VIRT2UE

Training the Trainer

D1.1 Report on the results from the stakeholder focus groups

WP1 Mapping of scientific virtues

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VIRT2UE Consortium

VIRT2UE has received funding from the European Union's Horizon 2020 research program under the grant agreement N 787580

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Project details	
Project full name	Virtue based ethics and Integrity of Research: Train-the-Trainer program for Upholding principles and practices of the European Code of Conduct for Research Integrity
Project acronym:	VIRT2UE
Start date of the project:	01.06.2018
Duration:	36 months
Project number:	787580

Deliverables details	
Work Package	WP1 Mapping of scientific virtues
Description of deliverable	D1.1 Report on the results from the stakeholder focus groups
Work package leader	MEFST Sveuciliste u Splitu, Medicinski Fakultet
Responsible for the deliverable	Ana Marušić
Submission date	31.05.2019

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1 About the VIRT^{2}UE project

The VIRT^{2}UE project aims to develop a sustainable train-the-trainer blended learning programme enabling contextualized ethics and research integrity (ERI) teaching across Europe focusing on understanding and upholding the principles and practices of the European Code of conduct for Research Integrity (ECoC).[1] The training programme will be delivered using a blended learning approach: combining online and face-to-face teaching. This innovative blended learning programme will provide a toolbox of educational resources, based on an inventory of existing ERI educational resources, and incorporates an e-learning course with face-to-face sessions. VIRT^{2}UE's online component will be delivered through the EC funded platform currently being developed in the EnTIRE project (http://cordis.europa.eu/project/rcn/210253_en.html).

The overall aim of the data collection within the project is to provide evidence and information for the development of a sustainable train-the-trainer blended learning programme and materials for ERI teaching across Europe.

This work package is responsible for meeting the overall objective 1: Conduct a conceptual mapping amongst stakeholders about virtues that are crucial for good scientific practice and their relation to the principles of the ECoC. The ECoC formulates principles that are related to virtues, and these will be central to the development of VIRT^{2}UE's training programme.

In order to develop a holistic virtue-based training programme and provide researchers with more adequate guidance, it is necessary to further develop the evidence base regarding which virtues should be stimulated and developed in training for good research practice. The aim of this Deliverable was to involve a broad range of experts and stakeholders from the research domain in focus group discussions in order to answer this question.

[1] ALLEA. The European Code of Conduct for Research Integrity Revised Edition, ALLEA - All European Academies, Berlin; 2017. Accessed: April 2019. Available at: https://ec.europa.eu/research/participants/data/ref/h2020/other/hi/h2020-ethics_code-of-conduct_en.pdf

To achieve that aim, the following activities were undertaken:

1. We identified representatives from different stakeholder groups for face-to-face focus groups from all members of the consortium and different domains – total of 24 from academics (research, education; n=4), ERI committees (n=4), policy makers (n=4), funding and process organizations (n=4), students (n=4), industry and SME (n=4); and invited them to provide their opinions and experiences in two mixed focus group meetings of 12 persons each.
2. We prepared the protocol for the focus group meetings (demographic questionnaire and scripts for the group meeting).
3. The first focus group was organized.
4. We analyzed the results from the first focus group and adjusted the scripts for the second focus group meeting in order to allow further in-depth discussion of the topics identified in the first focus group.
5. The second focus group was conducted.
6. We analyzed the results from both focus groups and generated the initial list of virtues for training programmes.
7. We generated the final list of virtues for discussion, with the input from the scoping systematic review.

This Deliverable details the results of the first year of the stakeholder consultation, including a description of the approach, the participants and the thematic results from the two focus groups discussions.

2 Methods

2.1 Design and description of the focus groups

Focus groups were organized to gain an insight into the perspectives of key stakeholders on essential virtues for good scientific practice in research. We set the following main question for the focus groups: Which virtues should be stimulated and developed in training for good research practice?

As our aim was to explore new insights and different views on this topic, the group context of a focus group setting makes an ideal method for our study. Focus group discussions are most suitable when seeking community-level information, such as seeking information about social behaviour, cultural values or community opinions.[2] In addition, focus groups are suitable for provoking a discussion and are therefore useful when seeking justifications and explanations of issues or for studying group dynamics.[3]

We used a heterogeneous stratified purposive sampling to reach participants from different domains. Purposive sampling is a non-probability sampling method widely used in qualitative research for the identification and selection of information-rich cases for the most effective use of limited resources in which elements selected for the sample are chosen by the judgment of the researcher. The purpose of a stratified purposeful sample is to capture major variations rather than to identify a common core, although the latter may also emerge in the analysis.[4] [5]

In this study, we included only participants who are currently active at some stage of the research process and who are representatives of these stakeholder groups: academics, policy makers, students or part of the research integrity committees, funding and process organizations, or members of industry and SME.

[2] Hennink MM. International Focus Group Research: A Handbook for the Health and Social Sciences. Cambridge: Cambridge Univ Press; 2007. 1-257 p.
[3] ibid.
[4] Black K. Business Statistics: For Contemporary Decision Making: Wiley; 2011.
[5] Patton MQ. Qualitative Evaluation and Research Methods: SAGE Publications; 1990

Focus groups discussion were conducted during meetings of other EU projects because it was the most efficient way to include international experts from different research domains in a face-to-face focus group. We conducted the first focus group discussion using a self-developed discussion guide (**Appendix 1**) in Split, Croatia during the EU project MiRoR meeting in two rounds. The first round took about 65 minutes and the second round took about 40 minutes. There was a total of 14 participants which represented the stakeholder groups; 3 of them belonged to two different groups: academics (n=2), ERI committees (n=2), policy makers (n=1), funding and process organizations (n=2), students (n=5), industry and SME (n=5). We transcribed audio recordings from both rounds of the first focus groups meetings and anonymized the data. After preliminary analysis, we adjusted the scripts (**Appendix 2**) for the second focus group discussion and identified representatives from different stakeholder groups for the next face-to-face focus group meeting. We conducted the second focus group discussion in Aarhus, Denmark during the kick-off meeting of the EU project SOPs4RI. The second focus group discussion took about 70 minutes and involved 7 participants from different stakeholder groups: academics (n=3), ERI committees (n=1), policy makers (n=2) and students (n=1).
In both groups, a specially constructed questionnaire was used to collect basic socio-demographic data from the participants (**Appendix 3**)

2.2 Analysis

Qualitative data generated during the face-to-face focus groups discussions were analysed using thematic analysis. Thematic analysis is a method of identifying important or interesting patterns within qualitative data, and use them to address a specific issue or research question. There are many different approaches to thematic analysis, but in this study we followed Braun & Clarke's (2006) framework.[6] Recording of the face-to-face consultation discussions, all of which were conducted in English, was transcribed verbatim.

A deductive coding scheme was developed from the preliminary data collection categories (1. understanding of scientific virtues; 2. relationship between virtues and research; and 3.

[6] Braun V, Clarke V. Using thematic analysis in psychology, Qualitative Research in Psychology. 2008;3(2):77-101.

learning of scientific virtues) and focus group topic guides. This scheme was used in initial line-by-line coding of the transcripts of the face-to-face focus groups and the text from the online discussions. Further codes were developed when the deductive scheme insufficiently described a concept. This complementary inductive coding informed both the focus group topic guide for subsequent discussions and the data collection categories. Codes were organized into potential themes and the final coding scheme is presented in **Figure 1**. The final themes were described, with particular attention to divergent experiences and opinions of representatives from different stakeholder groups. All transcripts were line by line coded by both two team members, Vicko Tomić and Ivan Buljan, with codes, themes, and comparative analysis discussed during internal project meetings.

All data analysis was performed using a qualitative data analysis computer software NVivo 12 Plus for Windows (QSR International).[7]

2.3 Ethics

Face-to-face focus groups with stakeholders were performed after having obtained the approval from the Ethics Committee of University of Split School of Medicine (Reg. No.: 2181-198-03-04-18-0044). All participants received and signed the informed consent form before a focus group meeting (**Appendix 4**).

[7] NVivo qualitative data analysis software; QSR International Pty Ltd., London, UK,Version 12; 2018.

3 Results

3.1 Participants

A total of 21 individual stakeholders participated in the face-to-face focus group meetings during two rounds. The purposively selected participants from different stakeholder groups are described in **Table 1**. Three participants belonged to two different stakeholder groups.

Table 1. *Representation of stakeholder groups*

	Round 1		Round 2		Total	
Stakeholder groups	n	%	n	%	n	%
Academics/researchers	2	8.3	3	12.5	5	20.8
ERI committees	2	8.3	1	4.2	3	12.5
Policy makers	1	4.2	2	8.3	3	12.5
Funding bodies	2	8.3	0	0	2	8.3
Students	5	20.8	1	4.2	6	25.0
Industry and SME	5	20.8	0	0	5	20.8
Total	17	70.8	7	29.2	24	100.0

The sum of the roles represented exceeds the number of participants because participants could select multiple stakeholder groups. ERI – ethics and/or research integrity committees, SME – small and medium enterprises

Ten European nationalities were represented and one participant was from the United States (**Table 2**).

Table 2. *Countries of residence of participants*

	Round 1		Round 2		Total	
Country of residence	n	%	n	%	n	%
Belgium	2	9.5	1	4.8	3	14.3
Croatia	4	19.0	0	0	4	19.0
Denmark	0	0	1	4.8	1	4.8
France	1	4.8	0	0	1	4.8
Germany	1	4.8	0	0	1	4.8
Ireland	0	0	1	4.8	1	4.8
Italy	0	0	1	4.8	1	4.8
Netherlands	0	0	2	9.5	2	9.5
Spain	1	4.8	0	0	1	4.8
United Kingdom	4	19.0	1	4.8	5	23.8
USA	1	4.8	0	0	1	4.8

The focus groups had participants of both genders: 57.1% women and 42.9% men. The median age of participants in both rounds was 36 years (range 25-70). The most common research discipline amongst the researchers who participated was biomedicine, followed by social sciences. The self-reported disciplinary backgrounds of the researchers are presented in **Table 3**.

Table 3. *Disciplinary background of researchers*

	Round 1		Round 2		Total	
Disciplinary background	n	%	n	%	n	%
Biomedical sciences	10	32.3	3	9.7	13	41.9
Social sciences	2	6.5	7	22.6	9	29.0
Natural sciences	1	3.2	1	3.2	2	6.5
Applied sciences	0	0.0	1	3.2	1	3.2
Humanities	1	3.2	2	6.5	3	9.7
Other	2	6.5	1	3.2	3	9.7

The sum of the roles represented exceeds the number of participants because participants could select multiple disciplinary backgrounds.

The participants played different roles in the research process (**Table 4**), with academic researchers most strongly represented. The median years of experience that participants had in these roles was 8 (range 1-40). In average, participants published 18 publications during their carrier (median 5; range 0-100).

Table 4. Participants' role in the research process (self-reported)

	Round 1		Round 2		Total	
Role	n	%	n	%	n	%
Academic researcher	7	18.4	5	13.2	12	31.6
Journal editor	5	13.2	0	0.0	5	13.2
Peer reviewer	3	7.9	2	5.3	5	13.2
ERI committee	1	2.6	1	2.6	2	5.3
Policy maker	1	2.6	2	5.3	3	7.9
Industry or in SME	2	5.3	0	0.0	2	5.3
Funding organization	2	5.3	1	2.6	3	7.9
Student	2	5.3	1	2.6	3	7.9
Other	2	5.3	1	2.6	3	7.9

The sum of the roles represented exceeds the number of participants because participants could select multiple roles. ERI – ethics and/or research integrity, SME – small and medium enterprises.

4 Thematic findings

Qualitative analysis of focus group transcripts identified 4 main themes: 4.1. virtues, 4.2. context for virtues, 4.3. acquisition of virtues, and 4.4. possible improvements in virtues. Summarily, the participants identified some virtues that were relevant for research. They discussed them in different contexts, mostly religious and moral context, societal and scientific context, and in the context of virtue antonyms; for them, the understanding of virtues arises from those contexts. They also considered that virtues are not inborn but can be can be acquired through learning. They suggested improvements in this process of learning virtues. The thematic map of the identified themes is presented in **Figure 1**.

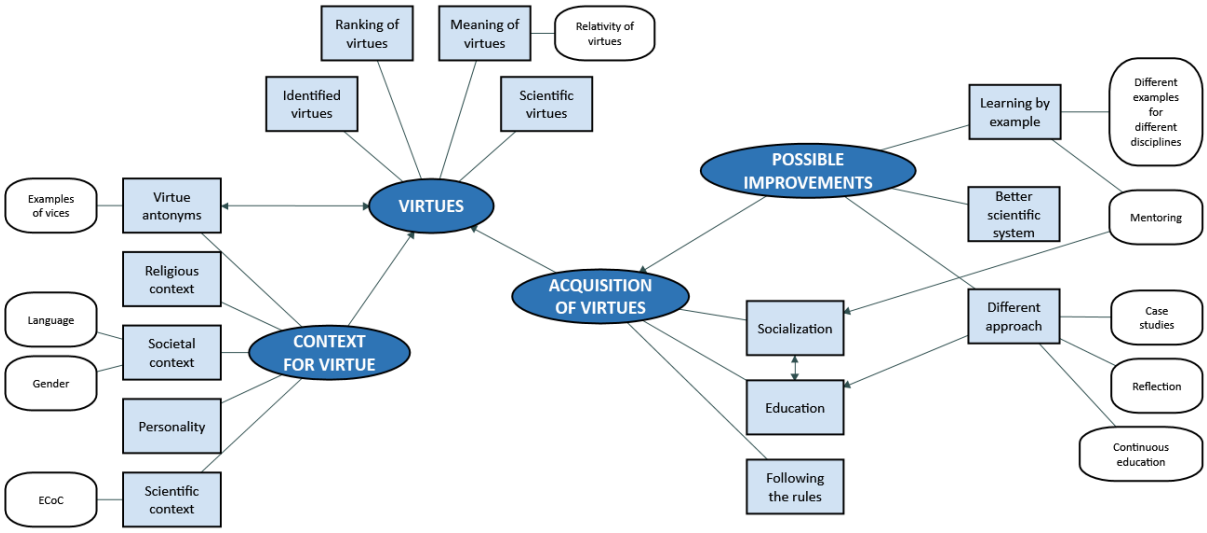

Figure 1. Thematic map of virtues in research practice

We now describe in detail the individual themes identified in qualitative analysis of focus group content.

4.1 Virtues

Since the virtues were a main topic of discussion, virtues were also one of the major themes because participants often talked about them in general as well as in more specific terms in order to explain them. As a result, four sub-themes emerged: 4.1.1. the meaning of virtues, 4.1.2. the virtues in scientific practice, 4.1.3. the possibility of ranking of virtues, and 4.1.4. concrete examples of virtues.

4.1.1 Meaning of virtues

Participants had different understanding of the word virtue, but they mostly saw them as personal characteristics, traits of admirable quality or particular moral excellence. Regardless of individual differences in understanding of the term itself, they generally identified virtues as something good or positive.

> *P5: I would say that for me virtue means a set of qualities and some of them are defined by your upbringing and basically you can mould them as an adult but not completely change it. So you are basically a construct of your environment.*
> ***Participant 5, Funding and process organization and ERI committee Member, Croatia***

> *P2: [...] it's a personal characteristic, it's something related to, it`s a highlight. Something you are proud of, something you want share with others or highlight in others, in hiring it can be something important, generally something positive.*
> ***Participant 2, Student, Belgium***

> *P1: Virtue… I don't know… Something good, it's a trait or quality…*
> ***Participant 1, Student, United Kingdom***

Some participants also identified virtue exclusively as an internal characteristic of a person. Since virtues are not something external but an integral part of ourselves, we have control over them in a sense that we can meaningfully shape them and develop over time.

> *P7: [...] [W]hen I translate the word virtue in Croatian it's exactly what you said – something you internalise during your childhood and so on. So virtue has to be a high moral standard that is in internalised. So if you don't have it in yourself it's not the virtue, in my definition. It's not personality trait, it's something more connected with the moral development in my opinion. I'm also psychologist [laughter], this is probably why I'm saying that. And I would said that things you said about teaching the virtue, I would agree but in case you have some basics… I don't know… little snowball that will become later [an] avalanche. [silence]*
> ***Participant 7, Academic and Industry and SME Member, Croatia***

P5: [...] I think that virtue or being virtuous is an intrinsic quality and not extrinsic. We can control it, we can mould it.

Participant 5, Funding and process organization and ERI committee Member, Croatia

Participants often tried to define the concept of virtue using a description of specific virtue or as an act of self-reflection.

P19: Hmm, that's a big question, you see, what do we mean by virtues, I think we mean, um, well, what I mean by virtue… I think it carries a connotation of trustworthiness… [P15 and P20 are expressing their agreement with nodding and agreeing noises]

Participant 15, Academic, Denmark

Participant 19, Academic, United Kingdom

Participant 20, Academic, Italy

P8: It's usually to describe something that is your characteristic, not something that you developed but something that you realise about yourself.

Participant 8, ERI committee Member, Croatia

Others pointed out that virtue is not only related to persons because one can also consider some acts or some ideas as virtuous.

P12: I think that act can have virtue and an idea can have virtue because I think underpinning the word virtue is this idea that it is morally positive whether it's [a] person or act or idea.

Participant 12, Policy maker, United Kingdom

Virtues were thus recognised as something which doesn't have clear boundaries. Moreover, some participants emphasized that even the word 'virtue' represent an abstract idea that may be difficult to define.

P10: It's an old fashion word, virtue… It's a quite nice word, but it's, it's a pretty abstract word…

Participant 10, Academic and Industry and SME Member, United Kingdom

P11: For me, English is not my first language, so virtue is very abstract word that I can't

really understand even when I translate it to my language.

Participant 11, Student, Belgium

We can conclude that participants differ in their understanding of the concept of virtue because it represented an abstract idea that may be difficult to define, but they generally identified virtues as something good or positive: virtues are an integral part of ourselves and we can meaningfully shape them and develop over time.

The concept of 'virtue' may have more than one meaning and may depend on personal viewpoints influenced by or based on personal beliefs or feelings but also on cultural differences because different societies can have a different value system. These value systems can cause different ways of looking at things, which can lead to problems in interpretations of the action of another person.

P9: I think that also there is a part of subjectivity, so it's not… yeah… To me the real virtue can be really, for example, honesty. That is the most important virtue, but for you it can be completely different. So I think it's also a matter of what you think as a person.

Participant 9, Student, Spain

P10: I think it could be different in different societies as well because for example loyalty to your family as opposed to loyalty to your country or whether you feel you should break the law in order to protect a member of your family. So that's relative thing, it's not an absolute thing.

Participant 10, Academic and Industry and SME Member, United Kingdom

According to some of our participants, something that is generally considered positive can also be perceived as something negative and vice versa. In other words, too much of virtue can lead to something completely opposite.

P12: But ruthlessness could then be translated to clarity of purpose, focus…

Participant 12, Policy maker, United Kingdom

P8: [...] you want creative person as PhD student but not as creative to make up the whole paper.

Participant 8, ERI committee Member, Croatia

This could also be understood in the Aristotelian view on the golden mean. Aristotle understood virtue as the midpoint between two extremes, which he called vices. In that sense, virtue is position between the extreme of excess and the extreme of deficiency. In this case, creativity is a virtue between the two extremes – of fruitlessness and of fraud. Fruitlessness is a deficiency of creativity, while fraud is an excess of creativity.
Some participants said that it is possible for a person to be honest but still not considered virtuous. A good example is a research that has honestly reported data, results, methods and procedures but is not ethical in the aspects of the justification of research because it was done, for example, in ways that harm animal or humans subjects.

> *P16: I mean, I think you can do very good and very honest and very transparent research which is completely unethical.*
> *P15: Yeah, yeah. [agrees]*
> ***Participant 15, Academic, Denmark***
> ***Participant 16, Policy maker, Ireland***

On the other hand, some considered that dishonesty can be considered as a virtue. To give an example of a different interpretation of honesty, a PhD student from Belgium pointed out to something that is commonly known as 'white lies' or lies that can be understood as something positive because they are usually told in order to be polite or to stop someone from being upset by the truth.

> *P2: There is a very interesting book by Dan Ariely, it says the honest truths about being dishonest, so all of us should cheat in very little, um, measures, so you can do it knowing intentionally but in a very small amount that it is not been shown but then, it's. If you repeat it, then you cheat just too little, you know, it's then…*
> ***Participant 2, Student, Belgium***

We can conclude that the meaning of the 'virtue' may depend on personal beliefs or feelings, as well as on cultural differences. This is the reason why some virtue that is generally considered positive can also be perceived as something negative. Also, it is possible for a person to be honest but still not considered to be virtuous and vice versa.

4.1.2 Ranking of virtues

This theme was not about ranking of individual virtues but about whether virtues could be ranked. The importance of individual virtues was a frequently discussed topic amongst participants from both focus groups meetings. We can say that participants generally felt that some virtues are more important than others. Some of the participants directly emphasized the importance of particular virtue, and some used examples to illustrate the importance of a particular virtue.

> *P9: To me the real virtue can be really, for example, honesty. That is the most important virtue, but for you it can be completely different.*
>
> ***Participant 9, Student, Spain***

> *P10: [...] [I] wouldn't knowingly hire someone for who[m] I felt was liable to be dishonest. Certainly, honesty comes out high, I mean. And there will also [be] other things like lack of punctuality or personal hygiene [laughter]…*
>
> ***Participant 10, Academic and Industry and SME Member, United Kingdom***

> *P20: I mean, to me the single feature I admire the most in someone is, is the fact that even that he is accomplished researcher and a big name and whatever, he always, he or she always remain a student.*
>
> *P16: Uh-huh. [agrees]*
>
> *P20: So you see these people that, you know, they, they are really big figure in the field, go listen to anybody taking notes and thinking they can learn from anybody. And, and the opposite of that for me is the kind of researcher that I will never want to be, someone who at one point reached the point of ay, ok. you know, I know it all, I can go anywhere, tell people what I think and there's nothing for me to learn from whoever I meet.*
>
> ***Participant 16, Policy maker, Ireland***
>
> ***Participant 20, Academic, Italy***

When asked directly, the participants clearly pointed out that some of the virtues were more important than others. They agree that research could be conducted without some of the virtues but there are some virtues that are crucial for responsible research.

> *P16: It's tricky… I mean, I think if I had to choose between let's say honest and curiosity, I would choose honesty.*

P15: Yeah, me too. [agrees]

Participant 15, Academic, Denmark

Participant 16, Policy maker, Ireland

P20: Yeah, honesty, transparency are those that… Let's say if, if they're really in terms of the implemented the kind of way lead you to, well, let's put this way, the lack of those clearly make a lot of more damage than the lack of others. You can have research without curiosity, ok it`s not particularly [group laughter] damaging anyone, but a dishonest research is a different story.

Participant 20, Academic, Italy

Therefore, the virtues can be ranked, and there may be ways how this could be done, including scientific methodological approaches.

P19: If there were eight quote on quotes research virtues, we could find out which is the most important, which is the least important and then get people to rank the others. There's some nice techniques for doing that without over texting people's cognitive abilities. But it would certainly, I think it would be a piece of research which you, you wouldn't want people to rush through. It's quite challenging, quite a challenging question. But, you know, we picked trust, honesty over curiosity and in, in a minute and a half…

Participant 19, Academic, United Kingdom

We can conclude that participants generally felt that some virtues were more important than others because research could be conducted without some of the virtues but there are some virtues that are crucial for responsible research. This also means that virtues can be ranked.

4.1.3 Scientific virtues

Participants emphasised honesty as the most important scientific virtue. They also mentioned accountability as a crucial scientific virtue.

Facilitator: So, in your opinion what are the most important virtues in, um, what are the most important scientific virtues?

P5: I think that we already identify honesty and that's a really all-encompassing one, but I think that it's also very important the, the, accountability. Um, once you say that you will

be held accountable, that you know that you will be held accountable and the institution that you work for tells you will be held accountable, it does help – in sticking to the rules.
Participant 5, Funding and process organization and ERI committee Member, Croatia

P8: And accountability the same but the honesty and respect the other hand it's…
P10: Yeah, accountability is almost more attitude and it's similar to saying take responsibilities to your actions is linked to accountability.
Participant 8, ERI committee Member, Croatia
Participant 10, Academic and Industry and SME Member, United Kingdom

Participants also emphasized that it is important to separate how a researcher behaves in private life and in professional life because behaviour outside of the scientific environment does not necessarily have an impact on the scientific output. This is especially important in the area of retractions in academic publishing because if we retract research due to unscientific reasons, we can deny the benefit from the public. For example, should someone's research report be retracted because of misconduct that is not related to research (e.g. harassment at work)? If so, that the research findings, which may be valid, would be lost from the body of scientific knowledge.

P4: Now, it would be sexual harassment of someone in the lab by definition because that's the whole [inaudible], um, well, should you retract some or all of someone's papers because they done that, I don't know the answer to that but are we going to separate, um, personal and private, um, you know…
Participant 4, Industry and SME Member, USA

P10: I have an interesting (?) case of a journal that came to me and said: we have found that this researcher has been put in prison for child abuse, should we retract his papers? I felt a very odd and strange question because I thought, well, his sexual preferences, to me, have nothing to do how good his research was. And so, in that very extreme case I felt like I was totally separating whether he was a good person and if he was a good researcher and I think we are using 'good' in very different points (?) uses? there.
Participant 10, Academic and Industry and SME Member, United Kingdom

P5: You wouldn't judge that person's research on the fact that he or she molested someone. You would not hire them…

P10: Sure. No.

P5: …but you would not retract their publications.

P10: I think there's difference because we think there may be a public good in those research. So if that research led to healthful treatment while retracting it you are actually denying people of some benefit from it.

Participant 10, Academic and Industry and SME Member, United Kingdom

One of the characteristics of scientific virtues is that they have to be aligned with science itself. This means that understanding of virtues in science will be based on scientific methodology and something similar to a peer review process.

P21: For me the virtues in science in research are mainly [...] what differentiates opinion someone has from a scientific fact or what is argumented as sort of direction as close as possible to a scientific fact and I think honesty as was mention is key to that. Honesty, transparency and also accountability because in the end, um, what separates those two, I think is a solid methodology to go together with those virtues and there we come to, as you said, the peer review is very important for that accountability cause who can really judge if you have done this in the right way or in the virtues way, in the way that contributes something and it's a peers that can have a good look into that and therefore that system is one of the core of values I think also what research is and should be.

Participant 21, Policy maker, Belgium

4.1.4 Identified virtues

Participants most frequently pointed out honesty as the most important virtue.

P9: To me the real virtue can be really, for example, honesty. That is the most important virtue.

Participant 9, Student, Spain

P5: If we talk honesty, yes, honesty on reporting everything… Honesty that you recognizing your mistakes or your, um, shortcomings but also recognizing how this fits into a larger picture.

Participant 5, Funding and process organization and ERI committee Member, Croatia

P16: [...] I think I`d agree with you on the honesty one, for me that's really at the core the great deal because not only are you honest in how you do your research but I think you have to be honest with yourself in your, whether you competent to do your research as well and if you not, you seek to, you know, there is a certain sense of self-reflection in that but also I think there has to be honesty and this is where public thrust gets damaged to a great deal in how you report your research, what you report and quoted.

Participant 16, Policy maker, Ireland

Reflexivity also comes high according to our participants.

P18: I would say, um, one of the virtue would be reflexivity as a researcher. So consider where your research is positioned towards society but also being research and why are you doing with your research for. Not just for the science in general but also for society. And also consider obviously your bias, so reflexivity would be a virtue.

P15: I agree with reflexivity…

Participant 15, Academic, Denmark

Participant 18, Student, the Netherlands

P20: I guess, yeah… in addition to what you said, which I agree, I mean self-reflexivity and critical approach and all this practices.

Participant 20, Academic, Italy

The collaborativeness was also identified as being an important scientific virtue.

P21: It depends on what they can contribute, I suppose always find there is an exchange between people you judge the character and that plays into your decision. And if the person has sort of medium added value to what you're trying to do and has a character that you really don't want to be involved with, you might not collaborate with them if they have a character or medium added value within very high sort of person that you would like to work with and then you might work with them.

Participant 21, Policy maker, Belgium

P8: So I would say that it is the worst question that you get asked on the job interviews, so what is your virtue and what is your flaw. So virtue, you would say that you're punctual, you're very easy to work with, something like that, team player.

Participant 8, ERI committee Member, Croatia

P16: I think it's also depends on why you collaborating with somebody so if you're collaborating with to acquire certain expertise that you simply don't have, obviously there, than level of their expertise is going to be probably more important and as long as they contribute that expertise to the project whether you like them or not is really beside the point.

Participant 16, Policy maker, Ireland

Respect was shown even during discussion. When asked to describe the exemplary researcher, a younger participant just pointed to his older colleague, showing clearly that the respect for the older colleague as a researcher.

Facilitator: How would you describe exemplary researcher? Someone that you can show as an example to everyone. Google researcher.

P20: Looks like we all know him [group laughter]. It is one sitting here [points to P19].

Participant 19, Academic, United Kingdom

Participant 20, Academic, Italy

Accountability was recognised as one of the important virtue as well.

P5: I think that we already identify honesty and that's a really all-encompassing one, but I think that it's also very important the, the, accountability.

Participant 5, Funding and process organization and ERI committee Member, Croatia

P21: Honesty, transparency and also accountability because in the end, um, what separates those two, I think is a solid methodology to go together with those virtues and there we come to, as you said, the peer review is very important for that accountability cause who can really judge if you have done this in the right way or in the virtues way, in the way that contributes something and it's a peers that can have a good look into that and therefore that system is one of the core of values I think also what research is and should be.

Participant 21, Policy maker, Belgium

We can conclude that participants especially emphasised honesty as the most important virtue for good research practice. They also mentioned accountability as a crucial scientific

virtue. Reflexivity, collaborativeness and respect were also very important scientific virtues according to our participants. Complete list of the virtues mentioned during these focus group discussions is shown in **Table 5**.

Table 5. *List of virtues mentioned during focus groups discussions in alphabetical order*

List of virtues		
Accountability	Fairness	Positivity
Availability	Goodness	Punctuality
Clarity of purpose	Honesty	Reflexivity
Collaborative	Humility	Reliability
Competency	Integrity	Respect
Compliance	Loyalty	Responsibility
Courage	Moderation	Thoroughness
Creativity	Morality	Transparency
Critical awareness	Objectivity	Trust
Curiosity	Open-minded	Truthfulness
Diligence	Patience	Unselfishness
Empathy	Perseverance	

4.2 Context for virtues

This theme describes the influence of the context in which participants discuss virtues. This theme includes five subthemes: 4.2.1 religious context, 4.2.2 societal context, 4.2.3 personality, 4.2.4 scientific context, and 4.2.5 virtue antonyms.

4.2.1 Religious context

For some participants, religion was the first association for virtues in the discussion. During the first focus group meeting, the topic of discussion would often return to religion.

> *P10: Um, so I associate it with religious context, um, I don't think it's a word I use too much*
>
> ***Participant 10, Academic and Industry and SME Member, United Kingdom***

> *P13: I agree on that, first thought would be religious…*
>
> ***Participant 13, Student, France***

P8: Which again means follow good laboratory or research practice, so follow the rules.

P10: Or what that to be virtuous is to resist temptation.

[crosstalk] [laughter]

P7: Back to religion.

[crosstalk] [laughter]

Participant 7, Academic and Industry and SME Member, Croatia

Participant 8, ERI committee Member, Croatia

Participant 10, Academic and Industry and SME Member, United Kingdom

P4: Isn't also a gender sort of, and gets back to religion, wright, I mean…

Participant 4, Industry and SME Member, USA

In contrast to participants who associate virtues with religious connotations, others said that virtues have a non-religious meaning to them. They emphasized that religion is not a necessary condition for being virtuous and they rather saw virtues as a part of morality.

P5: So the virtues you have growing up whether it be religious or non-religious. I mean, virtues mean also non-religious for me. It's not the first thing that comes in mind – religion, I would say knighthood will be the first thing comes to mind when I said virtue.

Participant 5, Funding and process organization and ERI committee Member, Croatia

P12: Issues of moral codes…

P10: Yes.

P12: So it's, whatever it is, it comes back as issue of morality rather than, for example religion, there is a difference…

P10: Yeah, but I think lots of us got our moral codes form religion which is why it has that sort of religious connotations but it doesn't have to, but it's often mystique…

Participant 10, Academic and Industry and SME Member, United Kingdom

Participant 12, Policy maker, United Kingdom

P10: Are more religious people less like to cheat?

P5: No! [group laughter]

Participant 5, Funding and process organization and ERI committee Member, Croatia

Participant 10, Academic and Industry and SME Member, United Kingdom

4.2.2 Societal context

Participants generally agree that virtues are a social construct, this will be more discussed in the next theme. Some participants pointed out that virtues are often used in social context even when we try to explain some actions we consider to have a positive effect on society.

> *P10: Sure, but I don't think people are born virtuous, I think it is a social construct.*
>
> ***Participant 10, Academic and Industry and SME Member, United Kingdom***

> *P13: Now is used in different context, like social, like a some enterprise are virtuous, I mean it`s like they do good for people, selected good for animals, good for environment, but I can see difference between what I would take immediately…*
>
> ***Participant 13, Student, France***

One of the most discussed topic by our participants was the influence that science has on society. If scientists violate the standard codes of professional scientific research and ethical behaviour, the consequences of that can be viewed as undermining the society itself.

> *P18: I would say, um, one of the virtue would be reflexivity as a researcher. So consider where your research is positioned towards society but also being research and why are you doing with your research for. Not just for the science in general but also for society. And also consider obviously your bias, so reflexivity would be a virtue.*
>
> ***Participant 18, Student, the Netherlands***

> *P5: So, I think that we also recognize here that it's not only that we need to behave on science, ugh, behave well on science's behalf, we need to behave well also on the society's behalf. Usually, people think about fabrication, falsification and plagiarism as the three evils but, yes, they are evils but they are against different populations. If you plagiarising I would say that's somehow a sin against a fellow researcher… [crosstalk] …But if you fabricating and falsifying research…*
>
> *[crosstalk] P10: Yeah.*
>
> *P5: …that applies that you are actually undermining the society itself. Science definitely, the society in large probably. So, within these three evils, there are evils that we do to each other which, you know… But overall some of them is worse than the others.*
>
> ***Participant 5, Funding and process organization and ERI committee Member, Croatia***
>
> ***Participant 10, Academic and Industry and SME Member, United Kingdom***

P20: But I think you know there is a lot of social science research that underestimate the impact that they could have in society at large, in negative terms, rather than positive terms. Perhaps justifying some weird ideology or… Of course there's also an issue of capture. So, someone politically motivated can capture a research meaning, interprets that research as, you know, a justification for what he's doing or so clearly the researcher should try to contrast that but it's not entirely his fault.

Participant 20, Academic, Italy

Some participants mention that language as a social construct plays a significant role in the understanding of virtues. Since virtues are sometimes perceived as an abstract term, these language barriers can cause difficulties in international communication in situations when some participants are not native speakers.

P11: For me, English is not my first language, so virtue is very abstract word that I can't really understand even when I translate it to my language it's difficult to know what it means

Participant 11, Student, Belgium

P8: So I wanted to add also about the language part. So, P5 is also Croatian so we have the same vison about the virtue

P7: It's a language problem, we don't have this concepts and definitions…

Participant 7, Academic and Industry and SME Member, Croatia

Participant 8, ERI committee Member, Croatia

P10: Very practical, almost a question, but what languages are you preparing this in? A lot of scientist may using this all when working international language but actually they are much more comfortable speaking in their native tongue.

Participant 10, Academic and Industry and SME Member, United Kingdom

Depending on the context, characteristics differentiating between masculinity and femininity could also influence our understanding of virtues.

P1: Patience is a virtue, have it if you can, seldom found in woman, never found in man [group laughter].

Participant 1, Student, United Kingdom

P4: When someone says women of virtue, I don't know if that translates to…

P10: I'm just gonna say that… as someone who is obsess with etymology, I don't like the fact that it refers to manliness, origin of it is about being a good man, and yet…

P4: Women of virtue refer to a virgin…

P13: No, I would say it's from Vir that in Latin is man… most probably, I mean it's not my field…

P10: I think that's the origin…

P4: In US… woman of virtue means someone who was still a virgin when she was married…

P13: Yes, that is…

P4: …it's a very gender, very terrible thing…

Participant 4, Industry and SME Member, USA

Participant 10, Academic and Industry and SME Member, United Kingdom

Participant 13, Student, France

P4: And now we seeing these cases and there are obviously more. Where's, you know… Women on power you not allowed to…

P6: Uh-huh. I think men as well can get away with the kind of quirky, that`s just how he is, he's a mad scientist. While women often perhaps are put up to highest standards in that sense.

Participant 4, Industry and SME Member, USA

Participant 6, Industry and SME Member, United Kingdom

4.2.3 Personality

Participants frequently described virtues as personal traits or personal characteristics that can evolve from sociological factors.

Facilitator: So for you, that would be more like traits?

P5: Yeah, so, like a personal trait…

Facilitator: And, how, um, according to what you said, that can be shifted or moulded but not too much?

P5: Um, well you can, in adult life, well you can try to emulate expected behaviour but if that will necessarily become your personal trait, I'm not necessarily sure.

Participant 5, Funding and process organization and ERI committee Member, Croatia

Facilitator: So you saying that job interview is most common context…

P8: Yes, where you here this word. It's usually to describe something that is your characteristic, not something that you developed but something that you realise about yourself.

Participant 8, ERI committee Member, Croatia

Personal characteristics are essential in selecting other researchers to cooperate with in the workplace or during education. To achieve that, some participants valued more personal characteristics, and others looked at their achievements.

P19: I think one of the characteristics of the really admirable researchers I really think what you`re saying P20 [noise] but one characteristic is something about imagination.

Participant 19, Academic, United Kingdom

P1: Well, as a student, normally I look at achievements of the supervisor and what come from them and start looking at characteristics and after a while I would enjoy working in this environment and then I would have more capacity to navigate and chose something else. First comes to priorities and what do I value at this moment and I value if a person has a good record and can supervise me for the while. And then slowly can move on to working in another working environment if the personal characteristic does not fit me.

Participant 1, Student, United Kingdom

When asked directly, participants considered as equally important both their abilities and personal characteristics.

Facilitator: I mean, when you trying to do something on your job, not research but different branch, would you consider only their abilities or personal characteristics?

P4: Consider both, you need to know both, it's why we do reference checks by phone and not relying on letter that I know it will said they're wonderful and on the top 2% of anyone in the world.

Participant 4, Industry and SME Member, USA

Facilitator: So, in order to collaborate with another researcher, um, do you look mostly at their academic achievements or you also try to judge their personality, their character traits?

P20: What a good question!

P17: Yeah, both. I mean, I think on experience of lot of people of us, lot of us notice that working with difficult people really is not very productive and just a hassle and annoying, so yeah, both aspects I would say but problem is of course you often only learn that by going through experience [group laughter], yeah…

Participant 17, ERI committee Member, the Netherlands

Participant 20, Academic, Italy

Participants also emphasized that time is necessary in order to find out the characteristic of other persons so it plays a crucial role in judgment about personality.

P9: I believe that is really, really difficult to understand the personal characteristic of person. You really need time, so, um, you say time, which in a different characteristics you get a colleague that you want to work with, I think you really need time to understand the person.

Participant 9, Student, Spain

P20: I think one, the academic achievements is more or less easy to make a quick judgment then, even that the case can be more complex about personality or that you just need a time. It's impossible to make a, you know, call after a meeting or something. But, yeah, it's clearly very important.

Participant 20, Academic, Italy

4.2.4 Scientific context

Science is another context under which participants discuss virtues. Respondents also emphasize morality in this context but more in a sense of responsibility to the scientific community.

P19: I'd like to pick up upon the point you recently made about the scientific community. I'm not sure if it's about integrity but one does have a responsibility as a scientist to participate in the community and in the particular to take peer review seriously.

P15: Uh-huh. [agrees]

P20: Uh-huh. [agrees]

Participant 15, Academic, Denmark

Participant 19, Academic, United Kingdom

Participant 20, Academic, Italy

P10: I would say it's about taking responsibilities for your actions and thinking about your motivation… So not doing something because you want to get a PhD and you want a paper, fame, glory or whatever it is, but because you actually want to help patients or animals or science

Participant 10, Academic and Industry and SME Member, United Kingdom

P5: So I don't think it's impossible that a researcher can hope that he or she is doing this research in assess for the greater good. I don't think that… at least 50% of researchers while they publish, they do publish for selfish reasons because they want to be promoted, they want some financial, social, psychological, whatever, but the other half actually believes that what they're doing is good, so they are increasing the total amount of knowledge in the world that it may help someone some day, so…

Participant 5, Funding and process organization and ERI committee Member, Croatia

Participants most frequently discuss virtues which are stated as main principles in The European Code of Conduct for Research Integrity. This includes honesty, accountability and respect. The participants also emphasized reliability, not so directly as the other principles, but more in a sense of research design and methodology. When they talk about the European Code of Conduct for Research Integrity, participants do not see as a useful teaching tool for the younger researcher but more as a short reminder to more experienced researchers.

P5: Well, the 2015 Codes are basically again reinforcing what RCR means at the European level. Um, and they are re-establishing the expected behaviours. Um, so, they are again saying, um, these are the expected behaviours and, um, find ways of reaching those expected behaviours of both institutionalized and individualized and I think they also recognized that there is a difference in the way that individuals approach research and in the way that institutions approach research. And then another, the 2015 one, is a very, a

very short and… and in the same time very encompassing document that gives a lot of guidance and very, very little guidance for whether you, something we mention here, if you are young researcher, just naming the expecting behaviours and, is very difficult to emulate. If you are a seasoned researcher than these are a nice reminder. But…

P7: Seasoned?

P5: …I think that the ALLEA Code is not necessarily meant as a teaching tool, um, let's say reminder tool for everyone involved in research what the behaviours that we emulate are. Or that we need to emulate. That's what I think.

Participant 5, Funding and process organization and ERI committee Member, Croatia

Participant 7, Academic and Industry and SME Member, Croatia

P7: So this is a very short document and it is actually not very helpful for young researcher. It's helpful for trainers but in each field you have to develop… [silence]

P8: More specific guidelines…

P7: More specific guidelines what means reliability in social science, in humanistic, in arts, in medicine and so on.

Participant 7, Academic and Industry and SME Member, Croatia

Participant 8, ERI committee Member, Croatia

Participants also pointed out that ECoC did not provide the user with adequate definitions.

P7: I don't think there is a definition in the code… or there is?

Facilitator: Yeah, this is from the Code of conduct… [shows ECoC on screen] It is not a definition…

P7: But is there a definition of honesty in the Code?

[crosstalk]

P10: …that's a weird definition of honesty…

Participant 7, Academic and Industry and SME Member, Croatia

Participant 10, Academic and Industry and SME Member, United Kingdom

Some participants saw ECoC more like a set of rules then the guidelines that should be applied to entire Europe.

P5: I`m not trying to mix your scientific merit trying to publish, I'm saying whether you performed misconduct, no one checks for that in-between you trying to publish and you having start performing research so. There is disconnect there, so that's why the rules, well

not the guidelines, these are basically the rules, the RCR rules by the ALLEA that should apply to entire Europe. Um, I'm saying ok, once you have been approved, your research have been approved, you need to apply certain set of guiding principles and these are those or these are some of those. Otherwise you'll eventually be held accountable and then who knows what will happen.

Participant 5, Funding and process organization and ERI committee Member, Croatia

4.2.5 Virtue antonyms

Antonyms of virtue were an important and highly influential (sub)theme in this discussion because, in order to explain some particular virtue, participants frequently used words that have the opposite meaning of that virtue. Some participants even noticed during the discussion that it is easier to identify negative behaviour than the positive.

P10: I'm sure there is something called the cardinal virtues which I am unable to list, I can list the seven deadly sins but not the virtues [group laughter]… That also must say something about me…

Participant 10, Academic and Industry and SME Member, United Kingdom

P5: It's a lot easier recognizing, identifying and then treating bad behaviour [laugher].

Participant 5, Funding and process organization and ERI committee Member, Croatia

Participants even spent some time during discussion trying to find out the term which can be used as an antonym for virtues. They have concluded that the best expression for that purpose is vice.

P10: Can I propose a question, cause sometimes if you have problems with definition it's useful to look at the opposite, I'm just thinking what is the opposite of virtuous, it doesn't have obvious antonym.

P8: So in Croatian is flaws…

Someone: Or vice.

P10: Vice! But you need adjective to apply to something… You can say you are virtuous man.

P5: You are vice-o [laugh].

P13: Vicious.

P7: Vicious.

P5: No, no, no…

P4: Vicious is different.

[crosstalk]

P13: If you have vice…you play, you drink, you're not faithful to your wife…

Participant 4, Industry and SME Member, USA

Participant 5, Funding and process organization and ERI committee Member, Croatia

Participant 7, Academic and Industry and SME Member, Croatia

Participant 8, ERI committee Member, Croatia

Participant 10, Academic and Industry and SME Member, United Kingdom

Participant 13, Student, France

Dishonesty was most frequently mentioned as an antonym of honesty.

P10: You always know when you are lying, sure. And that to me is dishonesty.

Participant 10, Academic and Industry and SME Member, United Kingdom

Fraud means fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

P19: For example, Carlos Castaneda wrote either two or three books on his experiences taking various psychoactive substances in… on the border of California and Mexico, I think it was. And it turns out he made them all up.

Participant 19, Academic, United Kingdom

P20: You know, you could cheat about your research but clearly that's a problem of integrity and so on.

Participant 20, Academic, Italy

Participants recognize arrogance as a display of superiority or self-importance.

P20: And, and the opposite of that for me is the kind of researcher that I will never want to be, someone who at one point reached the point of ay, ok. you know, I know it all, I can go anywhere, tell people what I think and there's nothing for me to learn from whoever I meet.

Participant 20, Academic, Italy

P21: And does it go together with the arrogance that you're clearly seeing a lot of famous scientists [group laughter].

Participant 21, Policy maker, Belgium

Selfishness was characterized by participants as concern or care only for one's own interests or benefits. It can be understood as an antonym of cooperativeness.

P5: …at least 50% of researchers while they publish, they do publish for selfish reasons because they want to be promoted, they want some financial, social, psychological, whatever…

Participant 5, Funding and process organization and ERI committee Member, Croatia

P15: About the personality, do you mean something like with different opinions or it will be more like probably has a lot so he or she has lots of papers but they're actually not so much team worker.

Participant 15, Academic, Denmark

Complete list of the vices mentioned during these focus group discussions is shown in **Table 6.**

Table 6. *List of vices mentioned during focus groups discussions in alphabetical order*

List of vices	
Arrogance	Lust
Corruption	Ruthlessness
Dishonesty	Selfishness
Exploitation	Sloppiness
Fraud	Virtue signalling
Jealousy	

We can conclude that participants discussed and understood virtues under specific circumstances that form the setting in which virtues can be fully understood. We understood these settings as different contexts: religion, society, individual personalities, science and virtue antonyms.

4.3 Acquisition of virtues

This theme deals with factors that have an influence on the acquisition of virtues. It includes three subthemes: 4.3.1 socialization, 4.3.2 education and 4.3.3 following the rules.

> *P7: I agree with you, I also teach. I think we can teach students how to do good research, to follow the best practices to avoid sloppy science, hmm, but we cannot reach the ones that are, that don't have internal knows of, moral knows of honesty.*
>
> ***Participant 7, Academic and Industry and SME Member, Croatia***

> *P10: To me, some of these are much more trainable than others, so if you expect someone to understand research design and methodology. That is definitely something we expect to train. Whereas honesty is maybe something that we don't expect to train so much. We think of that more as personal traits. Or I find that in spite of all mixture, actually, of some of the things that I think of as almost technical skills and some of things I would see as virtues.*
>
> ***Participant 10, Academic and Industry and SME Member, United Kingdom***

> *P13: …it's not something that you can really teach from that point of view, it's something you have or you don't have.*
>
> ***Participant 13, Student, France***

4.3.1 Socialization

For this purpose, we can define socialization as the process of learning through which people are taught to accept society's beliefs, norms and values. Socialization was recognised by participants as a highly important and continuing process in which individuals acquire virtues. This means that virtues are not and inborn quality so a person can become a good researcher only through interaction with others.

> *P16: I don't think they we're necessarily born with the virtues intact actually. I think we're born as blank slates and in many instances and we learn a good deal from our parents or siblings, our wider social circles, our schools and so on.*
>
> ***Participant 16, Policy maker, Ireland***

> *P15: It's little bit about it like children, they do what they see and not what they hear, so. And, and that, and in that we, I think we're socialised into being good researchers.*

P16: Yeah.

Participant 15, Academic, Denmark

Participant 16, Policy maker, Ireland

P20: […] I mean, it's the socialization process. But I also think that the relationship between mentor and student is really delicate because you have some people that they see the student exactly is like cheap labour or some kind of resource to exploit.

Participant 20, Academic, Italy

Some participants also identified emulation of expected behaviours as a useful observational learning mechanism.

P5: Um, well you can, in adult life, well you can try to emulate expected behaviour but if that will necessarily become your personal trait, I'm not necessarily sure.

Participant 5, Funding and process organization and ERI committee Member, Croatia

P5: Yes, that's why I think that virtue or being virtuous is an intrinsic quality and not extrinsic. We can control it, we can mould it. And the researcher can try to emulate the behaviours, the expected behaviours of their surroundings, whether micro or macro surroundings to continue behaving integrally or virtuously.

Participant 5, Funding and process organization and ERI committee Member, Croatia

P19: And if turns [noise] out badly, other people will behave badly and if people set high standards those will be emulated. And I think that is probably much more important at the postgraduate level because the undergraduate do it…

Participant 19, Academic, United Kingdom

Education as another subtheme in this category was deeply connected with socialization and it is difficult to completely separate them. Participants sometimes talked about them as one concept but since they also frequently saw education as a standalone and important part of the acquisition of virtues, we will treat them as different subthemes.

P15: But it's difficult to train someone on this ride. The game is part of their socialization process.

[crosstalk] P16: Yes, [inaudible].

P15: Yeah, training and how to do your methods properly and so it's sort of the other way around. Yeah. But yeah, so good luck with that [group laughter].

Participant 15, Academic, Denmark

Participant 16, Policy maker, Ireland

P10: …we are not born virtuous, we have to get it from somewhere. Learning, I mean, learning doesn't have to be as you say a formal course, so maybe we get it from our parents or peers or society, as you say, they were emulate, and that's a different question from can you teach it. I don't think we're born virtuous.

Participant 10, Academic and Industry and SME Member, United Kingdom

4.3.2 Education

The importance of education in the acquisition of virtues was a frequently discussed topic amongst participants from both focus group meetings. Participants pointed out that learning, training, mentoring and reflection are crucial for good research practice.

P1: Yes, virtue can be developed, it might take training, it might take reflection, but it certainly can be developed at some consideration.

Participant 1, Student, United Kingdom

P8: But good research practice also can be and must be learned. So you don't know if everything you doing is correct.

Participant 8, ERI committee Member, Croatia

Facilitator: How would you assure that objectivity, how would you recognize it?
P3: Well, you learn it, have to learn that. You might be inclined already, you might have that quality with you but they have to teach you, obviously, you have to hear talk about it and then you have to figure it, you have to stop and say "is this me", decide this is bad or do I have enough information to say this exactly is good or bad. So it takes time, it takes experience, but you have to be taught as well. And you might have that already developed.

Participant 3, Industry and SME Member, Germany

Early engagement in research with adequate mentoring could be the best way to become a responsible researcher. This theme was closely related to the following theme on possible improvements of acquisitions of virtues.

> *P6: I think if you start early, with researchers who never had, never been involved in research performance, no reasons why that can`t be taught this is the correct way to do research whatever we think correct is and see that term is kind of flexible but I think if you have a good P.I. who's a good mentor that there's no reason why you can't be taught good research practices, yeah, and you might kind of become a person could get sloppy and thinks like that but I think if you start early enough than it's given good chance to be kind of engaged in a good research practices.*
>
> ***Participant 6, Industry and SME Member, United Kingdom***

Some participants emphasized a lack of training for poorly done research because without training, researchers cannot have the competence and there is no reason to put trust in their conclusions.

> *P19: There are a lot of people who drift into social research with no training whatsoever. I don't think that what they do is intentionally to [cough] mislead but without training, without competence, um, they don't have an integrity in the sense of you don't really trust the conclusions that they reach.*
>
> ***Participant 19, Academic, United Kingdom***

In contrast to the importance of education, some participants also suggested that teaching in ethics today has a little or no effect. They pointed out some studies that show a significant decline in acquired knowledge after some time.

> *P19: But I'd like to pick up that point. Teaching in ethics has been shown to have almost no impact.*
>
> *P15: Yes.*
>
> *P16: That's what I was saying.*
>
> *P18: Yeah.*
>
> ***Participant 15, Academic, Denmark***
>
> ***Participant 16, Policy maker, Ireland***
>
> ***Participant 18, Student, the Netherlands***
>
> ***Participant 19, Academic, United Kingdom***

P16: The, the, the papers I'm thinking about and what Sanderson did it and when she did a very, very large sample numbers. What she found was that if you, she had some behavioural tests that she, so they were getting all the participants students were given and a series of behavioural tests before they were given a bit immediately afterwards across there was a huge jump immediately afterwards. They were very engaged and, you know, as stimulated by what they had the training they had done but she found it over a nine-month period that went right back down to the pre-training levels.

Participant 16, Policy maker, Ireland

P17: So what I've seen, perhaps especially in fields that claim to be reflexive, such as my [institute anonymised], I've seen a lot of blind spots in famous people so they think that they do get things right and do things rights. But actually when you talk to students of theirs then you also come across all sorts of questionable practices on their part, so I find very difficult to imagine how you could operationalize the effectiveness of ethics courses or ethics training because there's a lot of people constantly tell themselves stories about how they are, how they behave in their research. So, yeah, I would take it with a grain of salt. I mean…

P16: Take the?

P17: The, the argument that ethics courses perhaps don't, you know, deliver in a sense or don`t make such a difference in terms of how people behave.

Participant 16, Policy maker, Ireland

Participant 17, ERI committee Member, the Netherlands

However, the reason for this decline of knowledge could be in other incentives from the environment that simply outweighed individual courses in ethics.

P17: But, yeah, I could imagine that maybe these effects of individual courses are by far outweighed simply by the constant incentives that you get from your environment, your daily environment. So, yeah. So, it's not a matter of the courses themselves doing something wrong but simply being outweighed by other factors.

Participant 17, ERI committee Member, the Netherlands

4.3.3 Following the rules

Participants identified following the rules as one of the main aspects of the acquisition of virtues. They pointed out that researchers who follow rules are more likely to be virtues and vice versa.

> *P13: I feel in the research I will go more with following set of rules made to be virtuous, like, about that research, more than…*
>
> ***Participant 13, Student, France***

> *P11: I think that rules, people who are virtuous would be more virtuous because they would follow them and people who don't follow the rules would not.*
>
> ***Participant 11, Student, Belgium***

> *P5: …the researcher can try to emulate the behaviours, the expected behaviours of their surroundings, whether micro or macro surroundings to continue behaving integrally or virtuously.*
>
> *P8: Which again means follow good laboratory or research practice, so follow the rules.*
>
> ***Participant 5, Funding and process organization and ERI committee Member, Croatia***
>
> ***Participant 8, ERI committee Member, Croatia***

Some participants suggested that there was a distinction between the virtuous researcher and virtuous research. They pointed out that it may take a long time to find out whether the research is virtuous or not, but the virtuous researcher can be detected relatively quickly because he followed rules.

> *P12: So is than there a distinction between the virtuous researcher and virtuous research and the second one, the virtue of the research, may not actually be known at the time. It may take 5, 10, 15 years to find out that what's good, moral good, what benefits to humanity that has actually had. Whereas the virtuous researcher can be detected recently quickly because that he's following rules.*
>
> ***Participant 12, Policy maker, United Kingdom***

However, learning rules can also have negative connotations because some people want to know the rules just to get around them.

P4: They did learn the rules cause they want to figure how to get around them…

Participant 4, Industry and SME Member, USA

Also, some participants emphasized that following the rules is a crucial part of research integrity because it means adhering to professional standards. However, following the rules virtuous does not make one a virtuous scientist.

P5: I recognize that basically we come down to the idea whether is something is research integrity or research ethics. Well, ethics is part of your moral reasoning, research integrity would be the one following the rules. So these are, I would say two different things. So I don't think it's impossible that a researcher can hope that he or she is doing this research in assess for the greater good. I don't think that… at least 50% of researchers while they publish, they do publish for selfish reasons because they want to be promoted, they want some financial, social, psychological, whatever, but the other half actually believes that what they're doing is good, so they are increasing the total amount of knowledge in the world that it may help someone some day, so… not saying that "oh, all you have to do is following these rules and that determines whether you virtuous or not. Even in the research setting.

Participant 5, Funding and process organization and ERI committee Member, Croatia

We can conclude that participants recognised socialization and education as a highly important and continuing process in which individuals acquire virtues because they emphasized learning, training, mentoring and reflection as crucial for good research practice. They also identified following the rules as one of the main aspects of the acquisition of virtues because the researchers who follow rules are more likely to be virtues and vice versa.

4.4 Possible improvements

The 'possible improvements' theme describes the processes and methods that could have an influence on the improvement of acquisition of virtues. This theme includes three subthemes: 4.4.1 learning by example, 4.4.2 better scientific system and 4.4.3 different approach.

4.4.1 Learning by example

Participants identified learning by example as a far more powerful experience than being lectured or forced to learn a specific set of instruction.

> *P19: But if you're going to provide somebody with training, you know, it's good to have a concrete example. And I guess it might be parallel to would you learn as much from reading a recipe book on how to create a risotto or if somebody took you through the steps of actually getting the rice out and doing this that and the other.*
>
> ***Participant 19, Academic, United Kingdom***

One way to achieve this is 'by your own example', which means that trainers should also be exemplary researchers themselves.

> *Facilitator: And what can trainers do to encourage researchers to integrate virtues in their everyday practice?*
>
> *P7: Show by their own example… that they have that, those virtues.*
>
> *Facilitator: And is there a way to create some kind of training for that? Or just by example… [crosstalk] P7: you mean how to train the trainers.*
>
> *P4: Hum.*
>
> *P7: Well, yeah. Pick the good persons, we were speaking about honesty, to pick honest, honest researchers and teachers or other kind of specialist and to preach them how teach research integrity.*
>
> ***Participant 4, Industry and SME Member, USA***
>
> ***Participant 7, Academic and Industry and SME Member, Croatia***

Some participants also mentioned that showing the consequences of different behaviours could be a useful approach.

> *P8: This is much easier to explain by examples than to put abstract things because these are not abstract things. Honesty, respect, reliability, so to a different people, they need different things as we all establish. So when you were say this person did this, so this was the consequence and these people did this things and this was the consequence that would be the much better approach.*
>
> ***Participant 8, ERI committee Member, Croatia***

P1: I think you depending on the field of the context should consider showing real-life consequences, good or bad of the research practices and routine and what led to that.

Participant 1, Student, United Kingdom

Differences in the approach for different scientific fields and disciples were also discussed. Participants believe that the most important virtues are generally equally desirable in all disciplines, but there are still some differences, so the guidelines should be developed specifically for each discipline.

Facilitator: Do you mean, um, different virtues should be stimulated according to the different research fields?

P7: Probably there all pretty much the same, the core ones, but there will be difference of course.

Participant 7, Academic and Industry and SME Member, Croatia

P7: I think they have to be op… oper… operationalized – meaning if you want to be revival, you need to do this and this and that. And in different disciplines. So this is a very short document and it is actually not very helpful for young researcher. It's helpful for trainers but in each field you have to develop… [silence]

P8: More specific guidelines…

P7: More specific guidelines what means reliability in social science, in humanistic, in arts, in medicine and so on.

Participant 7, Academic and Industry and SME Member, Croatia

Participant 8, ERI committee Member, Croatia

Some participants identified practices of giving the same examples for different scientific fields and disciplines as being ineffective. In order to get students more involved, it is necessary to provide them with examples from their own disciplines.

P10: I would suggest having something generic which the individual trainer can then adopt because we all respond best to things that come close to home. And so if I give in a try teach physicists things and I don't know anything about physics, so the examples need to come from the particular discipline. So you need something quite general that people can then put it to the more particular, um, I mean, certainly if you teaching in Croatia you need examples from Croatia. Um, so, I would say make it generic but expect the trainers to, I

think that also helps with understanding, helps us sort of rather than oh I`m just giving this on somebody else behalf than the trainers from their material.

Participant 10, Academic and Industry and SME Member, United Kingdom

P18: What would be different is how you teach them. That should go, I think, where discipline. Like if you want to really make people get more involved. If you're a humanities and then you just get examples from medicine…

P15: Yeah, of course you…

Participant 15, Academic, Denmark

Participant 18, Student, the Netherlands

P19: …do you think it'll be a successful and as prevalent as ethics because as far as I can see to go back to your question, should would there be different courses for different disciplines, different epistemic, you know, I mentioned the people teaching ethics in medical schools in RI departments and in social science department, might well be using rather similar case studies, but they in order to make it more accessible they may use slightly different examples, but I just thought the principles must be pretty much the same and I imagine the same will be true virtue. However, defined.

Participant 19, Academic, United Kingdom

Participants described the recognition of the importance of mentoring for the acquisition of virtues, and initiatives to strengthen coaching skills. Mentors have a huge impact on the behaviours so their students will model and echo the behaviours they see in them especially if they admire them.

P6: I think if you start early, with researchers who never had, never been involved in research performance, no reasons why that can`t be taught this is the correct way to do research whatever we think correct is and see that term is kind of flexible but I think if you have a good P.I. who's a good mentor that there's no reason why you can't be taught good research practices, yeah, and you might kind of become a person could get sloppy and thinks like that but I think if you start early enough than it's given good chance to be kind of engaged in a good research practices.

Participant 6, Industry and SME Member, United Kingdom

P16: But also I think you will eventually absorb those virtues and you know there's been a lot of very interesting work done in the states by Melissa Anderson, people looking at and the impacts of let's say ethics teaching and supervision and what they found was that actually delivering a course has very little impact on how people view the world and their behaviours. But actually their mentors have a huge impact on the behaviours so they will and they will model and echo the behaviours they see in people that they admire.

P15: It's little bit about it like children, they do what they see and not what they hear, so. And, and that, and in that we, I think we're socialised into being good researchers.

P16: Yeah.

P15: Quite our educations, our peers, supervisors, colleagues and so forth in and environment so that we see on different kinds of levels, um, yeah. But training of course is important. But, but training in terms of what you see and how, how, how…

P18: Mentoring?

P16: Mentoring!

P15: Mentoring, yeah, that's the word I was looking for. Yeah.

Participant 15, Academic, Denmark

Participant 16, Policy maker, Ireland

Participant 18, Student, the Netherlands

P20: I agree. I mean, completely what, what you said before. I mean, it's the socialization process. But I also think that the relationship between mentor and student is really delicate because you have some people that they see the student exactly is like cheap labour or some kind of resource to exploit.

Participant 20, Academic, Italy

4.4.2 Better scientific system

Participants discussed today's scientific system and they suggested some possible improvements that can lead to better acquisition of virtues. One solution can be better control and assistance of ethical bodies through the whole research process.

P5: Yes. So, at that point that research, that funding body and the ethics committee within that body are the ones deciding what rules you need to follow or fulfil to be able to perform research. Now, this is where the disconnect is. Once you've been approved that you may do the research and you actually start doing research there are very, very few bodies that actually check how you're doing that research until you perform or have been caught doing

something that's wrong. So, then they step in and then they look whatever happened from the point when you were allowed to perform this research and the point when you were caught doing something bad. Occasionally there are ethics advisory boards or ethics boards or something that actually checks whether you are following the rules and are doing the things that you promise you would do. The very, very few. So the trust comes into, into this story, after you've been approved to do the research and once you tried to publish.

Participant 5, Funding and process organization and ERI committee Member, Croatia

Plagiarism is still very much present is academic publishing, especially at the undergraduate level. There are effective technological solutions to reduce plagiarism so there is no reason to avoid checking for plagiarism of all texts at all levels.

P10: Yep, we did and we did show to be pretty effective.

P7: And you said text-matching software helps?

P10: That's true, and specific one about plagiarism.

Participant 7, Academic and Industry and SME Member, Croatia

Participant 10, Academic and Industry and SME Member, United Kingdom

Different people have different motivation. Some people are afraid of punishment; others are motivated by a reward or just self-respect. It is important that the scientific system has tools which can properly address different motivation.

P10: it's a people… Yeah, different people motivated by different things. Some people are fearful so, you know, it's a bad punishment, they were…

P4: Yeah.

P10: …yeah, see that. But others I think are more motivated by self-respect, feeling that, you know, I`ve done a good job and haven't hurt anybody, and I nurtured things, and I've been a good person.

Participant 4, Industry and SME Member, USA

Participant 10, Academic and Industry and SME Member, United Kingdom

Some participants identified retraction as the way of useful shaming which can reduce scientific misconduct.

P5: What happens when you are named and shamed at the international level? This is not local science, there is no, oh but only your mother, your grandfather and your closest

friends from the street will know about this. No, once you publish and your publication is retracted, that guy, that poor guy who lost his story about the thyroid [laugher], the entire world will know that he did not know the basic rules about submitting your research for publications.

P7: [personal information] That is true, I always show [Retraction watch] page to my students and they will call for wall of shame, yeah.

Participant 5, Funding and process organization and ERI committee Member, Croatia

Participant 7, Academic and Industry and SME Member, Croatia

P10: I think a lot is about explaining consequences…

P5: Yeah.

P10: …because actually, um, the person who said I didn't realise that I couldn't publish three times. If you explain that is unfair, that it might bias a meta-analysis, getting undue credit, than you say and, and that if you get caught out you get retraction. To some people, sticks and carrots which motivate different people, but I do think it's explaining the consequences of bad actions, can be helpful because especially junior researchers sometimes really didn't haven`t thought that through, don`t realise it…

Participant 5, Funding and process organization and ERI committee Member, Croatia

Participant 10, Academic and Industry and SME Member, United Kingdom

Others suggested that improvement of rewards in science could be more effective than punishment. Some participants frequently used the phrase "carrot and stick" as a metaphor for inducing the desired behaviour with a combination of reward and punishment.

P4: We need the better carrots. So, can we create carrots that will reward this kind of behaviour, directly? So it's not a question, I think, I think we are a step prior to actually teaching and, and instructional mentorship view. What are the carrots. Because no mentor is going to model behaviour, um, you know, no mentor is gonna go out of his or her way to mentor behaviour, to model behaviour that would hurt his or her own career and his/her mentees. So, we need to, sort of, take a step back, and maybe this is out of the scope for this, I don't but take step back and figure out better carrots.

Participant 4, Industry and SME Member, USA

P4: …there actually are some carrots that I think maybe wouldn't be a bad idea, um, talk about more. In there… they, um, this, these studies that I mention where people who, now

again, it's specific case, it's not just general integrity, it's… if you make a mistake, you tell all about it. Um, I think it's a part of integrity, it's not a day-to-day thing, you don't want to make a statement video. But, but, um, if, I think if we, you know, we all sort of promoted this idea that you don't, you don't want be punish for, um, which there are data for. Um, I don't know, that's one example of the carrot that I think… As valuable as I obviously think that, you know, the naming and shaming is, I don't know that is more valuable, or even as valuable as, even know it's more difficult to, to, create those carrots.

Participant 4, Industry and SME Member, USA

P10: I'm thinking also, sort of, within a laboratory or within a small group a personal relationship, I think that there are some carrots, um, because often dishonesty will cause a breakdown of relationship whereas good word would be prized and so on. What missing somehow is the more institutional or [inaudible], um, or at national level do we [inaudible] reward good research?

P8: Well again, good research gets publish, so…

[crosstalk] P10: so does bad research [group laughter]

P8: Yeah, but theoretically you are only rewarded in that way so have the motivation to do it as, um, as good as you can so you can, um get to better publication because you will have it for the rest of your life, so…

P7: In China you get 10.000 dollars if you publish in Nature…

P4: Yeah.

P9: It's a reward!

P4: Can I just push back on the good is getting publish – it is, but good research also isn't getting publish.

Participant 4, Industry and SME Member, USA

Participant 7, Academic and Industry and SME Member, Croatia

Participant 8, ERI committee Member, Croatia

Participant 9, Student, Spain

Participant 10, Academic and Industry and SME Member, United Kingdom

4.4.3 Different approach

Participants suggested that today's dominant approach to ethics and research integrity training should be improved. A possible approach could be the a combination of the principle-based approach and virtue-based approach.

Facilitator: Would you prefer scientific, um, virtue approach or this, to research ethics and research integrity training or this traditional approach based on rules and codes?
P5: I wouldn't stick with either, I would do a mix. There is definitely room for improvement on today's approach. There has to be a body that [giggle], that may look into how research is perform beyond just having proposed it [silence] and then approved. You have all the ethics approvals by the corresponding body but [laughter] no one's checking. So I would do both, I would both teach, I would tell the researchers the emulate, what the behaviours are that they need to emulate and what are expected behaviours and what are the applauded behaviours. But then I would say – you will be held accountable and we have body that actually checks what you do. We don't check everyone, we do a spot check. You don't want to be the one found having performed poorly on that spot check. So…
P10: I agree with P5 that you probably need a whole range of approaches started with different people learning different ways…
Participant 5, Funding and process organization and ERI committee Member, Croatia
Participant 10, Academic and Industry and SME Member, United Kingdom

Participants suggested using case studies as a teaching tool because they encourage students to communicate and collaborate in order to find solutions, solve a problem or make a decision in a specific situation.

P19: And I think that's what case studies are trying out to do you try and get people involved and a good example of that away from ethics is a technique that's come into social science which is contrasted vignettes. So instead of asking people 'Do you favour x or y, you give people a story. I mean, we did this with some work on gene editing so we had stories using gene editing either to as therapeutic to bring people up to the norm or enhancement to take them above the law. Now to describe that to people.
Participant 19, Academic, United Kingdom

The ethical dilemma was recognised as an important and highly influential teaching method because it is a good way to involve students but at the same time can be a useful problem-solving tool. An ethical dilemma is situations in which a difficult choice has to be made between two or more possible courses of action, neither of which is clearly acceptable or preferable. Participants also mentioned some useful examples that can be used in training, particularly Rotterdam Dilemma card game.

P19: And I think that's perhaps what one is trying to do with a case study on ethical principles to open people's eyes to a particular human issue, a human dilemma. And get them to sort of weigh up what leads to that, what are the intentions, what were the consequences. And, you know, in a way that's why, I was reading the other day at a conference, I think here, no, in the Netherlands, on the role of literature and in social science or something like this or it was history and I thought, well… And this was supposed to be a new endeavour. And I thought, well, the Greek myths still is relevant today as they were 2300 years ago and this seems to be kind of rediscovering what would be self-evident to anyone who had a vaguely reasonable education. That's me being snob.

Participant 19, Academic, United Kingdom

P18: I think… I have follow but also checked several forms of world courses because my research was also a PhD. And one I saw that I thought, at first I thought it was very silly but then I saw actually how people were engaging which I thought was very interesting. So there was this sort of card game which very clear cut black and grey, black and white statements and then you have to like order them or so. And then you start seeing how people, you can also fill your own, but then you start see how people are struggling with these very black and white and what's very interesting for that is not how you arrange these characters but then the discussion that comes about it. So I think because, I mean, a case study is interesting depending on the level of when you are in your research because you can come across dilemmas that maybe you're facing or you can imagine facing. But this is also interesting because then you can hear why people are struggling. I'm putting it really on this side or on one side or one kind of behaviours can also happen or the motivation. So that's actually more also interesting, so it's…

Facilitator: It's like a Rotterdam card game...

P18: Yeah, yeah…

P15: Yeah, Exactly

P16: Yeah.

[group crosstalk]

P18: So because then people start discussing and I think if you're just sitting and you're just getting, oh you will get, there also this course and they say read this book and then just sit there and then, that's probably…

Participant 15, Academic, Denmark

Participant 16, Policy maker, Ireland

Participant 18, Student, the Netherlands

P19: I periodically would try and teach a bit of ethics with case studies and there were one or two rather interesting and challenging that, I mean, I wouldn't say I was anywhere near Michael Sandel and, you know, the philosopher from, is he from Harvard who lectures to thousands of people and speaks to them of their Christian names presents them with ethical dilemmas gets them to think them through a sort of Plato to a massive audience, but I I've found the students really quite taken with ethical dilemmas.

Participant 19, Academic, United Kingdom

The use of popular movies as examples of an ethical dilemma was also mentioned. Participants pointed out that it could be a very powerful and interesting teaching tool because it is fun visually attractive to students.

P16: I saw really [inaudible] one and I can't think, who it was? Might've been ENRIO, one of the ENRIO people. And what they were doing was they were actually getting, taking clips from well-known movies that pretty you know, All the President's Men and I think Aliens, one of them, whatever, that presented a moral dilemma.

P20: Interesting.

P16: Yeah, yeah. Because it was a visually engaging as well and they maybe had two or three clips that they showed on unrelated things and then had, um, people sort of consider why, you know, what could each party actor within that scene have actually done differently or did they have a choice, so what the motivations are? Because it was often, you know, because it's, it's narrative and fiction, they were often impossible choices. You know, the wife is gonna get shot at home with his children if they didn't do such and such a thing and if they knew it was very bad thing to do and what, you know, if you were in the same, in their boots, what would you do and, you know, would you actually kill that guy to save your family's lives. And it was all that sort of stuff. But it was really, again, illustrated exactly as the dilemma against trying to do, try to get people to stand in somebody else's shoes and think, well, what would I do in this situation? What could I do in this situation? So, I, I, it was very visually then and was fun but very powerful, very powerful teaching tool. Yeah. Yeah.

Participant 16, Policy maker, Ireland

Participant 20, Academic, Italy

Some participants emphasized reflection as a very important way of acquisition virtues because it can be a useful way of assessing yourself and your way of research. Reflecting can help students in reviewing the effectiveness of their skills and in being more aware of their biases.

> *P1: Most things can be taught or changed if you willing to do and you have the ability to self-reflect and consider attitudes, anyway it can't be easily done, but if you want to become more honest than why can't you became more honest, or if you want to persevere at something you can develop ability to do that, so…*
>
> ***Participant 1, Student, United Kingdom***

> *P1: In qualitative research for me it's about being aware of my own biases and reflecting on those and trying to insure that, um, you know, you can't get rid of them, but knowing how to manage that so that I`m being honest rather than just ignoring it and, you know, hoping that it`s still honest. So, this, I think there are ways of dealing with it because I, I imagine that most researchers don't want to be dishonest but there are easy ways of falling into if you don't have certain mechanisms or ways or if you are not aware how to manage certain issues.*
>
> *Facilitator: What kind of mechanisms you think are appropriate?*
>
> *P1: Well for me, in qualitative research, is a lot of learning how to reflect, um, like, observations honesty, learning of how to reflect, um, what I see is going to happen versus what actually happened and maybe what I wanted to happen. And kind of, you know, trying to manage all that, give it the truest possible sense what, what it really was, then the more I collected more data, kind of [inaudible] process of going backwords and forwards and checking and insuring that they were as true and an accurate as possible, and, you know… just insuring that I need my own stance and trying to make sure I kept it as separate as possible.*
>
> ***Participant 1, Student, United Kingdom***

> *P5: That's why I think, what you said earlier, reflection, you were taught to reflect on the things you assume…*
>
> *P10: Yeah.*
>
> *P5: …on the things that actually had, so that's twice in a row [group laughter]. Um, so, reflection on those things and then intergrading that into your behaviours is key, so I think… once the researchers adopt that portion of, or a change of behaviour were they*

reflect that things they were doing. Where they recognize why they were doing this things, what their assumptions are and then try to remove their biases will help with sticking to RCR and maintaining good research. So, I think that training in self-reflection would be an important aspect.

Participant 5, Funding and process organization and ERI committee Member, Croatia

Participant 10, Academic and Industry and SME Member, United Kingdom

The need for continuous education was also discussed by focus group participants. One of the reason is an insufficient level of knowledge, which can explain the way some researchers are even today unaware of basic ethical standards.

P16: we are still seeing people who are, um, you know, doing really quite sensitive research and sometimes quite vulnerable populations, prisoners, for example, you know, or for teens and there is looking at their sexual behaviours and so on. And when they're asked about their ethical, you know, what are your arrangements for the ethical review, they take I don't need any. So, even now, even now. So I think that this idea that everybody understands where the ethical lines are is actually not true. And I think that, you know, there's it seems to be quite dynamic, you know, when it's pointed out to them that you we will not fund you without ethical approval. It's like, ok, all right, I get the approval, but honestly, they didn't see the problem. They just simply didn't see the problem. So I think we have come a long way in the last 20 years for sure. Well, we certainly aren't there yet.

Participant 16, Policy maker, Ireland

Some participants pointed out that continuous education is also needed because knowledge has to be updated due to the changing in ethical principles and new regulations.

P10: …it isn't just a case of once you`ve done the training, that's it, you immunise for life and you going to be a good researcher, sadly no.

Participant 10, Academic and Industry and SME Member, United Kingdom

P16: It was simply a module of training which of course is how unfortunately I think the point she was trying to make wasn't that you shouldn't train but that you couldn't do it in one little block at the beginning of a course and that's it. It's done you've done your training that you needed to reinforce like, like the most learning that you actually need to reinforce over a period of time in order to maintain that level of engagement.

Participant 16, Policy maker, Ireland

P19: So, I mean, nobody thought about it in the… They thought ethics was something biomedical, that was a treatment of patients, but the treatment of gene [noise], etcetera, etcetera. Ethics just didn't end. Now within 30 years, in the life science department, ethics will be part of the curriculum and I'm wondering whether, how the same might happen to virtue.

Participant 19, Academic, United Kingdom

We can conclude that participants identified that today's dominant approach to ethics and research integrity training should be improved. They suggested learning by example as a far more powerful tool than being lectured to or forced to learn a specific set of instruction as well as using case studies as a teaching tool. Also, the importance of mentoring and continuous education was recognized as important aspects in acquisitions of virtues.

5 Conclusion

The focus groups were conducted as a part of conceptual mapping amongst stakeholders of virtues which are crucial for good scientific practice, which the aim to develop the evidence base regarding which virtues should be stimulated and developed in training for good research practice.

Face-to-face focus groups with stakeholders in research resulted in rich description of the virtues in research areas. Explicit elements of the mapping of scientific virtues were described in the themes 'virtues', 'context', 'acquisition of virtues' and 'possible improvements'. The results of face-to-face focus groups with stakeholders confirm the importance of understanding the meaning of virtues in research areas as well as possible improvements in the process of acquisition of virtues.

We can conclude that participants had different understanding of the concept of virtue, but they mostly saw them as positive personal characteristics, traits of admirable quality. The importance of different virtues was a frequently discussed topic amongst participants so we can say that participants generally felt that some virtues were more important than others, which also means that the virtues can be ranked, but this can be done only with appropriate methods and techniques. Participants especially emphasised honesty as the most important virtue for good research practice but they also mentioned accountability as crucial scientific virtue. Honesty and accountability were also identified as the main principles in The European Code of Conduct for Research Integrity (ECoC) so we can conclude that these virtues should be central to the development of VIRT^{2}UE training programme. Two other principles of ECoC, respect and reliability, were also mentioned but more in relation to collaboration, research design and methodology. In addition, participants did not see ECoC as a useful teaching tool for the younger researcher but more as a reminder to more experienced researchers.

Participants recognised socialization and education as a highly important and continuing process in which individuals acquire virtues. They pointed out that learning, training, mentoring and reflection were crucial for good research practice. Possible improvements in

the acquisition of virtues were also identified by the participants. They suggested learning by example as a far more powerful tool than being lectured to or forced to learn a specific set of instruction. The importance of mentoring was also recognized because mentors have a huge impact on the behaviours of their students who emulate the behaviours they see in them.

Participants also suggested using case studies as a teaching tool because they encourage students to communicate and collaborate with each other. The ethical dilemma was recognised as an important and highly influential teaching method that can better involve students and provide them with a useful problem-solving tool. Continuous education on good scientific practice was also recognized as an important aspect in acquisitions of virtues due to the constant changing in ethical principles and newly updated regulations.

6 Appendix 1. First focus group discussion guide for stakeholder consultation on scientific virtues

Focus group round 1

I would like to thank you all for coming to this meeting. My name is_____ from_____. I am conducting discussion groups as part of H2020 project VIRT^{2}UE which aims to develop a sustainable train-the-trainer blended learning programme enabling contextualized ethics and research integrity teaching across Europe. We will discuss your experiences and understanding of scientific virtues in two consecutive focus groups. This will allow us to develop a holistic virtue-based training programme based on evidence because the results of the focus groups will be taken into account directly in the development of the training programme and materials.

We would like to cover these issues in the discussion. Even if you are unsure about any of these issues, your views are still very valuable to us, so please do not feel shy during the discussion. I would like to say that there are no right or wrong answers, we will simply be discussing your views, opinions and experiences; so please feel comfortable to say what you really think.

As we have already told you, your participation in this group is voluntary. Whatever we discuss today will be confidential and used only for this research project. During the discussion _____ will be taking notes and reminding me if I forgot to ask something. However, so that he/she does not have to worry about getting every word down on paper we will also be tape recording the whole session. The reason for tape recording is so that we don't miss anything that is said and these recordings will be destroyed after they have been transcribed. The transcription will be fully anonymous.

Please do not be concerned about this, our discussion will remain completely confidential; we will use only first names in the discussion and the information will only be used for this

research project. Is it OK with everyone to tape-record this discussion? It is also important that only one person talks at a time. We will not be going around the room; just join in when you have something to say. Remember we want to hear all your views, so it's OK to disagree with everyone else if you have a different opinion, but please also respect the views of the others here as well. This discussion will probably last about an hour or so. Are there any questions before we start? Let's start.

Introductory round

As an introduction, let's go around so that you can introduce yourselves, and perhaps tell us how are you involved in research.

Topic 1. Understanding of scientific virtues

1. What do virtues mean to you?
   (Possible probes: In which context do you usually hear virtues being discussed?)
2. How are virtues related to good scientific practice?
   (Possible probes: How can they contribute to the development of good science?)

Topic 2. Relationship between virtues and research

3. In order to cooperate with other researchers, do you look primarily at their academic record or do you also try to judge what character traits they have?
   (Possible probes: Can you name those character traits?)
4. Is there any difference between what virtues make a good person and what virtues make a good researcher??
   (Possible probes: What are the virtues every researcher should have as an individual and which virtues are crucial for functioning as a member of a research team? Can we asses those traits?)

Topic 3. Learning of scientific virtues

5. How exemplary scientific values and virtues can be learned?
   (Possible probes: Which virtues should be stimulated in training for good research practice?)
6. What would be examples of virtues teaching in relation of good research practice?

Focus group round 2

Okay, so just before we continue the discussion, I'd like to do a brief presentation about the Virtue project just so you get a better information on it and what are we doing in our research.

Presentation

[Presentation of the project, principles and practices of the ECoC and virtue-based approach in ERI training]

Topic 1. Understanding of scientific virtues

1. What do virtues mean in scientific practice?
   (Possible probes: What are the most important scientific virtues?)
2. How are virtues related to the principles of ECoC and vice versa?

Topic 2. Relationship between virtues and research

3. How can scientific virtues shape researcher behavior?
4. Can you think of a situation in real life research in which the development of virtues would be far more meaningful than setting rules and codes?

Topic 3. Learning of scientific virtues

5. Would you prefer scientific virtue approach to ethics and research integrity training or a more traditional approach based on codes and rules?
   (Possible probes: What are advantages and disadvantages of each approach?)
6. Do you think different virtues should be stimulated for different sector/discipline? Please explain.
7. What can trainers do to encourage researchers to integrate virtues into their everyday practice and understand how to act in concrete situations?
   (Possible probes: What are the barriers that prevent integration of virtues into everyday practice and concrete situations?)
8. How should the virtues be taught in order to make a content more adjust to trainers?

Ending questions

Does anyone have any further comments to add before we conclude this session?

7 Appendix 2. Adjusted focus group discussion guide for stakeholder consultation on scientific virtues

Topic 1. Understanding of scientific virtues

1. What would you consider as virtues in scientific practice?
   (Probe: Is there any difference between scientific virtues and virtues in general?)
   (Probe: What are the most important scientific virtues?)

Topic 2. Relationship between virtues and research

2. In order to cooperate with other researchers, do you look primarily at their academic record or do you also try to judge what character traits they have?
3. How would you describe an exemplary researcher?

Topic 3. Learning of scientific virtues

4. How exemplary scientific values and virtues can be learned?
   (Probe: Do you think different virtues should be stimulated for different sector/discipline?)
5. What kind of teaching methods would you prefer in order to teach virtues to someone?
   (Probe: Would you prefer theoretical lectures, workshops, discussion groups, examples of best practice or some other methods? Which methods you think would be the most efficient)
6. Would you prefer scientific virtue approach to ethics and research integrity training or a more traditional approach based on codes and rules?
7. How should the virtues be taught in order to make a content more adjust to trainers?
8. How can virtues be assessed?

8 Appendix 3. Questionnaire for participants

1. What is your country of residence?

2. What is your gender?
   Mark only one choice.

   a) Female
   b) Male
   c) Prefer not to say

3. What is your age in years?

4. In which stage of the research process you are currently active (e.g. research, publishing, policy, research funding) Mark all that apply.

   a) As an academic researcher
   b) As a journal editor (any role, from editor in chief to manuscript editor)
   c) As a peer reviewer
   d) As a member of a research ethics or research integrity committee
   e) As a policy maker
   f) As a researcher in industry or in SME
   g) As working for a research funding or process organization
   h) As a student
   i) Other:

5. How many years have you been active in this role(s)?

6. How many publications have you published?

7. In which discipline(s) do you work?
   Mark all that apply.

   a) Biomedical sciences
   b) Social sciences
   c) Natural sciences
   d) Applied sciences (e.g. engineering)
   e) Humanities
   f) Other:

8. Did you ever participate in a research ethics and/or research integrity training? If so, please briefly describe your experience:

9 Appendix 4. Informed consent letter

Dear Sir/Madam,

We at the VIRT^{2}UE project aim to develop a sustainable train-the-trainer blended learning programme enabling contextualized ethics and research integrity teaching across Europe focusing on understanding and upholding the principles and practices of the European Code of conduct for Research Integrity (ECoC). This European Commission funded project seeks to include all stakeholders in a participatory way. As such, we are conducting an in-depth stakeholder consultation amongst people involved in research. We aim to consult: academics, researchers, educators, ethics/integrity committees, policy makers, students, representatives from funding and process organizations, and representatives from industry and small and medium enterprises.

We would like to invite you to participate in this stakeholder consultation via participation in two focus groups meetings.

By agreeing, you commit to participating in two separate discussions approximately one hour apart in Split. They will be led by researchers from University of Split School of Medicine (in collaboration with KU Leuven). As this is a Europe-wide consultation, the language of the focus groups will be English. All focus group discussions will take place in autumn 2018. This letter contains details about the project and the stakeholder consultation so you can make an informed decision whether you would like to participate in the focus groups or not.

1. Aim of the focus groups

We will discuss your experiences and understanding of scientific virtues in two consecutive focus groups. This will allow us to develop a holistic virtue-based training programme based on evidence because the results of the focus groups will be taken into account directly in the development of the training programme and materials.

2. What is involved?

If you would like to participate, we will invite you to two focus group sessions at the University of Split School of Medicine. The preliminary date for both focus group sessions is the date of focus groups. Each of these focus groups will take about 1 hours. Before attending the focus group, we will ask you to complete a brief questionnaire (sent via email beforehand taking

about 15 minutes) about your background: gender, age, role, years of experience, published publications, nationality and country of residence. The questionnaire will also include a couple of open questions about scientific virtues. You can bring the printed survey answers to the focus group or fill them in before the focus group. We would appreciate that you do not return it by e-mail in order to protect your privacy and anonymity.

3. Benefits and risks of participating

The direct benefits of participating in the research are that participants can share experiences and contribute to the development of the train-to-trainer learning programme, thus being able to actively bring in and broaden their knowledge and experience; mostly, however, the benefits are indirect, they will be accrued by the research community as a whole which will have open access to online teaching material from this innovative blended (i.e. combined online and off-line approaches) learning programme designed to foster scientific virtues. One risk associated with the focus group is other people knowing the details about your personal information you might describe. Efforts to minimize this risk include asking all participants to return confidentiality agreements, and to avoid the use of identifying characteristics. In addition, the time commitment required for two focus groups discussions in one day may prove inconvenient.

4. If you do not want to join or want to stop the group conversation

Participation is voluntary. If you do not want to participate, you do not have to do anything and you are not required to let us know. If you decide to participate, you must sign the attached informed consent form and return it via email prior to the focus group. If you have agreed to participate but change your mind, you can of course withdraw at any point (including during the focus group discussions), we would ask you kindly to inform us if this is the case.

5. Use of data and dissemination of research findings to participants

The focus groups will be recorded. These recordings will be destroyed after they have been transcribed – the transcription will be fully pseudonymous. Informed consent forms will be stored separately from the discussion transcripts. The transcripts of the focus groups will be kept for up to 10 years after the end of the study. Only pseudonymised data will be used for analysis. The VIRT^{2}UE project will comply with the open science framework and open research data management. All data will be made publicly available following FAIR principles in order to make data findable, accessible, interoperable and reusable. The findings from the stakeholder consultation will also be published and made publically available on the Project's page on the European Commission research information portal:
https://cordis.europa.eu/project/rcn/214892_en.html

6. Financial aspects

There is no fee paid for participation, however all travel expenses will be reimbursed.

7. Do you have any questions?

Please do not hesitate to contact the consultation project coordinator, prof. dr. Ana Marusic ana.marusic@mefst.hr, if you have any questions. If you want to keep informed about the research process, please send us your request to the before-mentioned addresses. Also, all research results will be delivered through the EC funded platform currently being developed in the EnTIRE project (http://entireconsortium.eu/) and on the VIRT^{2}UE project webpage.

Informed consent and confidentiality agreement

Please read the statements below in connection with the research 'Virtue based ethics and Integrity of Research: Train-the-Trainer program for Upholding the principles and practices of the European Code of Conduct for Research Integrity (VIRT^{2}UE): stakeholder consultation' and sign if you are in agreement with all of the statements.

- I have read the information sheet.
- I was given the opportunity to ask any questions and any questions I did have were sufficiently answered.
- I had enough time to decide if I would join.
- I know that participation is voluntary. I also know that I can decide at any time that I would like to withdraw my participation and quit the study. I do not have to give any explanations.
- I give permission to make the audio recording.
- I give permission for collecting and using my data in the way and for the purposes stated in the information letter.
- I want to participate in this research.
- **I agree to maintain the confidentiality of the information discussed by all participants and researchers during the focus group session.**

Name:

Signature: Date: __ / __ / __