issue in the first place, moral deliberation, judgement, responsibility. So there are these six skills that our ethics teaching is supposed to at least begin to instill in our students. And then there is what is being mentioned around the table, really in some sense we also maybe are quite pleased if we get engagement or like the beginning of a transformation or, right? So do your own intuitions about a successful ethics course align with this idea that a certain list of competencies have to be instilled or do you disagree, I suppose. So if we can spend maybe 5 more minutes on that question, that would be wonderful. So I think that Giovanni already in a way started to address this a little bit. So yeah, if this aligns with the comments that you already were trying to make, great. If not, I would like you to ask to answer this specific question.

24:12 - V-1

Just really quickly for me. I wrote our university’s language. And I am still conflicted with it. Haha. So in a sense I myself don’t even have clarity on where to focus on in this spectrum of ideas. It just depends on the day.

Janna: Yeah, I understand. Thank you. Yes?

24:36 - V-2

In my own intuition, I was actually going to comment on the first question, but I think this is also in pretty much alignment. I work in the industry for more than 15 years. And my interest to engineering ethics education came from my personal experience during unethical dilemma’s almost on a daily basis. Costing me a job that I dearly loved. And when I was pursuing my PhD and I taking a class on content assessment and ethicology and the alignment between those. We needed, me and my peers, to create a course that eventually we could teach in the future in the engineering curriculum. So I actually developed a course to teach engineering ethics because to me it is critically important that students have…, are ethically grounded. But what that means when it comes to…, we still deal what should be considered as content when we are teaching ethics. What will be the assessment and proper pedagogy ? But to put the alignment between those three, it is also very difficult because lets just look at the assessment. What are we assessing actually ? I think that it is very critical that we agree on: What are we measuring ? We are measuring ethical awareness, ethical sensitivity. Everything that is absolutely abstract. But how people act when they are on the job and when they have to deal with ethical dilemmas, that is a completely different story that we have no way of measuring, how someone is going to act in the future. We are not considering other factors. Literature on moral reasoning on ethical reasoning for the last fifty years is showing that how mature a persons is affects our decisions, because basically it is decision-making when it comes to practicing any profession. But also, what is the moral foundation that someone has. What is the family that someone grew up in ? What is the religion, what is the gender, a lot of research is spend on gender and how people based on gender act when they make decisions. And a lot of actually critics on the scale that we use on the six stages of moral development, a lot of critic that is made for that scale is gender bias. We don’t consider any open/other doors (27:40) when we teach ethics or when we plan the curriculum the include ethics, when we plan assessment. So that is one thing that I talk to my students and teach them and engage them in case studies, how personal I will make that case and how I will touch my students in a sense, how important that will become to them. I think that is the problem. Because when they are making it personal, they actually have more time to think and to reflect on it and maybe that sticks with them later on when they have to make their decisions.

Janna: Thank you. I think we have time for one more comment from Nick.

28:30 – Nick

Before you started talking, there is three things that I wrote down. The first is context, which is when you make a decision in a vacuum it is often very different from when you are actually confronted with reality. Which I think is exactly the point. The second one is predisposition, we are all predisposed to a certain extent about our ethical meaning. And the third one is unconscious bias, we all have unconscious bias, whether it is due to gender diversity…, actually we all have biases. And actually it is quite hard to displace those. So you can teach the stuff but all of it that is going on in the background, which sets the pretext for any decision you then come to.

So you can establish the principles but there is a lot more baggage in the background what you can’t displace. Sorry, I am on a bit of rant.

Janna: If we can keep it really short because I want to make sure that we get to the other questions too. So maybe one more minute?

29:32 - Angeles

So yeah, basically on this alignment in my case there is complete disalignment. Even lack of understanding, say with the institutes or the rectorate that is in direct communication. When talking about ethics it was like novelty at the entire level, like even wasn’t aware why we need it. And when we started implementing all was restricted to research clearance for those interviewing human subjects. So then I am telling: that is much more than that. It starts with, first of all, with engineers or other students how they take on the ethical repercussions on whatever they design. And then started to try to change that perception, it is one of the goals.

Janna: Challenging.

Angeles: And also always the ?(30:26)…, because we are a small institute it is oh, we don’t have the resources, we don’t have the people and we don’t have the time.

Janna: Yeah, which reveals something about priority.

30:38 – Giovanni

I have just one sentence. Which is: I think it aligns. So your question was does it align with what other people are doing in different departments?

Janna: No, no, the question is: there are probably some official learning goals or competencies or skills that your department or your university says that students will have developed once they finish their degree, ethical skills. And do those specific ethical skills, the ones that are selected and how they are described, do they align with your intuitions about what you hope that students have accomplished in an ethical sense, once they have completed their degree.

Giovanni: Okay, got it.

Two things that are evident to me are critical thinking, we talk about it in many different places. …??(31:28) comes of the Bachelor degree. And logic, we didn’t mention logic today but developing an argument that is strong claimed with premises etc. These two are part of the ethics course that we sometimes do or in my experience it is that. So if you have logic, some logic and critical thinking this are abilities that are desired for the outcome of the students. And we can provide that and everybody’s happy.

*Question 2*

32:00 - Janna

Okay thank you, I want to move on. I think we could talk about this for an entire day. We have already basically been doing that. But now I want to talk about something slightly more concrete. Topic 2: Engineering ethics education means. With the first question: what is your most effective engineering ethics exercise and is it effective primarily in virtue of its content, its form or the combination of both? So role-play has been mentioned, group-based exercises with real life stakeholders has been mentioned. There is obviously the traditional essay-writing and this and this and that. Do you feel that teaching engineering ethics has worked best through a certain type of exercise that you do. Does the transformation or the click, right, the moment of engagement does it happen more often in a certain kind of exercise than in others ? Yeah.

33:07 - V-2

I have got one that I like really much. It is essentially a personal case study. So what I do and this is typically with my senior engineering students, but I also use it other contexts, is talk about the beginnings and progress of my own career in engineering and the beginnings and progress of my father’s career in engineering. And my father’s career turns out to be a very interesting case because he began in the 1930’s as a chemical engineer, served in world war 2, was part of development of nuclear power systems, worked in the pesticide industry, worked in the tabaco industry and essentially was personally present at most of the major industrial disasters of the 20th century. As a Bachelor’s level engineer. You know, someone typical coming out of college and just pursuing a career, that led hem directly to most of the things that we talk about as enormous technological tragedies. And I point out to the students that that could be them. It may not be, but it very well could be. Just with a typical baseline background in a technological discipline. That that could put you at the face of the greatest success stories and the greatest tragedies in the world. Some of the successes are interesting too, because my father also worked as expert witness in legal testimony for fraud trials, he worked as part of the development of hydroelectrical power system in the American South. So a lot of transformative events, both positive and negative. I just point out to the students that they are going to experience the same thing.

Janna: And do you think that it is the personalization of the stories that does the trick. Is that the key ?

V-2: Yes. In that particular case yes. I think there are other ways to make it more personal, but that is a very direct line.

Janna: Thank you. Thoughts?

35:25 – Roland

For me it kind of depends on what the goal is. So I mean different things have been successful in terms of different goals. But I mean, one thing that has been very successful is this kind of multi-layered case study where they start of thinking it is about eggs, it is a design project. And as they get more and more information, they realize that they, already early on, there should have been some stuff that they had realized that they needed to know about cultural context. And they suddenly realize that they were completely blind to what it is that they needed to know and didn’t know that they needed to know. And that has been really successful. Really simple questions which are activities that are designed to get them to recognize implicit biases or cognitive biases. Which don’t take very long at all, take like a matter of seconds, but, you know, there is this light bulb moment where suddenly they all realize that it is not just something that someone describes in a textbook. It is something they themselves are doing right there and then.

And that goes back to that notion of responsibility. So for me I mean there have been lost of different things and it always just depends on what the goal is. I can’t say this is the right method.

Janna: But in both examples that you list it seems implicating the self and seeing how you have been blind to something is a key aspect, right?

Roland: Yeah.

37:05 – Giovanni

I bring you an example from environmental studies ethics class, which can be applicable to engineering. So waste, people throw waste into bins and containers etc. So twice during the term I brought my classes to the landfill and we spent 4 hours at the landfill doing a visit of the landfill, it was an advanced landfill, so they were extracting methane and fueling electricity for 40 thousand homes, but then they had all the… well a complex facility. Then we sat down and discssed in the place, in that case not the virtues but values, what are the values and how this place extraction, what you can see giving your different competencies, what is the ethics of this? And then a reflection in class a couple of days after not immediately. And organizing a trip outside where they go to a place where they might even work in eventually, was for some of them very positive. Also because some of them were not…, they have like social or some problems relating to each other. So having a class excursion helps them to socialize. And then they talk more. So again simple things, putting people inside a bus and going to a place. But for some of them it was the first time they saw where there trash goes.

V1 : That is called empathy.

Giovani: Yeah exactly.

Janna: And crucially it was the form and the content of the exercise that made it effective.

Giovanni: Because they were adults it was not extremely complex. So one time we didn’t have bus passes. So they just organized with the groups of the presentations and we just went there with cars. So you don’t have a lot of responsibilities because they are not minors anymore. And they were very excited about it, yeah.

Janna: Thank you. Yes?

39:21 - Mandi

I thought it worked really well to do an exercise with students where they get to improve somethings. So a design exercise. So it is not like you just are pointing to them all the problems, rather you are letting them solve something. For example, I took Spotify and I showed them that there is this problem with Spotify that it railroads people into listening to certain types of music without their consent. And then I asked them, if you were Kension?(39:49) how would you re-design this? And then I had them do a re-design of the Spotify algorithm that asks for consent all the time, so there is a button to either turn of the recommender function or not. So the button is the first thing that is given to you, that was one of the solutions. And that worked well in terms of the form and the content I think.

Janna: And do you think one of the reasons it works well is because it might align more with the mindset of the, if you can generalize, the typical design student or engineer to shape the world but also think in a, I guess, constructive, creative, positive sense about intervening in the world. Whereas sometimes ethics is seen as a negative intervention. So I am wondering if that is one the reasons it worked well.

40:55 – V-1

I do something very similar in my engineering design courses. I actually teach design thinking through human centered or more through, so to say, emphatic design. So empathic design is putting yourself in the shoes of the user. And I ran a whole semester design course with the only project that students need to design a washer for a third world country. And they need to use the different design methodologies to have a design that is very affordable, no more than the cost of 10 dollars.

So they are not only using their technological expertise but they have to engage in interviews with their users through…, and that is also a sort of global competence because they find through their international students or peers, they found users of their designs and then they ask specific questions to the design but also the lives. This to get more insights into what is really valuable to the users. And some students who did not have the opportunity to engage with interviews through like virtual interviews, experience washing clothes by hands. There were students who decided that they were going to experience two weeks of washing their clothes by hand. Hanging it outside in the sun to dry, go through the full experience that someone in the third world will do. I have students who carry like woman in India the laundry baskets on their heads. Students really went through the full experience. That I think are humble students or designers. That is one of the characteristics, the qualities of being empathic. And I think it works, this type of exercises and assignments because empathy and ethics are very close and I don’t know that much examples of when we can use empathy to teach ethics as well. But empathy in the engineering curriculum in particular in engineering design it is gaining momentum. And that is the new quality that we are looking for to train our students in. Again something very difficult to measure and to train.

Janna: Yeah, just to flip it for a second. Could you identify a kind of exercise that really did not work. Something that you think this is not effective, we should abandon this when it comes to teaching engineering ethics.

Nick: Yeah, lectures for 400 students. It doesn’t work. A very didactic approach. All the exams we have heard and what does work is, we talked about it first thing this morning, is relevance. Can I relate to what the problem is ? And standing up in front of a lecture for 400 students simply doesn’t engage. So that doesn’t work.

44:38 Paulan

For me something that is very overrated. I heard a lot of people that were super positive about using quizzes in the course where you see the results of all the students in the course. It was semi-effective, but not as much as other people promoted.

Janna: You mean like Kahoot type things.

Paula: Yeah, yeah or other versions.

Janna: Where you kind of embed live polls and courses.

Paula: Yeah.

Janna: Okay. You don’t find it effective ?

Paula: I find it overrated. I don’t find it completely not effective, but I guess less than I expected based on education theory and stuff like that in theory it should work, but for ethics I find it not so.

45:27 – Tijn

About these quizzes. There was a teacher in another department that came to us and said he was in need of a case study. For his case I send him some long reads on Boeing Max problems. And then I got an interesting reply. Because what I got back was the outcome of a Kahoot quiz with who is responsible and it had the pilots, the government, FAA, Boeing and some other. And the votes were all over the place, so that was a big success. So the quiz was really all that was needed apparently.

46:07 – Nick

And I often start a lecture with an ethical question, I am an electrical? engineer. One that works, I teach a course on sustainability and I ask how many of you have taken a flight in the past year? Everybody’s hand goes up. And then I say how many of you have paid for the carbon offset. Surely there is nobody. And they look mortified. But what is interesting if you ask a bunch of aerospace professionals they say: Oh, that is interesting. And so this idea of context is really important. The results are the same, but it is actually their own predisposition that has completely governed their ethical standpoint.

46:58 – Roland

So I think the clickers thing it depends on the question. So one of my activities that works really well is a clicker type question. But it is about getting them to recognize their own … of places and it works pretty well for that. The one I do every year and I still do it and that doesn’t work at all.

Janna: And you stick with it?

Roland: Yeah, I do stick with it. It is they have to do a research project. So they need to write an ethical protocol for their research project. And they all go though the process, I give them you know an input with a lecture and a series of case studies on a principles-based approach to research ethics and then they write the ethical protocol. And then they come to me afterwards when they are doing the project and every single group will at some point come to me and say: we said we were going to do this, but do we really have to ask for consent or do we really have to give them notice? And then I am like, come on, this is ridiculous, you know. They all went through the process of thinking about the protocol and writing the protocol, but then they all come back to me afterwards and say can we just ignore this protocol please. I mean I still think they need to do it, but it is not working as an ethics learning activity.

48:32 – Giovanni

So something that I learned from pedagogical classes that I took to improve teaching and strategies and stuff, comes from psychology or physiology. So to answer your question, if you have anything that is more directional for more then 20 minutes, you have your answer. That is probably not going to work. Because it is not interactive and more than 20 minutes people don’t follow you and they get tires and they…

Janna: Unless they are a graduate philosophy student

Yeah, and then they go on whatsapp, that is what happens. That is an important thing to think about.

49:16 - V-1

And I think something to add to that is if it is not an in class activity when you have to engage students for more than 20 minutes, if it is like a homework or some type of assignment they have to do it on their own.

I think it is very important of how much of that final assignment is worth to the final grade. Because that is extensive motivation, but it really is what students in the end care about. If the assignment is 5% of the course they are not going to care and spend that much time on it and really work on it and put their mind into. If it is something 50% of their grade, I am sure that they will be engaged, I am positive. I know out of experience that a good outcome will come from that assignment and will work out.

Janna: It could be culturally dependent. Or at least just anecdotally having taught in the US and in the Netherlands, I think there is some difference there. But sure, main motivator I can agree.

50:26 – V1

I don’t know it is the end of the semester, we are having our final week today actually. And I have a line of students waiting to argue about their grades. Extra points haha, make-up assignments.

50:50 – Janna

I was maybe going to ask one more general question about this topic. Do you have any views on teaching ethics through essays, getting students to write essays. I am just asking because as I mentioned I am assessing this sort of success and implementation of an ethics learning line in the civil engineering department and asking the students for feedback on what kind of exercises worked well, what kind didn’t. The consensus among the students seems to be essay writing doesn’t work, the topic doesn’t become alive for us. Role-play and debates that works. But at the same time you can also sometimes see that when they are forced to write an essay they can dig deeper into a topic. And even though they made hate it still might learn more from it than using your intuitions to have a quick debate for 15 minutes. So I am wondering if you have any views on using essay writing as a way of getting students to reflect on ethical issues.

52:06 – Angeles

I am kind of hesitant, I would use it if could make personal revision ship(?) between the student and what is brought in about. So something personal I think would have more effect as writing an essay, if the students doesn’t feel the real connection.

Janna: So maybe an essay about how do you see yourself as an engineer? Or…

Angeles: Or a situation they might have experienced. I could put them on the other side, not as an engineer but more as the user or someone. That their benefits might be effective for their technology.

52:27 – Mandi

I think it teaches them a lot to write essays in terms of argumentations and in terms of theories. But the question then is, is that what we want to teach them ? And I noticed with our USE basics course, when we did the course with less essay and more end-product that the students liked it more and it was evaluated much better.

Janna: Exactly, I guess that that is the question, what is our end goal here?

53:30 - V-2

My comment is very quick. Which is I think that essays work if they are iterative. I don’t that a single discrete assignment in any case is going to do much. But with an extended, if you are talking of a course over a semester, back and forth in writing between instructor and student can be very effective.

Particularly when you force them not to provide the answer that they provided the last time. That you move them to a different place each time you ask them to dive into a standard writing assignment. But that is really my only comment.

Janna: Yeah, thank you.

54:13 – Nick

There are two things that we have tried. One is to get them to write a policy briefing for a minister. And it can be no longer then one page because ministers don’t…, but what are the arguments in one page to have a very clear adjective. The other thing we try to get them to do in groups is wiki’s. So they take ownership of one particular aspect, so they write an essay but actually it is in a technological framework. And this is quite good because we can mark this online. And so that gets them to engage with the technology as well as the ethics. And it makes it slightly more exciting.

Janna: Yeah, I can see that. Roland did you want to say something as well?

55:04 – Roland

Just very quickly. Student writing cases, I know Esther has done some work on this and it seemed really interesting what she has done. And it used to be, you know, 20 years ago when cases were a big thing in teacher education, student writing cases, as Tom says, then being iterative. So the student first writes the case and then you say to them: what is this the case of? So they have to do some sort of linking to some sort of theoretical framework. So that it is a iterative case learning process. That, cool. Essays, no.

Janna: Giovanni did you have a final comment ?

55:53 – Giovanni

Yeah, I just want to add to Angeles’ point. So I tell them the first week, you need to find a topic that you are passionate about. I don’t care whatever you want as long as it is related to Energand ethics. If you don’t find it, I give you a list of 40 and you pick from that. But you need to be passionate about that and delve into it and it has to have something to do with your life. And that is fundamental. And what I maybe wanted to underline is that in these iterations back and forth, at least three. It takes…, also the size of the class matters because otherwise you can not do the editing yourself, because then you die. But you meet different people. So I met especially silent people in class I met them online, so to speak, or in writing. And I am amazed every time. So it is very important to have essays, but you need to have generals and offer your time otherwise don’t do it.

Janna: Yeah, the point about inclusivity is also a good one.

*Question 3*

57:20 – Janna

Okay, lets move on the final point. A bit more abstract. Topic 3: Engineering ethics what is it anyways? So the idea is that…, and I talked about this very briefly earlier, but I think you guys were not yet participating. But there seem to be in the literature on what engineering ethics is, one way of carving up the field is that there are some sort of micro-ethical approaches and macro-ethical approaches. Where the micro-ethical approaches really focus on individual decision making and the engineer as an individual in a relationship to other individuals. And the macro-ethical approaches tend to focus more on systemic aspects of the engineering practice, social political forces, operative and impacting on the individual engineer.

And so one question that we have, I suppose, is do you agree with this characterization of engineering ethics. That there are sort of these two opposite perspectives and do you think that how you view what engineering ethics is, in terms of these two perspectives, has a bearing on what you teach in engineering ethics? So some research has been done really recently by one of the participants in the other room, that most universities still teach engineering ethics from this kind of micro-ethical perspective. And so we are interested to see if you agree with that ? Do you focus on these kind of individual moments of choice-making or do you think we need to bring in more sort of social critique, social political philosophy ? That is the question. So do you see the dichotomy and where does your own approach to ethics in your department as an individual fit in here?

59:32 – Paulan

First of all, I think it is good to make a separation in a sense that it highlights that you discuss one and not the other. This can reveal that you have certain empty spots. But I wouldn’t treat it as a dichotomy. I think that they are both very relevant elements that are highly tied to each other. So I try to teach both of them. Although I think one perspective is more complex than the other, the macro-perspective. But I prefer to move from the one to the other, back and forth, and also show how they are tied in together. But for me this few help to explain the two perspectives, at least show the students why they relate to each other.

Janna : So you actively use this distinction or these aspects in your teaching or?

Paulan: I do it without making the distinction and I think if you are distinguishing them and explain that they do relate to each other, is helpful to at least show the difference. That they are tied together but also make some sort of zoom in and zoom out function.

Janna: Okay, thank you. Any other thoughts? Yeah, Virginia Tech.

1:00:41 - V-2

So I lean macro, but I tend to actually think of three levels rather than two. I talk to the students about individual decision making, about a larger context that you can describe with the macro thing and I talk about the intersection of those in institutions, in disciplines, in organizations, professional codes and things along these lines. And that institutional intersection is the important context that is inevitable for them to work within. And it can’t be understood with the macro that lives behind it.

Janna: Great, thank you.

01:01:25 – Roland

Yeah, I mean I also use three levels but not quite in the way that Tom has described it. Which is the individual, the micro-social, so face to face interactional, and then the systemic kind of dimensions. And I mean I do find it useful because the systemic part of the issue about sensitivity, about being aware of ethical issues, is that very often it is actually at the systemic level that they don’t have an awareness. It is about supply chains and things like that. That they are really not thinking where did this cobalt come from. So I think it is useful, but I do also think that you have to make the connections between them. Because part of the difficulty with the macro is that it can be presented in such a way that students say no one can do anything about this, it is all terrible, so lets just go shopping. And so therefore I do think that that is where the interaction between them is quite important. And I used gender as a way of doing that, of getting to see where the big patterns are that were previously hidden to them and how that has played out in their own patterns of interaction.

So we bring it right down to what roles they get assigned in the groups they have and they don’t see that there is a gender-bias, but when we look at the stats of it women were assigned technical roles in most of the groups that they were in, you know 70 something percent, but for the guys it was over 80 percent. And it is a small difference, not enough for them to actually be aware of. You can only see it if you have statistics and if you take a step back. That is where the macro things is important. But actually all of these small little cuts are making an impact. And that is the way that we make that connection and that seems to work quite well.

Janna: So from the sound of it, working with some sort of conceptual distinction does quite directly inform how you teach ethics, yeah can I infer that ?

Roland: Yeah, I mean, I think… I am a sociologist so I think I just take those frameworks for granted. For me it is a surprise when other people don’t take them for granted.

Janna: Yeah, I see. Any other takes on I guess the pedagogical usefulness of seeing that there might be different levels or perspectives on where ethics operates on these different micro- and macro-levels?

01:04:43 - Nick

I am very taken with the approach of Virginia Tech, I really like it. It is our duty as educators to expose people beyond their own discipline. So that does lead more to the macro approach. And certainly in times that we see, we see it in all our students, the light bulb that goes on and they say: I haven’t thought about that. And that often happens when it comes from outside of their immediate discipline. So an example again from aerospace we get our senior law professor who chairs the UN court of human rights to talk to students in aerospace about the consequences of migration. And what that has on societies, both locally and moving skills out of countries. And the students just simply haven’t thought about that. So I do think it moves to the macro-level, which is why I am really interested in university level initiatives where we can cross pollinate. So I quite like Virginia Tech’s approach and I didn’t know you were doing it.

Janna: Oh, it is 5:30. Then I use these two minutes to thank you all for participating. This was very, very helpful and I’ll be sure to keep you posted on our shared results. Thank you so much!