VIRT2UE

Training the Trainer

D2.1 Review of the existing ERI training literature and practices review

WP2 Mapping the educational resources

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D2.1 Report on the results of the ERI literature and practices review

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1. About Virt2ue

Recognizing the importance of addressing ethics and research integrity (ERI) in Europe, in 2017 the All European Academies (ALLEA) published a revised and updated European Code of conduct for Research Integrity (ECoC). Consistent application of the ECoC by researchers across Europe will require its widespread dissemination as well as an innovative training program and novel tools to enable researchers to truly uphold and internalize the principles and practices listed in the Code. The VIRT$_2$UE project recognizes that researchers not only need to have knowledge of the ECoC, but also to be able to truly uphold and internalize the principles underpinning the code. They need to learn how to integrate them into their everyday practice and understand how to act in concrete situations. VIRT^{2}UE will address this challenge by providing ERI trainers and researchers with an innovative blended (i.e. combined online and off-line approaches) learning programme that draws on a toolbox of educational resources and incorporates an e-learning course (including a YouTube channel) and face-to-face sessions designed to foster moral virtues. ERI trainers and researchers from academia and industry will have open access to online teaching material. Moreover, ERI trainers will learn how to facilitate face-to-face sessions of researchers, which focus on learning how to apply the content of the teaching material to concrete situations in daily practice.

2. About WP2

Work Package 2 aims to identify and consult ERI trainers and the wider scientific community to understand existing capacity and deficiencies in ERI educational resources. Through this, it will bring together the insights of local or regional initiatives, to gain insight into what works, as well as identify concrete challenges and needs. This will give us a state of the art of the scientific evidence on ERI educational resources and allow us to reduce the current fragmentation of efforts and to optimize efficiency.

3. Description and objectives of the deliverable

The aim of the deliverable is to present the results of the ERI literature review (MEFST) and to present an overview about the collected educational material on the topic of research integrity (RI). The educational material has been collected from National, European and extra-European sources (KU Leuven). Moreover, in this deliverable information about RI educational practices within the European contexts (KU Leuven) will be presented.

4. Results of the ERI literature review (MEFST)

4.1 Description

VIRT2UE project aims to develop a train-the-trainer blended learning program focused on Ethics and Research Integrity (ERI). Ethics will be included in ways which apply to research integrity, rather than the professional ethics. VIRT2UE will also be based on virtue ethics approach to research integrity and principles defined in the revised edition of European Code of Conduct for Research Integrity. To help develop the training program, we reviewed published scientific literature for interventions aimed at research ethics and research integrity.

4.2 Methods

We performed a systematic search of Scopus and Web of Science bibliographical databases. A detailed search strategy was developed in collaboration with a librarian experienced in systematic reviews (available in **Supplement A**). Publications considered relevant for inclusion were journal articles which describe or evaluate interventions aimed at improvement of ERI. We considered articles that aimed at research ethics, research integrity, responsible conduct of research (RCR) or prevention of research misconduct. We differentiated research integrity from academic integrity, which is broader in scope[1,2]. We included articles on academic integrity if they focused on plagiarism, which is an important part of authorship conduct[2]. We considered any kind of educational approach and delivery mode of trainings. The results were limited to those published after 1980, as that was the time when research integrity emerged as a field. Gray literature search was performed through specialized databases (http://base-search.net, http://opengrey.org, http://science.gov, https://www.rri-tools.eu/). The search strategy was sensitive rather than specific, using the terms “research AND ethics” and “research AND integrity”. There were no language, geographical or limitations for participants regarding their levels of education and areas of research.

[1] International Center for Academic Integrity, Fishman T (editor). The Fundamental Values of Academic Integrity. International Center for Academic Integrity, 2013.

[2] Marusic A, Wager E, Utrobicic A, Rothstein HR, Sambunjak D. Interventions to prevent misconduct and promote integrity in research and publication. Cochrane Database of Systematic Reviews 2016, Issue 4. Art. No.: MR000038. DOI: 10.1002/14651858.MR000038.pub2.

4.3 Results

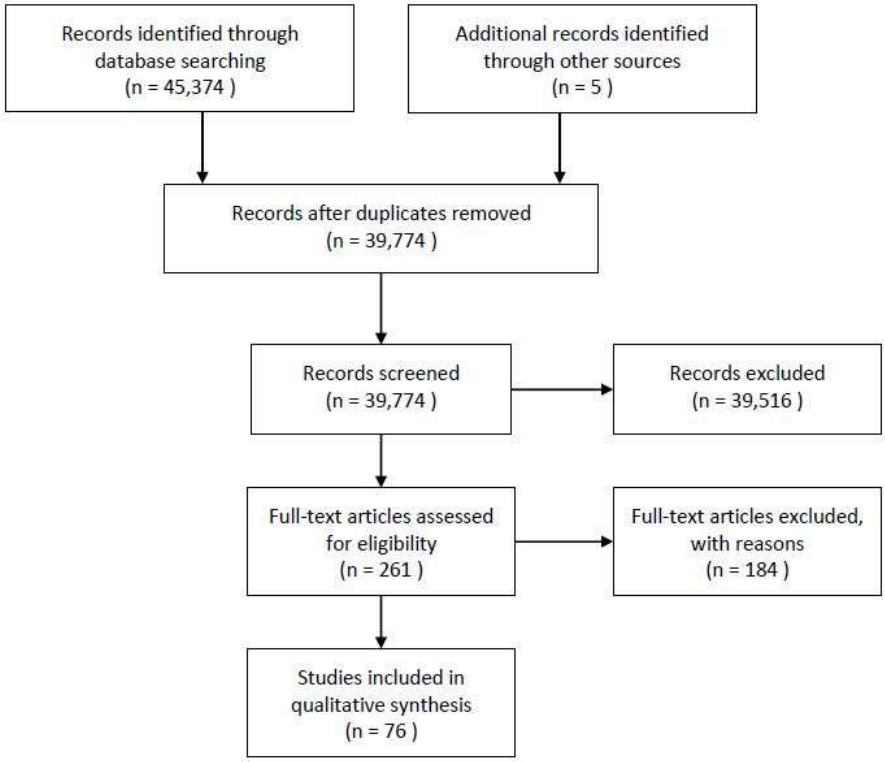

Figure 1. Flow chart of literature review

Our search of Scopus and Web of Science retrieved 45 374 results, 39 769 after removing the duplicates (**Figure 1**). After screening of titles and abstracts by two independent reviewers, 257 articles were selected for full text assessment. Further 184 articles were excluded at that step, leaving 72 articles for analysis. Search of grey literature resulted in 4 included resources, two of which are projects, and two of which are educational materials.

For included articles, we extracted the information on authors, country of origin, year of publication, research area, target population, ERI topics addressed in the training (content), educational approach, delivery mode and duration, outcome assessment, key findings, identified gaps and availability of materials. Full list of extracted resources is available in **Supplement B-sheets 1,2,3**
We present the main characteristics of the courses in the domains of the content of education, research area and target audience, delivery and duration of training, and training evaluation.

4.3.1 Content of training

Extracted educational interventions were declaratively mainly focused on research ethics (RE) only (42 articles), responsible conduct of research (RCR) only (18), or research integrity (RI) only (6). A combination of RE and RI was described in 3, RE and RCR in 2, and RI and RCR in 1 article. Following one of the included articles on modeling a RCR course[3], we loosely categorized topics that were addressed in

[3] Watts LL, Mulhearn TJ, Medeiros KE, Steele LM, Connelly S, Mumford MD. Modeling the Instructional Effectiveness of Responsible Conduct of Research Education: A Meta-Analytic Path-Analysis. Ethics & Behavior. 2016. 27(8), 632–650.

the educational interventions to: ERI in general (specific topics were not defined and/or precise term "RE in general" was used), guidelines, principles and codes (content focused on key facts about rules in a professional research context), and decision making and processes (content aimed at developing capacity for identification, addressing and analysis of ethical issues) (**Table 1**).

Table 1. Topics addressed in educational interventions

Topics addressed in educational interventions (n of appearances)	
RE/RI/RCR in general (n=39)	
Guidelines, principles and codes	
fabrication and falsification (n=2)	collaborative research and conflicts (n=2)
plagiarism (n=9)	confidentiality and privacy (n=7)
authorship (n=11)	data management (n=9)
research misconduct (n=8)	codes, regulations and guidelines (n=14)
informed consent (n=12)	roles of ethics committees, IRBs, ORI, UKRIO (n=7)
research with humans (n=27)	publication ethics (n=2)
research with animals (n=4)	peer review (n=3)
conflict of interest (n=4)	the relationship of study design to ethics (n=3)
supervisor student relationship (n=3)	historical context of RE and RI (n=3)
Decision making and processes	
a framework for ethical analysis (n=1)	whistleblowing (n=1)
honesty (n=2)	fairness (n=2)
deception (n=2)	bias (n=2)
respect (n=1)	beneficence (n=1)
justice(n=1)	autonomy (n=1)
cultural relativism (n=1)	moral theory (n=1)
researcher subjectivity (n=1)	

4.3.2 Research area and target audience

Educational interventions were primarily developed in the biomedical and health sciences (n=31). They were followed by social sciences (n=10), engineering and technology (n=5), and natural sciences (n=4). Some of the interventions were developed multidisciplinary (n=7), and included all of the mentioned professions. Target audiences of the interventions were predominately students (undergraduate, graduate, PhD) (n=40). Researchers, experts, faculty staff, and research ethics committees (REC) members were target audience of 12 interventions. Dominance of biomedical background was also reflected in the target audience, since 5 of the interventions were specifically aimed at biomedicine and health professionals. Mixed audience, described as students, experts, researchers and REC members, were target audience in 7 interventions.

4.3.3 Delivery and duration of training

Majority of interventions were delivered face to face (n=41), some of them were completely online (n=11), and some of them were blended, i.e. partly online and partly offline (n=10). Delivery activities, or educational approaches of the interventions were mostly focused on lectures and cases. There was an equal distribution between interventions that used one, single educational approach (n=30), and those that used multiple educational approaches (n=29). Full list of used educational approaches is presented in **Table 2**.

Table 2. Educational approaches used in analysed interventions

Educational approach (n of appearances)
Lectures (n=24)
Case based (n=14)
Discussion (n=15)
Problem based learning (n=18)
Group based, workshops (n=14)
Scenario and role-play (n=14)
Peer and group mentoring (n=2)
Drama based teaching (n=1)
Nonfiction reading assignment based (n=1)
Fish bowl technique (n=1)
Hands-on qualitative research (n=1)
Card game (n=1)

Information on duration of training was not always available (30/72). Reported duration of training varied from 15 minutes to a full semester. We categorized the duration to three groups:

- *training in duration of 2 hours or less (*n=*8),*
- *training in duration of one day up to one week (*n=*12), and*
- *training in duration of more than a week and/or dispersed throughout the semester (*n=*15).*

4.3.4 Evaluation of training

Reporting on the assessment of the interventions was mixed. Some studies reported only on the assessments of the interventions, mostly in the form of surveys on satisfaction and evaluation of the course (n=27). Studies that reported on assessment of participant oriented outcomes could be categorized into three groups: assessment of knowledge of ERI, through multiple choice and/or open ended questions (n=20), assessment of ethical awareness (participants' self perception) through open ended questions and essays (n=11), and assessment of ethical decision making and/or intention to change behaviour (n=8). Assessments were usually done post intervention (n=25), only some pre and post intervention (n=12).

5. Results of the collection of the RI educational material (KU Leuven)

5.1 Description

The main aim of the EU funded project VIRT^{2}UE is to develop a train-the-trainer blended learning program that may serve as starting point for the development of local RI training program and that can help future trainers to acquire the right knowledge and skills for spreading as much as possible good research practices. Making a broad collection of RI educational material may serve as base for the development of new educational resources. Understanding the current state of the art within the European context as well as worldwide can give us an overview about the lacunas and the needs regarding the existing learning material. Moreover, the educational resources collected may be used in the online session of the VIRT^{2}UE training. We mainly focused our attention on the educational material that is free available online since it can be used in full autonomy and without any constriction by both, trainers and trainees. Moreover, the choice of looking at the free available educational material is also related to the main limitation of our task. Analysing the current material used by the universities, research institutes and for-profit organizations depends on the willingness to share with the project private resources. However, it turned out that most of the material used by the universities is freely available on line, in particular cases studies, textbooks, videos, card games and movies. The majority of the collected educational material is from extra-European sources, mainly from U.S., and from northern European countries.

5.2 Methods

In order to collect as much material as possible, we conducted an online search using Google as main search engine. We collected educational resources until end of March 2019. We used, as starting point, the same key words used by Heitman and Bugler[4] in their assessment of the educational literature, namely responsible conduct of research (RCR), research integrity, scientific integrity research ethics, science ethics and ORI (office of research integrity). In support, we also made a search using different keywords or mixes of them, namely academic integrity, research integrity educational material, RCR educational material, research integrity training programs, RCR training programs, research integrity educational practices, RCR educational practices. As second step, we used the so-called snowballing process for increase our collection, starting from our preliminary outcomes. As final step, we looked for the RI educational material already collected in previous national or European funded project on RI in order to add what was lacking from our search and to delete potential duplicates.

In building up our collection, in order to have a broader overview about the topics or contents addressed and the type of material, we decided also to include educational resources developed by for-profit companies (Epigeum and CITI program). We decided to include also those two online training programs because they are the most used by universities and research institutions worldwide[5,6].

[4] E. Heitman and R. E. Bulger, "Assessing the Educational Literature in the Responsible Conduct of Research for Core Content," *Accountability in Research* 12, no. 3 (2005): 207–24, https://doi.org/10.1080/08989620500217420.
[5] T. Phillips et al., "America COMPETES at 5 Years: An Analysis of Research-Intensive Universities' RCR Training Plans," *Science and Engineering Ethics* 24 (2018): 227–49, https://doi.org/10.1007/s11948-017-9883-5.
[6] https://www.epigeum.com/epigeum/ (update march 2019)

Since there is no uniformity in the topics covered by different educational materials[1,7], we did not use any inclusion or exclusion criteria to define which contents include in our analysis. Since RI is an evolving field and new topics continuously appear, we took into consideration any topic even if mentioned only once. In order to establish a background list of topics, we decided to use as starting point the Office of Research Integrity (ORI)'s nine core topics[8] (research misconduct, research with humans, research with animals, conflict of interest, data management, mentor/trainee relationship, collaborative research, authorship and publication ethics, and peer review). To those, we added several other topics that were presented in in different resources worldwide.

We also decided not to have inclusion and exclusion criteria regarding the type of educational resources, but considering all kind of material that might have had educational purpose.

5.3 Categorization of the RI educational material

After having made a collection of online free available educational resources, the main challenge was to find a way to make this material easy accessible to everyone, trainees as well as trainers. We needed a way to categorize and to list the educational material we collected, developing a tool that may serve as grid in case new material will be added even after the end of the project.

We developed a grid (**Supplement B- sheet 4**) in which the educational material is listed and categorized using the following criteria:

- The name of the educational material
- Resource type
- The author(s) or the name of the institution who developed the material
- The date of the development
- The country of the development
- URL
- The virtue(s) or vice(s) mentioned
- Targeted audience(s) depending on the background
- The topic(s) addressed
- Language of the educational resources

In order to make a clear distinction among different typologies of educational resources, we started our categorization using a list of nine basic types of resources but we ended up with 18 different kind of educational resources that can have pedagogical aim (list 1).

[7] A. A. Kon et al., "Content Analysis of Major Textbooks and Online Resources Used in Responsible Conduct of Research Instruction," *AJOB Primary Research* 2, no. 1 (2011): 42–46, https://doi.org/10.1080/21507716.2011.564263.
[8] https://ori.hhs.gov/

1) Online training program
2) Card games
3) Role-play scenarios and role-play scenario collections
4) Videos and video collections
5) Movies and interactive movies
6) Case studies and case studies collections
7) Infographics and flowcharts and collections
8) Podcasts and podcast collections
9) Textbooks
10) Guidance
11) Reports
12) Visual art
13) Flash cards collections
14) Checklists
15) PPT presentations
16) Glossaries
17) Codes collections
18) Instructor material

List 1: type of educational resources

Despite this clear division, it was not always easy to identify the right position of some resources because the same resource may contain at the same time different typologies of material. Moreover, categorizing a resource as online training may be too reductive because the training program itself may contain references to guidelines or guidance, references to textbooks and may contain case studies or other kind of material.

For each educational resource, beside providing the typology of the material, we also provide the author(s) or the name of the institution or university, when and where the resource was developed and the exact URL where to find the material itself (if applicable). We provide information about the virtues or values possibly mentioned the targeted audience, the topics mentioned and the language used.
In order to distinguish among different targeted audience we made a selection of six categories (list 2). In some case the resources is clearly customized for one or more educational fields, in other cases the resources may be used by everyone, independent on the background.

1. Biomedical science
2. Humanities
3. Social sciences
4. Engineering
5. Natural sciences and physics
6. Administrative sector

List 2: targeted audience

Moreover, having analysed the educational resources we can also provide information about the addressed topics. In order to give the right information about the topics addressed in the educational resources, we used as starting point the ORI's nine core topics, but in analysing the collected material, we ended up with 30 addressed topics (list 3).

1) Research misconduct
2) Questionable research practices
3) Falsification
4) Fabrication
5) Plagiarism
6) Authorship
7) Peer review
8) Publication ethics
9) Mentor/trainee relationship
10) Collaborative research
11) Research with humans
12) Research with animals
13) Data management
14) Conflict of interest
15) patenting
16) Reproducibility
17) Financial responsibilities
18) Social responsibilities
19) Safety or lab safety
20) Work environment
21) Grant application
22) Allegation of misconduct
23) Open access
24) Whistleblowing
25) Intellectual property
26) Environmental responsibilities
27) Image manipulation
28) Moral reasoning
29) Biosecurity
30) Responsible research

List 3: addressed topics in RI educational material

5.4 Educational material collection

We analysed 100 educational resources, making out categorization based on the criteria mentioned above. We can easily say that most of them were developed for people with a biomedical science background.

Online training programs

We collected 22 full free available online training programs. Four of them are not free available. In the case of the Epigeum training program, the full access to the resource was granted by our universities whereas, in the case of the CITI programs, the information available online about the training programs (from the CITI website and from published articles) were more than enough to ensure a full analysis. It is very important to say that the collected online training programs are already per se a collection of

material. The analysed training programs are only in English (with one exception). The categorization of all training programs is fully available on the grid (supplement 1). We made descriptions of some important examples of RI educational training programs.

- The Research Integrity Basic program, developed and commercialized by Epigeum in 2012, is an online training used mainly at university level. The resource is not free available, and a subscription and a payment of a fee is needed. For this reason, the resource is mainly usable from people directly affiliated to an institution who made the subscription.
  The resource is customized for five different background, namely biomedical science, humanities, engineering, social sciences and, natural sciences and physics. Depending on the customization, different topics are addressed during the training. The main core is composed by different topics, namely research misconduct, questionable research practices (QRPs), falsification, fabrication, plagiarism, collaborative research, data management, financial responsibilities, work environment, authorship, peer review, social responsibilities and mentor/trainee relationship. In addition, topics related to research with humans and research with animals are addressed if needed, depending on the background, for instance in the biomedical science customization. The resource mentions in its first part different values and virtues that we can find on several national and international codes of conduct. Honesty, accountability, professional courtesy and good stewardship are mentioned in the Singapore Statement and presented in the training as well.
  In addition, Epigeum developed in 2016 a shorter version, the Research Integrity Concise, ideally used by senior researchers as refreshment of some topics and for addressing new different contents. The course provides a summary on topics such as research misconduct, QRPs and social responsibilities within a core course and five optional modules related to intellectual property, conflict of interest, safety, research with humans and research with animals. In this case, there is not any kind of customization available depending on the background. The Concise program mentions as well as the Basic program the values states in the Singapore Statement. Honesty, accountability, professional courtesy and good stewardship remain fix points in the Epigeum way of thinking about research integrity.
  The only language available for both is English.

- The Responsible Conduct of Research (RCR) basic online training program was developed in 2004 in U.S. by the Collaborative Institutional Training Initiative (CITI) program. As the Epigeum programs a subscription is needed. The program became full available in January 2007. As the case of the Epigeum Basic program, the CITI online training is available in five different customization depending on the field. The five customizations are the following: biomedical science, engineering, humanities, physical sciences and, social, behavioural and education sciences. The main topics addressed in all versions are research misconduct, QRPs, falsification, fabrication, plagiarism, authorship, collaborative research, conflict of interest, data management, mentor/trainee relationship and peer review. In addition, depending on the background the training program provides information about research with humans and research with animal. Unlikely the Epigeum training, the CITI provides an independent customization for research administrators in which a specific module on financial responsibilities has been added. In addition, modules on environmental and social responsibilities, and national security were added as optional.
  As Epigeum, also CITI program gives the opportunity to follow a refresh training program, also available from 2007. In this case as well, the program was developed having in mind senior researchers or people who has already a basic knowledge about the topic.

The refresh program presents the same customization of the basic one, except for the research administrators that is not available. The program is based on the ORI's nine-core topics[5]. Authorship, collaborative research, conflict of interest, data management, mentor/trainee relationship, peer review, research with humans, research misconduct and research with animals are presented shortly, providing a brief a general summary about the topic. In both training are mentioned values such as honesty and fairness.
The main limitation in evaluating this training program was that we did not have the access to the full online training, so we had to collect information using published papers[2, 9], and from the CITI program website[10].

- The Open Learning Research Ethics[11] is an online training developed by the Finnish Doctoral Training Network. The particularities of this online training program are that was developed by a national board, the training program is the same at national level and it is compulsory for every Finnish doctoral students in order to have access to the face-to-face sessions.
  The online training is available for Finnish doctoral student as well as for everyone is interested in following the course. The course is completely free available but a subscription to the website is needed.
  The online training does not present any kind of customization and the course is the same for every doctoral backgrounds. The training program proposes different topics, namely research misconduct, falsification, fabrication, plagiarism, data management, financial responsibilities, authorship, publication ethics, mentor/trainee relationship and collaborative research. Unlike the previous ones, the Finnish training does not propose biomedical science related-topics. The training is available in Finnish as well as English.

- The ORI Introduction to the RCR[12] is a free available training resource developed by Steneck and made available in 2007 via the ORI website. The online training is supported by the U.S. Department of Health and Human Services and it was clearly developed with a biomedical and social sciences customization. Honesty, accuracy, efficiency and objectivity are the core values mentioned in the training and presented directly at the beginning of the training. The following sections present several topics, deeply related to the ORI's nine-core topics. The online program present information on the topics of research misconduct, QRPs, falsification, fabrication, plagiarism, mentor/trainee relationship, research with humans and animals, data management, work environment, social responsibilities, authorship and peer review.

- The Committee of Publication Ethics (COPE) present in its website a core practices[13] online training program developed mainly for editors, peer reviews and publishers. However, the training may be used at any level since it provides information about publication ethics, research misconduct, authorship, conflict of interest, data management, reproducibility, intellectual property and allegation of misconduct. The resource is continuously maintained up to date by COPE itself. No specific customizations are present and no values or virtues are mentioned.

[9] P. Braunschweiger and K. W. Goodman, "The CITI Program: An International Online Resource for Education in Human Subjects Protection and the Responsible Conduct of Research," *Academic Medicine* 82, no. 9 (2007): 861–64, https://doi.org/10.1097/ACM.0b013e31812f7770.
[10] https://about.citiprogram.org/en/homepage/
[11] https://findocnet.fi
[12] http://www.personal.umich.edu/~nsteneck/researchintegrity/RCRintro/index.html
[13] https://publicationethics.org/core-practices

- Printeger Upright[14] is an online training program developed within the European funded project Printeger. The project involved different European stakeholder from 2015 to 2018. The online training presents as introductory part to RI the movie "On being a scientist", developed by Leiden University in 2016. The resource focuses on the four values mentioned in the European Code of Conduct for Research Integrity (ALLEA, 2017). The four principles mentioned are reliability, honesty, respect and accountability. The added value of using the Leiden movie is that in each of the nine part at least one topic is addressed. The topics mentioned in the training program are the following: research misconduct, QRPs, fabrication, falsification, plagiarism, peer review, authorship, open access, publication ethics, conflict of interest and data management, research with animals.

Card games

In our collection, card games are represented just marginally (2/100). Card games are a proactive and quite new approach in teaching RI topics. They address just specific topics without considering the large amount of hypothetical contents they may cover.

- The "Dilemma game"[15] is a card game developed by the Erasmus University of Rotterdam in the 2013. The game focuses on professionalism and integrity in research. Seventy-five cards, reporting questions on publication ethics, data management, QRPs, plagiarism and authorship, compose the game. The resource can be used by everyone and not depending on the background, and as specify on the game, it is possible identify different cards, depending on the career level.

- The "Peer Review Card Exchange Game"[16] is a card game developed by Tokalić and Marušić in 2018. The game is based on 32 cards statement about peer review and publication ethics pointing out values such as responsiveness, competence, impartiality, confidentiality, constructive criticism and responsibilities to science. Two more resources related the card game are fully available on the webpage of the journal presenting the game. The card game itself and an instructors' manual are fully and free available[13].

Case studies collections

We collected 10 case studies collections mainly from UK and US. Since we are talking about collections, we are not able to say the exact number of case studies or if there are overlaps. Mainly developed for biomedical science studies they fully cover all topics, starting from cases of research misconduct to peer review issues. We provide a written description of just three collection, one from US, one from UK and an European collection.

- The "RCR Casebook: Stories about Researchers Worth Discussing"[17] is a case studies collection developed by DuBois and sponsored by ORI. The collection makes distinction among case studies depending on the topic. The topics addressed are authorship and publication ethics, research misconduct, collaborative research, data management, conflict of interest, peer review, mentor/trainee relationship and social responsibility. Each section presents different case studies

[14] https://printeger.eu/upright/toc/
[15] https://www.eur.nl/en/about-eur/strategy-and-policy/scientific-integrity/dilemma-game
[16] http://europeanscienceediting.eu/articles/a-peer-review-card-exchange-game/
[17] https://ori.hhs.gov/rcr-casebook-stories-about-researchers-worth-discussing

and a final role-play game. This collection does not make any customization and the material can be used independent on the background. Trainees can use directly the full educational resources or just consider the case studies as reflection starting point. In addition, the educational material can be also use by trainers since an instructors' manual in available.

- The COPE website dedicates a whole section to several case studies[18]. The collection is made by 597 case studies, collected starting from 1997. The collection make a selection of real cases concerning several topics, not exclusively related to publication processes. The topics addressed are the following: research misconduct, QRPs, plagiarism, authorship, conflict of interest, publication ethics, financial responsibilities, whistleblowing, peer review, copyright and collaborative research.

- The training section and the reports/cases section provided by the ENRIO website[19] present different case studies concerning topics such as authorship, plagiarism, mentor/trainee relationship, peer review, data management, conflict of interest, research misconduct, fabrication and falsification.

Role-play scenarios

Even if it was not always easy to make a distinction between case studies a role-play scenarios, we listed in our grid, three examples of them. They mainly cover the nine ORI's core topics and were developed for three specific backgrounds, namely biomedical science, engineering and, natural sciences and physics. The only example we listed are from US.

- The National Center for Professional & Research Ethics developed a collection of nine role-play games[20]. Each scenario has been developed based on a specific topic: authorship, conflict of interest, research with humans, mentor/trainee relationship, hazardous substances, peer review, whistleblowing, data management and research with animals. The resource customizes topics for biomedical researchers and engineers. Moreover, the resource refers to three published papers about the development and the assessment of the nine role-play scenario, helping trainers in using this educational resource.

- The Online Ethics Center[21] (OEC) collected several case scenarios concerning research ethics and research integrity topics. The educational resource contains material until 2015 and the contents are mainly customized for biomedical science, engineering, natural sciences and physics. The scenarios are based on topics such as data management, research with humans, authorship, peer review, grant application, mentor/trainee relationship and research with animals. It is notable how each scenario presents a teaching aid section for helping trainers to provide correctly the resource.

[18] https://publicationethics.org/cases
[19] http://www.enrio.eu/resources/?cat=4
[20] https://ethicscenter.csl.illinois.edu/research-ethics-resources/educational-materials/active-learning-exercises/
[21] https://www.onlineethics.org/Topics/RespResearch/ResCases/ethicsmodscen.aspx

Infographics and flowcharts

We listed in the grid four infographics and flowcharts collections. We reported in the supplement 1 two examples from Australia, one from US and one from UK. The collected examples cover the majority of the topics mentioned in the list N.3.

- The ORI website presents a dedicate section composed by 18 infographics[22], related to RCR topics. The collection present in a visual way several topics, namely data management, fabrication, falsification, research misconduct, whistleblowing, questionable research practices, allegation of misconduct, plagiarism, authorship, mentor/trainee relationship, social responsibilities and grant application. The resource highlights basic principles, tips and key points related to good scientific practices.

- Looking at the COPE website, a complete set of flowchart was designed to help editors, publishers and peer reviewers[23]. Unlikely the other resources we mentioned above, the COPE's flowcharts are available in several languages. The website provides translations from English version to Arabic, Chinese, Croatian, French, Italian, Japanese, Persian, Polish, Portuguese, Spanish and Turkish. The collection provides information and advice related to authorship, publication ethics, peer review, conflict of interest, intellectual property, data management and allegation of misconduct.

Checklists

We identified four free available checklists, provided by universities, which are available online even for people not related to academia. Checklists can be specifically developed for specific needs and background and can be related to a single specific topic.

- The Utrecht University provides an academic checklist[24] that can help its students with writing papers, conducting researches and working in a team. Data management, plagiarism, authorship and collaborative research are the topics addressed in this resource. Reliability, responsibility, impartiality, scrupulousness, collaboration and ambition are listed as important values to follow in doing research.

- The UK data service developed a "Data Management checklist"[25]. As mentioned on the website, the resource may help researchers identify best practices for data management and data sharing.

Movies

We listed three resources free available online that show a new approach in teaching RI topics. The topic addresses are different as well as the teaching approach used (active Vs passive).

[22] https://ori.hhs.gov/infographics
[23] https://publicationethics.org/resources/flowcharts
[24] https://students.uu.nl/sites/default/files/uu-academicintegrity.pdf
[25] https://www.ukdataservice.ac.uk/manage-data/plan/checklist

- The movie "The Lab"[26] is an interactive movie developed in 2017 by ORI and available in four different languages: English, Chinese, Japanese and Spanish. The movie is customized mainly for biomedical science even if its principles may be used in other context. The movie concept is about making decisions about integrity that can have short and long-term consequences. The resources can be played impersonating the role of four different character. The different roles can experience different pressure, making different decision and undergoing different consequences. The four different role everyone can experience are the graduate student, the postdoctoral researcher, the principal investigator and the RI officer.

- The Leiden University has developed a more standard movie in 2016. "On being a scientist"[27] plays around the four values mentioned by the ALLEA code of conduct, namely reliability, honesty, respect and accountability. The Movie can be easily split in nine different sub-sections. Each sub-section can be seen independently from the others. In its entirety, the movie addresses topics such as research misconduct, fabrication, plagiarism, authorship, mentor/trainee relationship, data management, intellectual property, conflict of interest, social responsibilities.

Videos

Thirteen videos related to RI topics were identified from different sources. We listed both, collections of video as well as single video RI-related. Under this category, we included webinars as well as video tutorial, informational video or videos that summarize case studies.

- In collaboration with CITI program, the West Virginia University developed a series of video case studies related to principal RI topics[28]. The video series addresses cases about data management, conflict of interest, research with animals, research with humans, research misconduct, authorship, mentor/trainee relationship, peer review and collaborative research. Besides presenting the topics, the resource gives information regarding codes and policies.

- During the First Insubria International School in methodology, ethics and integrity in biomedical science, in 2014, the full summer school was filmed and all presentations were made available as webinars[29]. The presentations are in English and Italians and addresses topics mainly related and customized for biomedical sciences. The videos refer to reproducibility, research misconduct, conflict of interest, research with animals, work environment, publication ethics and open access.

Podcast or podcast collections

We listed in our grid five examples of podcast or podcasts collection on different topics.

- The University of Oxford, starting from 2009 to 2011, released a series of nine podcast on topics RI related[30]. The main values addressed in the podcasts are transparency and accuracy. The

[26] https://ori.hhs.gov/content/thelab
[27] https://video.leidenuniv.nl/media/t/1_ad7tdgxp/42960832
[28] https://oric.research.wvu.edu/services/responsible-conduct/core-areas
[29] https://www.youtube.com/playlist?list=PL9wdu0_Er9E1ezVGdBUBE4rSvpSb-TVWs
[30] https://podcasts.ox.ac.uk/series/research-integrity

lecturers focus on different aspect of research integrity in biomedical science. The series deals with topic such as publication ethics, data management, research misconduct and QRPs.

- "Three things society can do to promote research integrity"[31] is a podcast released in 2016 by Wiley on research integrity and its promotion in the society. The resource focuses on data management, publication ethics, conflict of interest, open access and reproducibility. Moreover, the podcast highlights values such as openness, integrity, transparency, credibility and reproducibility.

Textbooks

Twelve books were listed in our grid. Almost all of them address all main RI topics. The collected textbooks are mainly from US and in some cases customized for specific background. We provide written description of three examples, two from US and one developed within an European project.

- "Fostering Integrity in Research"[32] is a textbook published by The National Academies of Sciences, engineering and medicine in 2017. The textbook is based on different core values, namely objectivity, honesty, openness, accountability, fairness and stewardship. The resource reports information on research misconduct, questionable research practices, data management, mentor/trainee relationship, authorship, peer review, research with humans, research with animals, safety and conflict of interest, and it is mainly customized for biomedical science, engineering and physics.

- The University of Princeton released in 2015 the textbook "Doing Global Science: A Guide to Responsible Conduct in the Global Research Enterprise"[33]. The textbook mentions topics such as mentor/trainee relationship, plagiarism, peer review, collaborative research, research with humans, data management, open science, social responsibility, safety and environment, allegation of misconduct, conflict of interest and authorship. In addition, honesty, fairness, objectivity, reliability, skepticism, accountability and openness are mentioned as core values.

- Within the EU funded project ENERI, the Maastricht University published a manual on RI and RE topics[34].
  Considering only RI topics, the ENERI manual reports information on research misconduct, questionable research practices, falsification, fabrication, plagiarism, social responsibilities, peer review and authorship.

Reports

We collected seven reports from different organizations. Even if they have a different purpose, reports can be used to raise the awareness regarding the topic

[31] https://soundcloud.com/wileysocietyupdates/episode-6-3-things-societies-can-do-to-promote-research-integrity
[32] National Academies of Sciences, Engineering, and Medicine. 2017. *Fostering Integrity in Research*. Washington, DC: The National Academies Press. https://doi.org/10.17226/21896.
[33]https://www.researchgate.net/publication/305496842_Doing_Global_Science_A_Guide_to_Responsible_Conduct_in_the_Global_Research_Enterprise
[34] http://eneri.eu/wp-content/uploads/2018/10/ENERI-e-Manual.pdf

- In spite of not being developed with an educational purpose, the ScienceEurope report[35] and the U.K. concordat to support RI[36] are important to define the state of the art regarding RI topics and to raise awareness among the scientific community on the importance of maintaining and supporting good scientific practices.
  The two reports mentions values such as trustworthiness, integrity, rigour and transparency, in addition, focusing on the importance training practices.

Power Point Presentations

We collected two full collections of Power Point presentation about RI-related topics from the WCRI website.

- The World Conference on Research Integrity (WCRI) website give us the opportunity to access to the PPT presentations regarding the researches presented during the worldwide event[37,38].

Others

In addition to the material already mentioned, we listed six examples of guidance, two full glossary, a huge flash cards collection, two resources about educational material developed for trainers, and one resource providing a full collection of international and national codes/guidelines. We reported as well an example in which an art exhibition about research misconduct may have an educational role in promoting awareness and in boosting a RI culture.

- Flashcards collections are fully available online[39], and they can easily be used from undergraduate students or by people that who approach the topic for the very first time. Different topics are mentioned, namely research with humans, authorship, publication ethics, research with animals, research misconduct, mentor/trainee relationship, data management, collaborative research, conflict of interest, peer review, moral reasoning, and social responsibilities.
- A different approach was used by the HEADT centre who organized an exhibition named "How Trustworthy? An exhibition on negligence, fraud, and measuring integrity"[40]. As reported on the website, the goal of the exhibition is to increase awareness about research integrity. The exhibition serves as a learning tool on the topics of the manipulation, falsification or complete fabrication of images and data, and on QRPs.

[35] https://www.scienceeurope.org/wp-content/uploads/2016/07/Science-_Europe_Integrity_Survey_Report_July_2016_FINAL.pdf
[36] https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2012/the-concordat-to-support-research-integrity.pdf
[37] https://wcrif.org/2015-plenaries
[38] https://wcrif.org/2010-resources/2010-conference-materials
[39] https://quizlet.com/subject/research-integrity/
[40] https://headt.eu/How-Trustworthy

6. Results of the RI training practices review

6.1 Description

Besides collecting educational material from free available online sources, we also collected information about RI training practices within the European context. Collecting this information give us the opportunity to compare what is online available in terms resources and addressed topics and what is currently in use in the existing training.
Despite being common knowledge that a collective and mutual approach regarding RI training programs is missing at European level, we lack basic information about the state of the art of RI training practices. Our aim was to collect as much information as possible regarding RI training practices. We aimed to collect information from non-commercial (universities and research institutions) and from commercial (private companies) stakeholders within the European context. Unfortunately, collecting information about RI training practices and about the educational material used in such training programs is related to the willingness of the respondents in giving us such information.

6.2 Methods

It has been asked (in)directly to more than 100 different stakeholders, involved (in)directly on RI trainings to participate actively in the collection of existing educational practices (**Supplement C**). Stakeholders involved in RI European or national funded projects, academic and industry associations were involved through sharing information about their training practices.
We developed and sent a questionnaire directly to universities, and to universities and commercial associations, in order to have the questionnaire shared through their communication channel. With the before–mentioned questionnaire (**Supplement D**), we wanted to collect information such as the level at which the training is organized, the targeted audience, the format of the training, the addressed topics and about the educational material used during the trainings.
We sent 51 request of collaboration to universities and institutions directly. In addition, we asked the collaboration to three universities associations, one funding organizations associations and to one industries association to spread our questionnaire. After 3 months from the first request, we sent a reminder to those stakeholders who had not responded yet.

6.3 Limitations

The main limitation to our approach is related to the stakeholders' willingness in sharing with us information about their training practices. While universities and non-commercial organizations shared with us RI training practices-related information without problems, collecting the same information from commercial stakeholders resulted impossible.
We tried to contact commercial stakeholders directly and through European association but no one provided us information on their training practices.

6.4 Results

We collected in total 29 filled out questionnaires (**Supplement B- sheet 5**), proving us the information we were looking for. Since we collected information at European level, we have a nice overall vision about the different RI practices used by the institutions.

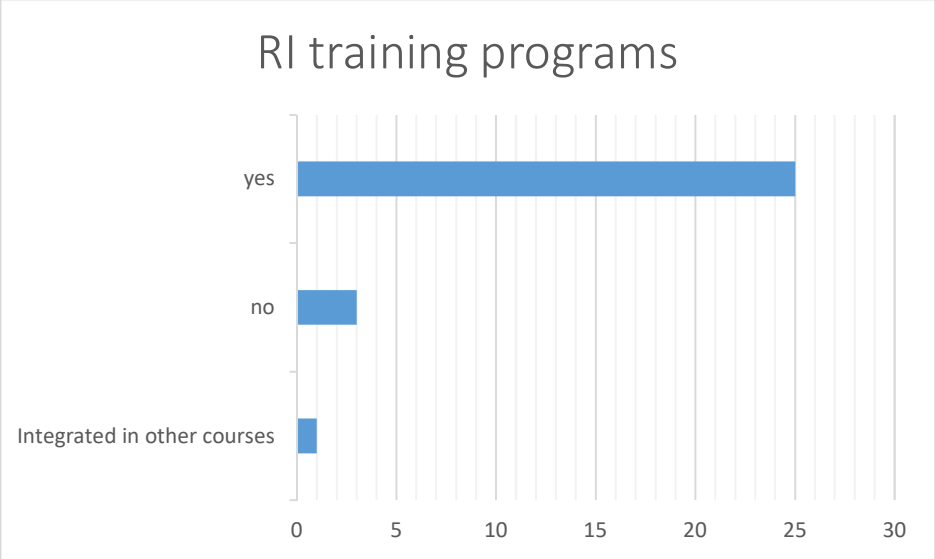

Table 1: training programs on RI

All institutions, except three, are providing RI training program (table 1). The courses are organized at different levels, depending on the targeted audience. It is notable how there is no a homogenous a common approach neither on ways of formatting the training program nor on the topic addressed.

In seven cases the program is offered only to PhD students and developed within the doctoral school. Only in six cases the training is organized, on voluntary basis, for all academic staff.
Among the training programs provided and customized for PhD students, just in seven cases the teaching is mandatory for all PhDs. For the rest, the teaching program is mandatory only for PhD students enrolled in biomedical doctoral schools or even customized only for PhD candidates in biomedical science.

Regarding the modalities in which the training program is structured as well as frequency and the duration of the training, a classification is almost impossible to make. In 13 cases the training program is organized only using face-to-face sessions. Only in few cases a real blended program, where the online part as well as the face-to-face part are both compulsory, is organized. In the majority of the compulsory teaching program, only the face-to-face part is carried out on compulsory basis. In all cases, except one, for-profit third parties provide the online training program used. Concerning the duration and the frequency, the only certain thing is that RI trainings are provided just in "one shot" without any follow up or refresh lectures.

Regarding the topics mentioned during the training, the majority of them provide information about research misconduct (FFP), Authorship, data management practices. Falsification, fabrication and plagiarism are the core themes of all courses (table 2) Basic knowledge about authorship, how to deal with this publication issue and the entailed responsibilities in being authors is given to everyone. Conflict of interest, mentorship, peer review, collaborative research are provided just in few cases. Concerning

the topic about research with humans and animals, those areas are covered only in biomedical customizations.
Some training programs propose topics such as open access, social responsibilities, patenting and notions about the reproducibility crisis.

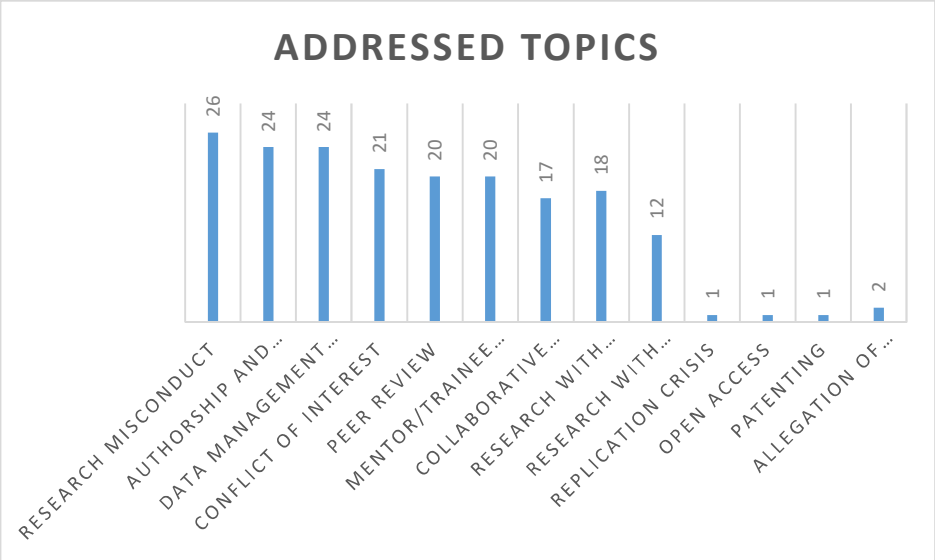

Table 2: addressed topics

Regarding the educational resourced in use in RI training programs; it is striking how the use of textbooks is one of the approaches less utilized. Beyond PowerPoint presentations, which are the most selected mean as teaching resources in face-to-face lectures, cases studies, interactive movies, videos and card games are more and more used as teaching tools. (Table 3)

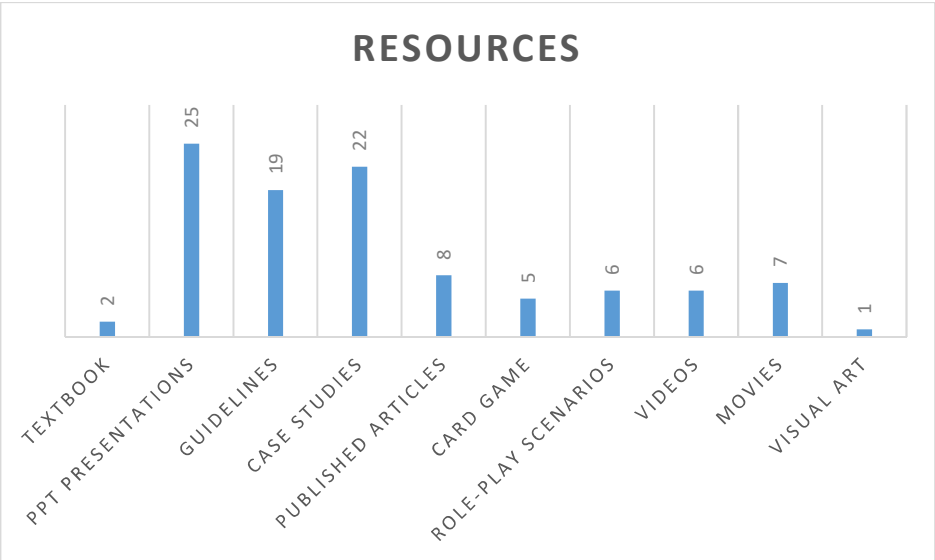

Table 3: resources type

6.5 Conclusion

The main aim of this part of the study was to make an overview about RI educational practices, the educational resources used and the topics addressed within the European context. It was impossible to define the real state of the art at university level because of the non-cooperation of many institutions in sharing with us this kind of information. However, it is clear how the situation in Europe is largely fragmented in the way institutions approach RI. In some cases, a common approach is missing even within the same university. This because there is no willingness to make strategic decisions at central level.

Acknowledgements

The study was possible thanks to all universities and organizations who were willing to help us, sharing with us information about their training practices. The collection of the information was possible thanks to all colleagues who collected this information within their own institution.

7. Supplements

Supplement A (Search strategies for Web of Science and Scopus)

WoS

11 27,041 #10 AND #6

10 4,938,852 #9 OR #8 OR #7

9 365,737 TS=((program* OR plan* OR policy OR rule* OR procedure* OR standard* OR code*) NEAR/2 (formulat* OR develop* OR improve* OR expand*))

8 715,245 TS=(course* OR seminar* OR workshop*)

7 4,135,631 TS=(educat* OR teach* OR train* OR motivat* OR instruct* OR interven* OR promot* OR supervis* OR mentor*)

6 75,884 #5 OR #4 OR #3 OR #2 OR #1

5 727 TS=((author* OR contribut*) NEAR/2 (undeserv* OR ghost OR guest OR gift*))

4 986 TS=((publication* OR publishing) NEAR/2 (ethics OR plagiari* OR falsif*))

3 128 TS=((researcher* OR scientist*) NEAR/2 (integrity OR honest*))

2 4,196 TS=((scientific OR academic) NEAR/2 (fraud OR ethics OR integrity OR misconduct OR honesty OR dishonesty))

1 71,020 TS=(research NEAR/2 (integrity OR ethics OR conduct OR misconduct OR malpractice OR manipulation OR fraud* OR honest*))

Indexes=SCI-EXPANDED, SSCI, A&HCI, ESCI Timespan=All years

Scopus

(TITLE-ABS-KEY(research W/3 (integrity OR ethics OR conduct OR misconduct OR malpractice OR manipulation OR fraud* OR honest*))) OR (TITLE-ABS-KEY((scientific OR academic) W/3 (fraud OR ethics OR integrity OR misconduct OR honesty OR dishonesty))) OR (TITLE-ABS-KEY((researcher* OR scientist*) W/3 (integrity OR honest*))) OR (TITLE-ABS-KEY((publication* OR publishing) W/3 (ethics OR plagiari* OR falsif*)) OR (TITLE-ABS-KEY((author* OR contribut*) W/3 (undeserv* OR ghost OR guest OR gift*))))

AND ((TITLE-ABS-KEY(educat* OR teach* OR train* OR motivat* OR instruct* OR interven* OR promot* OR supervis* OR mentor*)) OR (TITLE-ABS-KEY(course* OR seminar* OR workshop*)) OR (TITLE-ABS-KEY((program* OR plan* OR policy OR rule* OR procedure* OR standard* OR code*) W/3 (formulat* OR develop* OR improve* OR expand*))))

Supplement B

2.	Aggarwal R, Gupte N, Kass N, Taylor H, Ali J, E	A Compar	BMC Med	2011	Yes	India/US	Journal Article	0		NA	RE	ethical principles, a	Experts, trainers	
10.	Antes AL, Murphy ST, Waples EP, Mumford M	A Meta-Ar	Ethics Beh	2009	Yes	US	Journal article	1	grant #5R01-NS	National Institut	Natural Sciences,	RE	NA	NA
11.	Antes AL, Wang XQ, Mumford MD, Brown RP	Evaluating	Acad Med	2010	Yes	US	Journal article	0			Natural sciences, I	RE, RCR	RE/RI in general	Master students, F
12.	Archila PA	Evaluating	Argument	2018	Yes	Colombia	Journal article	0			Biomedicine and h	RE	RE/RI in general	students
13.	Atkinson TN	Using Crea	J Acad Eth	2008	Yes	US	Journal article	0			Natural Sciences,	RI, RE	Research environm	Students
22.	Bragger JD, Freeman MA	Using a co	Teach Psy	1999	Yes	US	Journal article	0			Social science	RE	Data managment,	Students
25.	Brkic S, Bogdanovic G, Vuckovic-Dekic L, Gavi	Science et	J Buon	2012	Yes	Serbia	Journal article	0			Biomedicine and h	RE	Plagiarism	students
30.	Burr V, King N	'You're in	Psychol Le	2012	Yes	UK	Journal article	0		Higher	Social science	RE	Informed consent,	students
36.	Chilengi R, Nyika A, Tangwa GB, Noor RA, Rar	Role of E-l	Camb Q H	2013	Yes	NA	Journal article	0		European and D	Biomedicine and h	RE	RE in general	Junior- to middle-l
37.	Cho KC, Shin G	Operation	Nurs Ethic	2014	Yes	South Kore	Journal article	0			Biomedicine and h	RE	Research Ethics in	students
44.	Danowitz AM, Taylor CE	Integratin	J Chem Ed	2011	Yes	US	Journal article	0			Natural sciences (I	RE	authorship, plagiar	graduate students
50.	DuBois JM, Chibnall JT, Tait R, Vander Wal JS	The Profes	Acad Med	2018	Yes	US	Journal article	0			Biomedicine and h	RI	Research bias and	Principal investigat
52.	DuBois JM, Dueker JM, Anderson EE, Campbe	The Devel	Acad Med	2008	Yes	US	Journal article	0		NIH T15 training	Biomedicine and h	RE	RE/RI in general	students
61.	El-Shinawi M, Mohamed KO, Fouad YA, Fahm	Assessing	Account R	2016	Yes	Egypt	Journal article	0			Biomedicine and h	RCR	Basic principles an	students
64.	Fernandes LB	Embeddin	Biochemis	2017	Yes	Australia	Journal article	0			Biomedicine and h	RCR	Human subjects, sc	students
68.	Fleetwood JE	Teaching E	Teach Lea	1994	Yes	US	Journal article	0			Biomedicine and h	RE	Research miscondu	students
79.	Halkoaho A, Matveinen M, Leinonen V, Luotc	Education	BMC Med	2013	Yes	Finland	Journal article	0		Tekes – the Finn	Biomedicine and h	RE	An initial examinat	PhD students
92.	Hu X, Graesser AC	Human us	Behavior F	2004	Yes	US	Journal article	0		This work was di	Biomedicine and h	RE	Human research st	Researchers, milita
98.	Johnson JF, Bagdasarov Z, MacDougall AE, Ste	Improving	Account R	2014	Yes	US	Journal article	1	"Case Based Re	National Science	Social science	RCR	mentor-mentee re	Students
99.	Jones NL, Peiffer AM, Lambros A, Eldridge JC	Problem-b	J Med Ethi	2010	Yes	US	Journal article	0	This project was	National science	Biomedicine and h	RCR	RCR in general	Students
102.	Ju YS	Evaluatior	J Educ Eva	2009	Yes	Korea	Journal Article	0	2008-Research	Korea Research	Biomedicine and h	RCR	Research ethics on	Health professiona
113.	Kligyte V, Marcy RT, Sevier ST, Godfrey ES, M	A qualitati	Sci Eng Eth	2008	Yes	US	Journal article	0			NA	RCR	NA	NA
125.	Lescano AR, Blazes DL, Montano SM, Moran J	Research I	PLoS One	2008	Yes	Peru	Journal article	0	This work was p	Fogarty Internat	Biomedicine and h	RE	conducting ethical	IRB Chairs and me
136.	Macrina FL, Munro CL	GRADUAT	Acad Med	1993	Yes	US	Journal article	0			Biomedicine and h	RI	Authorship, Peer re	Graduate students
142.	Marusic A, Wager E, Utrobicic A, Rothstein HI	Interventi	Cochrane	2016	Yes	Croatia	Systematic review	1	Professionalism	Croatian Science	Biomedicine and h	RI	Research integrity,	NA
145.	May DR, Luth MT	The Effect	Sci Eng Eth	2013	Yes	US	Journal article	0	(NSF Grant #06:	This research pr	Engineering and te	RCR	RCR in general	Students
147.	McCormack WT, Garvan CW	Team-Bas	Account R	2014	Yes	US	Journal article	0		NIH/NCATS Clini	Biomedicine and h	RCR	RCR in general	students
148.	McGee R, Almquist J, Keller JL, Jacobsen SJ	TEACHING	Account R	2008	Yes	US	Journal article	0		This research wa	Biomedicine and h	RCR	Authorship, intelec	Postdoctorate fell
164.	Nadolny L, Woolfrey J, Pierlott M, Kahn S	SciEthics I	ETR&D-Ed	2013	Yes	USA/Sourt	Journal article	0	This research w	National Science	Engineering and T	RE	Animal subjects	Students
166.	Ndebele P, Wassenaar D, Benatar S, Fleische	Research	J Empir Re	2014	Yes	USA/Niger	Journal article	0			NA	RE, RCR	RE/RCR in general	Faculty staff
170.	Ogunrin OA, Ogundiran TO, Adebamowo C	Developm	BMC Med	2013	Yes	US	Journal Article	0	Grant Number I	from the Unitec	Biomedicine and h	RE	RE in general	Biomedical researc
175.	Peiffer AM, Hugenschmidt CE, Laurienti PJ	Ethics in 1	Sci Eng Eth	2011	Yes	US	Journal article	0	National Institu	National Institut	NA	RE	NA	Students
176.	Pennock RT, O'Rourke M	Developin	Sci Eng Eth	2017	Yes	US	Journal article	0		National Science	NA	RE	RE in general	NA
180.	Plemmons DK, Kalichman MW	Mentoring	Sci Eng Eth	2018	Yes	US	Journal article	1	Integrating Ethi	National Science	NA	RI, RE	RE/RI in general	Students, mentors
186.	Ramalingam S, Bhuvaneswari S, Sankaran R	Ethics Wo	J Clin Diagr	2014	Yes	India	Journal article	0			Biomedicine and h	RE	RE in general	Postgraduate stude
190.	Roberts LW, Warner TD, Dunn LB, Brody JL, H	Shaping m	Ethics Beh	2007	Yes	US	Journal article	0		National Institut	Biomedicine and h	RE	Human research st	Students
193.	Roland MC	Réflexives	Promotin	2011	Yes	US	A book chapter	0			NA	RI, RCR	supervisor-student	supervisors, PhD st
196.	Rosnow RL	Teaching F	Teach Psy	1990	Yes	US	Journal article	0			Social science (psy	RE	Deception, fairness	students
201.	Schmaling KB, Blume AW	ETHICS IN	Account R	2009	Yes	US	Journal article	0			Social science, Bio	RCR	RE in general	Students
204.	Scialfa CT, Lyndon J	Web-Base	Educ Gero	2008	Yes	Canada	Journal article	0			Biomedicine and h	RE	RE in general	Physicians
205.	Segarra I, Gomez M	A Learning	J Empir Re	2014	Yes	Spain	Journal article	0			Biomedicine and h	RE	RE in general	students
206.	Seiler SN, Brummel BJ, Anderson KL, Kim KJ,	Outcomes	Account R	2011	Yes	US	Journal article	0		National Science	Engineering and te	RCR	RE/RI in general	Students
207.	Semendeferi I	Feelings a	J Microbio	2014	Yes	US	Journal article	0			Biomedicine and h	RE	RE in general	Students
208.	Semendeferi I, Tsiamyrtzis P, Dcosta M, Pavli	Connectin	Sci Eng Eth	2016	Yes	USA/Greec	Journal article	1	EESE-Experienci	National science	NA	RE	RE in general	Students
210.	Silverman H, Strosberg M, Luna F, Philpott S,	AN ANALY	J Empir Re	2013	Yes	US	Journal article	0	Grant R25TW00	Fogarty Internat	NA	RE	RE in general	Students
212.	Sim K, Sum MY, Navedo D	Use of nar	BMC Med	2015	Yes	USA/Singa	Journal Article	0			Biomedicine and h	RE	informed consent,	students
221.	Strohmetz DB, Skleder AA	The Use o	Teach Psy	1992	YES (an evaluation of Rosnov	US	Journal Article	0		Temple Universi	Social science (psy	RE	Deception, fairness	students
223.	Sun JCY, Yu SJ, Chao CH	Effects of	Educationa	2018	Yes	Taiwan	Journal article	0	Grant number M	Ministry of Scier	NA	RE	RE in general	Students
225.	Teixeira-Poit SM, Cameron AE, Schulman MD	Experienti	Teach Soc	2011	Yes	US	Journal article	0			Social science	RE	RE in general	Students
228.	Todd EM, Torrence BS, Watts LL, Mulhearn T.	Effective F	Account R	2017	Yes	US	Journal article	0		grant number Ol	NA	RE	RE in general	NA
229.	Todd EM, Watts LL, Mulhearn TJ, Torrence BS	A Meta-ar	Sci Eng Eth	2017	Yes	US	Journal article	0		Grant No. ORIIR:	NA	RE	RE in general	NA
232.	Torrence BS, Watts LL, Mulhearn TJ, Turner M	Curricular	Account R	2017	Yes	US	Journal article	0		grant number Ol	NA	RE	RE in general	NA
240.	van den Bemt V, Doornbos J, Meijering L, Ple	Teaching e	J Geogr Hi	2018	Yes (RE education)	Netherlanc	Journal article	0			Natural sciences (I	RE	informed consent,	undergraduate stu
241.	Viswanath B, Jayarajan RN, Chandra PS, Chat	Suppleme	Asian J Psy	2018	Yes (RE education)	India	Journal article	0			Biomedicine and h	RE	history of RE, respe	psychiatry residen
243.	von Unger H	Reflexivity	Qual Inq	2016	Yes (RE education)	Germany	Journal article	0			Social science	RE	informed consent,	undergraduate stu
248.	Watts LL, Medeiros KE, Mulhearn TJ, Steele L	Are Ethics	Ethics Beh	2017	Yes	US	Journal article	0		Grant Number C	NA	RE	RE in general	NA
249.	Watts LL, Mulhearn TJ, Medeiros KE, Steele L	Modeling	Ethics Beh	2017	Yes	US	Journal article	0		Grant Number (	NA	RE	RE in general	NA
253.	Wilson DJ	Introducin	Medical Ec	2008	Yes (teching of RCR and rese	UK	Journal article	0			Biomedicine and h	RCR	research miscondu	graduate students

To compare onli	Online, surve	58	Online course in biostatis	NA	NA	blended	0	15 lectures with 8.75 hours of instruc	Scores on knowledg	On-line and on-sit	The effects should be exp
The aim of the st	Meta-analys	26 studies, 304	NA	NA	NA	NA	0	NA	Quality rating of the	An examination o	There is a necessity to inv
To examine the e	The nationw	173	NA	NA	NA	NA	1	NA	The participants wer	Course participant	These findings indicated t
To describe the u	Mixed meth	91	The play Should've, writte	Drama-based te	The literature re:	Face-to-face	0	60 minutes	Evaluation of argum	Students in drama	The recommendation it t
To describe the r	NA	NA	Writing technique, which	Scenario based	Ward, T. (2001).	Online	1	NA	Two creative writing	The students impr	Case study methods shou
To test the cost-b	Post interver	94	Discussions and presentat	Scenario based	NA	Face-to-face	1	2 times per 120 minutes	Assessment of costs	Students indicated	NA
The purpose of t	A 45 min lec	98	The programme of the co	Lectures	NA	Face-to-face	0	45 minutes	An especially design	Students increase	Even a short lecture focu:
To explore the	Post	15	15 minutes long Big	Problem based	NA	Face-to-face	0	15 minutes	Students	Students were	Presenting reality show
To raise awarene	Post course	599	The cpourse modules con:	Case based	NA	Online	0	1 week	the completion of th	More than 80% of	To increase the number c
To evaluate the e	Before and a	114	The nursing research curri	Problem based,	Strickland AW. A	blended	1	30 hours	Knowledge and perc	The results of this	The concept and scope o
We describe here	experimenta	NA	The sequence began with	Lectures, small g	NA	Face-to-face	1	4 hours (in two days)	We used the nature	Senior graduate st	It must be noted, howeve
To evaluate the e	Before and a	39	PI Program teaches evider	Problem based	NA	Face-to-face	0	3 days	Progeam evaluation	A follow-up surve	The evaluation was done
To describe the c	Pre and post	NA	70 different cases of resea	Case based	NA	blended	1	NA	Knowledge about re	The program succ	The reasons for decrease
To increase awar	Pre and post	95	A three-day educational c	Lectures	The booklet and	Face-to-face	0	3 days	A questionnaire wit	Most of the pre-ca	RCR awareness should be
To assess studen	Post interver	112	The educational intervent	Case based, lect	NA	blended	1	NA	Researchers assesse	RLCR was found to	RCR should be implemen
To assess the eff	Post interver	59	Course on research ethics	Lectures, Proble	NA	Face-to-face	1	NA	Writing papers abou	The papers were c	Recommendation is that
The aim of this p	Post interver	56	New web based course in	Problem based	NA	Online	0	138 hours	Questionairre about	The course was vi	Ethical issues and legislat
ary personel	Post interver	26	The Human Use Regulator	Lectures, proble	NA	Online	0	NA	Memory for core co	Th biggest differer	It is hard to develop a rep
To assess the co	Four gorup p	143	Case content was standar	Case based	https://www.ncb	Face-to-face	1	1.5 hours	Participant Knowled	Valence consisten	Cases might be beneficial
A process evalua	The percepti	NA	The curriculum was chose	Case based, disc	NA	Face-to-face	1	1 semester	Course satisfaction a	For example, activ	How to implement RCR c
To investigate th	Post worksh	11	One day workshop on RCI	Team based lear	NA	Face-to-face	0	8 hours (One day)	Course satisfaction,	There was a posit	The workshop should be
NA	NA	NA	NA	Dicussion, Case	NA	Face-to-face	0	NA	NA	NA	NA
To report the exp	Cross sectior	972	Training courses (not expl	Problem based,	NA	blended	0	na	Participant evaluatic	Participants asses	There is no information w
NA (It is just a de	NA	NA	NA	Lectures, case p	NA	Face-to-face	1	10 hours	Standard A-F gradin	NA	NA
To assess the eff	The authors	31 studies invo	Most interventions involv	NA	NA	NA	0	na	Most studies did not	Overall, there is ve	Active training, particular
To examine the e	pretest–post	150	5 day workshop on resear	Lectures, case di	NA	Face-to-face	1	5 days	Moral judgement, K	Findings revealed	There should be assessm
To assess whethe	Pre and post	43	10 1.5 hours long module:	Discussions, tea	na	Face-to-face	0	15 hours	Readiness assurance	team-based learni	NA
To assess the eff	Post interver	127	11 90-120 minutes lecture	Lectures, cases	NA	blended	1	20 hours	Post hoc qualitative	Participnats that it	The results support perio
To assess the eff	Post interver	53	nded, 3D virtual world em	Problem based (	NA	Online	0	NA	Two day workshops	mulation. The stuc	As indicated within this s
To produce an o	Cross sectior	275	NA	NA	NA	Face-to-face	0	Most of them had duration of one ye	Characteristics and e	The prgrams vary	the increasing amount ar
This study was d	Post interver	75	Online training module in	Lectures, proble	National Code of	Online	0	NA	Comprehension and	The module based	NA
To evaluate the '	Post interver	16	Ethics in 15 minutes techr	Discussions	NA	Face-to-face	1	15 minutes	Participant satisfacti	Participants enjoy	NA
To describe three	NA	NA	NA	theory-centered	Pennock, R. T. (2	NA	1	NA	NA	NA	NA
To develop and a	Mixed meth	70	Workshop on RE	NA	NA	Face-to-face	0	NA	Survey assessment	Majority of partici	NA
ents and faculty s	Pre and post	64	One day workshop	Lectures and prc	NA	Face-to-face	1	1 day	Knowledge, attitude	The faculty showe	NA
To compare the t	Post interver	83	The criteria-oriented inter	Scenario based	NA	Face-to-face	0	NA	A postintervention v	Compared to cont	NA
NA	NA	NA	Core seminar and comple	workshops of 8 (	NA	Face-to-face	0	5 + 2 days	For students: to build the capacity to situate their project and themselves, to conduct their research in a respons	NA	
A classroom exer	NA	NA	The discussion, which take	role play, discus:	NA	Face-to-face	1	NA	Informal feedback	Student reactions	If the class is large and th
To assess whethe	NA	48	One semester course in R	Lectures	na	Face-to-face	1	1 semester	11 questions about I	Knowledge about RCR but not moral judgme	
To develop and a	Post interver	18	Online course in RE	Lectures, discus:	NA	Online	0	3 weeks	Participant feedback		Student reactions were q
To describe the r	NA	NA	A course in research ethic	Problem based	NA	Face-to-face	0	NA	Sumbission of resea	NA	This activity was within a
To examine expe	Interviews	41	NA	Scenario based	Kalichman, M. W	Face-to-face	1	NA	Issues, perspectives	Scenario based ap	NA
To propose a nev	NA	NA	NA	NA	NA	Online	0	NA	NA	NA	NA
To develop the q	Post interver	98	Course in RE	Lectures, proble	NA	blended	1	NA	Scores on newly dev	Results of this que	Questinnaire must be ap
To assess the qua	Cross sectior	4	NA	Lectures, proble	NA	Online	0	NA	95 criteria for qualit	Together, one or n	NA
To asses if narrat	Post interver	273	Four narratives that were	Lectures	NA	Face-to-face	1	60 minutes	Course assessment	Amongst the resp	NA
Rosnow's (1990)	We were abl	126	We used the role-play exercise described earlier (Rosnow, 1990), with one modification. Because of class size and time constraints, only a limited number [illegible]	role play, discussion	NA	Face-to-face	1	NA	The changes in students' [illegible]	participants' [illegible]	[illegible]
To assess how di	Four feedba	191	Encouragement + warning	Problem based	NA	Online	0	NA	The cognitive and er	Encouragement ar	NA
To present asn a:	Pre and post	51	Three step excercies	Problem based	NA	Face-to-face	1	NA	Knowledge about ba	Participation in the exercise increased know	
Therefore, the pr	a qualitative	106 courses	NA	NA	NA	NA	NA	NA	NA	Review of the mos	Although a qualitative an
The purpose of t	meta-analyti	106 courses	NA	NA	NA	NA	NA	NA	Study contents was	Process-based contents were best delivered face-to-face, whereas contents delivered online	First, it is open to questio
The purpose of t	a qualitative	106 courses	NA	NA	NA	NA	NA	NA	Key themes in instru	Through a qualitat	First, only a limited numb
The aim of this a	qualitstive a:	11	The course aimed to teach	small groups	NA	Face-to-face	1	10 weeks	Students were asses[illegible]	Our findings [illegible]	[illegible] complemented by two peer review assignments and particip
To describe a nev	NA	25	Five tier approach (5 mod	Online course, g	the declaration c	blended	0	6 hours, plus online work in Module	Identification of ethi	During the third mo[illegible]	[illegible] feedback regarding certain areas – autonomy, benefits and ju
To present the co	experimenta	20	Sociology students were trained to pursue a research question and reflect on ethical aspects of their experiences. Their research project explored [illegible]	Small groups, [illegible]	NA	Face-to-face	1	2 hours a week, 1 semester (12 weeks)	The students [illegible]	In summary, [illegible]	[illegible] Munich, Germany. In teams, the students conducted qualitative intervi
Research Question 1: Have ethics instruction programs in the sciences, on average, become more effective over time?	meta analyti	106 courses	NA	NA	NA	NA	NA	NA	In the present study	First, ethics trainir	Few studies provided con
Might modeling t	meta analyti	106 courses	NA	NA	NA	NA	NA	NA	These 12 general cat	With regard to cor	First, only ethics courses
Why the idea wa	experimenta	NA	A session on research mis	case based, grou	NA	Face-to-face	1	NA	Working in groupsof	The sanctionssugg	NA

NA	https://bmcmededuc.biomedcentral.com/articles/10.1186/1472-6920-11-37
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2762211/
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4578657/
NA	https://link.springer.com/article/10.1007/s10503-017-9429-7
NA	https://link.springer.com/article/10.1007/s10805-007-9053-5
NA	https://journals.sagepub.com/doi/10.1207/s15328023top2601_6
NA	https://www.researchgate.net/publication/233864152_Science_ethics_education_Effects_of_a_short_lecture_on_plagiarism_on_the_knowledgeof_young_medical_researchers
NA	https://journals
NA	https://www.cambridge.org/core/journals/cambridge-quarterly-of-healthcare-ethics/article/role-of-elearning-in-teaching-health-research-ethics-and-good-clinical-practice-in-africa-and-beyond/90DD0E0AF8C
NA	https://journals.sagepub.com/doi/abs/10.1177/0969733013505310?rfr_dat=cr_pub%3Dpubmed&url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&journalCode=neja
NA	https://pubs.acs.org/doi/full/10.1021/ed1009915
NA	https://www.ncbi.nlm.nih.gov/pubmed/28640035
NA	https://insights.ovid.com/crossref?an=00001888-200806000-00020
NA	https://www.tandfonline.com/doi/abs/10.1080/08989621.2015.1127762?journalCode=gacr20
NA	https://iubmb.onlinelibrary.wiley.com/doi/full/10.1002/bmb.20990
NA	https://www.tandfonline.com/doi/abs/10.1080/10401339409539693
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3867673/pdf/1472-6939-14-53.pdf
NA	https://www.researchgate.net/publication/8358732_Human_use_regulatory_affairs_advisor_HURAA_Learning_about_research_ethics_with_intelligent_learning_modules/download
NA	https://www.tandfonline.com/doi/abs/10.1080/08989621.2013.848803?journalCode=gacr20
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3752918/
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2796727/
NA	https://link.springer.com/content/pdf/10.1007%2Fs11948-007-9050-5.pdf
NA	https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0003274#ack
NA	https://journals.lww.com/academicmedicine/pages/articleviewer.aspx?year=1993&issue=12000&article=00003&type=abstract
NA	https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.MR000038.pub2/full
NA	https://link.springer.com/article/10.1007/s11948-011-9349-0
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3801221/
NA	https://www.ncbi.nlm.nih.gov/pubmed/18298028
NA	https://link.springer.com/article/10.1007/s11423-013-9319-0
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4280231/
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3546837/#B9
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3904356/
NA	https://link.springer.com/article/10.1007/s11948-016-9757-2
NA	https://link.springer.com/article/10.1007%2Fs11948-017-9897-z
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4149127/
NA	https://www.tandfonline.com/doi/abs/10.1080/10508420701309937
NA	https://books.google.com/books/about/Promoting_Research_Integrity_in_a_Global.html?id=q3TZu6sovJMC
NA	https://journals.sagepub.com/doi/10.1207/s15328023top1703_10
NA	https://www.tandfonline.com/doi/abs/10.1080/08989620903190323?journalCode=gacr20
NA	https://library.laredo.edu/eds/detail?db=ccm&an=105592531&isbn=03601277
NA	https://journals.sagepub.com/doi/abs/10.1177/1556264614557238?rfr_dat=cr_pub%3Dpubmed&url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&journalCode=jrea
NA	https://www.tandfonline.com/doi/full/10.1080/08989621.2011.584760
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4278455/
NA	https://link.springer.com/article/10.1007/s11948-015-9626-4
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4042314/
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4363464/
NA	https://www.ncbi.nlm.nih.gov/pubmed/11652142
NA	https://www.tandfonline.com/doi/abs/10.1080/01443410.2018.1527291?journalCode=cedp20
NA	https://journals.sagepub.com/doi/abs/10.1177/0092055X11407346?journalCode=tsoa
NA	https://www.tandfonline.com/doi/abs/10.1080/08989621.2017.1301210?journalCode=gacr20
NA	https://link.springer.com/article/10.1007%2Fs11948-017-9869-3
NA	https://www.tandfonline.com/doi/abs/10.1080/08989621.2016.1276452?journalCode=gacr20
NA	https://www.tandfonline.com/doi/full/10.1080/03098265.2018.1436534
NA	https://www.sciencedirect.com/science/article/pii/S1876201817308961?via%3Dihub
NA	https://journals.sagepub.com/doi/abs/10.1177/1077800415620220
NA	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6368181/
NA	https://www.tandfonline.com/doi/abs/10.1080/10508422.2016.1247354?af=R&journalCode=hebh20
NA	https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1365-2923.2008.03204.x

Study ID	Authors	Title	Journal	Year of	To include: YES/NO (elaborate
1.	Acharya M	Integrating	J Eng Educ	1995	No (professional ethics)
100.	Jones NL, F	Developin	J Med Ethi	2010	No (It is a description of a previous training that is already included in this review)
101.	Joob B, Wi	Science Et	J Buon	2012	No (It is a correspondece between authors about an article)
103.	Kalantri SP	Workshop	Natl Med .	2003	NA
104.	Kalichman	A Brief His	Account R	2013	No (It is a historical overview)
105.	Kalichman	Research i	Handbool	2016	No (book, no intervention)
106.	Kalichman	Responsib	Acad Med	2016	No (it is only a description of a field in a few bulletpoints)
108.	Kardas EP,	Teaching e	Best Pract	2012	No (book, not on RE)
109.	Keefer MW	The Impor	Sci Eng Eth	2014	No (Not related to research ethics)
110.	Kenneally I	Cyber-secu	ACM SIGC	2014	No (conference report)
111.	Kenneally I	Cyber-secu	Computer	2014	No (conference report)
112.	Kim SY	Students'E	J Educ Eva	2008	Duplicate
114.	Kon AA, Sc	Content ar	AJOB Prim	2011	No (There is no description of the intervention)
115.	Kraus R	You Must	Coll Teach	2008	No (The focus is too narrow, and related to sociology only)
116.	Krishnamu	Promoting	113th Ann	2006	No (conference report)
117.	Kulkarni AI	A learning	2005 ASM	2005	No (conference report)
118.	Langone M	Promoting	J Nurs Edu	2007	No (It is a commentary)
119.	Le T, Carbo	Educating	1st Interna	2013	No (conference report)
120.	Ledwith A,	Using anti	Stud High	2008	No (it is related to academic integrity)
121.	Ledwith A,	Using anti	Stud High	2008	No, duplicate
122.	Lenz ER, Ke	Promoting	J Prof Nurs	1995	No (There is no description of educational intervention)
123.	Lenz ER, Ke	Promoting	J Prof Nurs	1995	No, duplicate
124.	Leonard AE	Inducing a	Interdisci	2016	No (book, not on RE)
126.	Loue S	LIFE META	Rev Rom E	2009	NA
127.	Loue S, Lof	MENTORII	J Empir Re	2013	No (There is no description of the intervention)
128.	Loue S, Ok	Research E	Journal of	1996	No (framework for guideline development)
129.	Lovett LM,	An innova	Medical E	1990	No (Not related to research ethics)
130.	Luchini-Co	What is th	123rd ASE	2016	No (conference report)
131.	Mabrouk P	Study of th	Abstr Pap	2015	NA
133.	Mabrouk P	Introducin	J Chem Ed	2007	A duplicate, included
134.	Macfarlane	Academic	Stud High	2014	No (There is no description of the interventions)
135.	Macfarlane	Academic	Stud High	2014	No, duplicate
137.	Macrina FL	The case s	J Prof Nurs	1995	No (It is the description of the experiences mostly, no intervention)
138.	Macrina FL	THE CASE-	J Prof Nurs	1995	No, duplicate
139.	Malmstron	Ethics in a	J Am Coll I	2008	No (Not related to research ethics intervention)
14.	Baer W, ed	Using vide	ASEE Annu	2008	No (Not related to research ethics, conference report)
140.	Marcus RJ	Mythologi	Abstr Pap	1997	No (it is an abstract)
141.	Martin T, R	Teaching f	Sci Eng Eth	2005	No (Mostly not related to research ethics)
143.	Marušić A,	Teaching S	Acad Med	2003	No (Not focused on research ethics)
144.	Mastroiani	The impor	Acad Med	1998	No (There is no description of the interventions)
146.	McCarron	A Canadia	Can Psych	2011	No (Not related to research ethics)
149.	McGee R, S	Beyond Re	J Microbio	2014	No (There is no description of the intervention)
15.	Bagdasaro	Case-Base	Sci Eng Eth	2013	No (Not related to research ethics)
150.	McGibony	An online	In: Daus K	2015	No (conference report)
151.	Melvin A, E	Seeing is b	ASEE Annu	2009	No (conference report)
152.	Melvin AT,	Ten years	125th ASE	2018	No (conference report)
154.	Miller DC,	Introducti	MRS Fall M	2010	No (conference report)
155.	Millum J	Introducti	J Nerv Me	2012	No (Only description of the cases)

156.	Millum J, G	INTRODUC	J Empir Re	2013	No (There is no description of the intervention)
157.	Mishra NN	Tutorials c	14th Worl	2013	No (conference report)
158.	Mogk DW,	Developin	Eos	2014	No (conference report)
159.	Morris EJ	Academic	Handbool	2016	No (book chapter on academic integrity)
160.	Mulhearn	Review of	Sci Eng Eth	2017	No (Not related to research ethics)
161.	Mulhearn	Cross-Fiel	Account R	2017	No (There is no description of the intervention)
162.	Mumford M	A Sensem	Ethics Beh	2008	No (There is no description of the intervention)
163.	Mumford M	A sensem	Ethics and	2008	No, duplicate
165.	Naidoo S, \	Adapting a	Med Princ	2014	No (Not related to research ethics)
167.	Nel AL, Car	Ethics asse	8th IEEE Gl	2017	No (conference report)
168.	Nell Trautr	Using the	Teach Soc	2013	No (Not related to research ethics)
169.	Novaes MF	ETHICS ED	Dev Worlc	2013	No (It is just a cross sectional study of current state in national education)
17.	Bebeau MJ	An Eviden	J Microbio	2014	No (Not related to research ethics)
171.	Olesen AP,	Research E	Sci Eng Eth	2018	No (There is no description of intervention)
172.	O'Neill-Car	Work in pr	38th ASEE	2008	No (conference report)
173.	Orr J	Developin	J Acad Eth	2018	No (It is focused on academic integrity, not RE/RI)
174.	Peacock J,	Effects of	Sci Eng Eth	2013	No (Not related to research ethics, tool used in research described in the included research)
177.	Pennock R	Developin	Sci Eng Eth	2017	A duplicate, included
178.	Percy A, Ya	Using evid	24th Annu	2007	No (conference report)
179.	Pinkus RL,	The Role c	Sci Eng Eth	2015	No (There is no intervention)
18.	Ben-Jacob	Computer	4th Int Cor	2006	No (Not related to research ethics, conference report)
181.	Pollock RE,	A short co	Acad Med	1994	No (It is a letter)
182.	Pollock RE,	A SHORT-(	Acad Med	1994	No (NA)
184.	Prescott L	Using colla	Open Lear	2016	No (Not related to research ethics)
185.	Quigley D,	Research e	J Environ S	2016	No (Related to professional ethics)
187.	Ratliff M, M	RCR Onlin	Account R	2012	No (description of development of a model, no intervention)
188.	Resnik DB	Using elec	Sci Eng Eth	2005	No (There is no description of the intervention)
189.	Rivera R, B	Many wor	Dev Worlc	2005	No (no intervention description)
19.	Berling E, M	A New Me	Sci Eng Eth	2018	No (There is no intervention)
191.	Rodríguez	Learning q	Acta Bioet	2012	No (Not related to research ethics)
192.	Roff S, Pre	Helping m	J Med Ethi	2004	No (Not related to research ethics)
194.	Rosenbaur	Educating	Crit Care M	2003	No (There is no description of the intervention)
197.	Rosnow RL	TEACHING	Teach Psy	1990	A duplicate, included
198.	Rozmus CL	The Brews	Nurs Ethic	2015	No (focused on professional ethics)
199.	Ruiz A, Wa	Ethics as a	Psychol Le	2014	No (There is no description of the intervention and not related to the research ethics)
20.	Bowater L,	Twelve tip	Med Teacl	2012	No (There is no intervention)
200.	Sachs GA, S	TEACHING	Acad Med	1993	No (It is a plan for program development)
202.	Schmidt KL	Evolution	CTS-Clin T	2014	No (It is the description of the center)
203.	Schrag B	Research e	Ethics Acr	2018	No (a book chapter, no intervention)
209.	Serra-Toro	Promoting	44th Annu	2014	No (conference report)
21.	Bradley C	Plagiarism	1-166 p	2011	No (It is a book)
211.	Sim K, Sum	Use of nar	BMC Med	2015	A duplicate, included
213.	Singh N, W	Developm	6th Intern	2014	No (conference report)
214.	Smith K, W	Using "eth	Biochemis	2007	No (Not describing an intervention)
215.	Smith MF,	Creating Ir	J Res Adm	2005	No (It is just a case review)
216.	Sponholz G	Teaching s	Forensic S	2000	No (It is the description of the curriculum)
217.	Steele LM,	A Compari	Sci Eng Eth	2016	No (It is just a comparison of the training effects between groups, the trainig was already described)
218.	Steneck NH	Workshop	Promotin	2011	No (conference report)
219.	Stephens J	Using the	Peabody J	2013	No (It is not related to research ethics)
220.	Sterling S,	Training in	Ethics in A	2015	No (book chapter, review on teaching ethics)

224.	Sweet S	Using a m	Teach Soc	1999	No (Mostly related to professional ethics)
226.	Thompson	Infusing R	Account R	2012	No (It is a case presentation)
227.	Thomsen M	A course t	Sci Eng Eth	2007	No (professional ethics)
23.	Brent RL	AN EDUCA	Pediatr Re	1994	No (It is a comment)
231.	Tolich M, C	Teaching r	Int J Soc R	2017	No (Related to professional ethics)
233.	Toth EE	Educating	IEEE Nano	2012	No (no description of the course and its content)
234.	Townsend	Ethics wor	Eos	2014	No (a brief journal report)
235.	Trabia MB,	Training g	123rd ASE	2016	No (conference report)
236.	Trautner M	Using the	Teach Soc	2013	No (focused on academic dishonesty)
238.	Valdes D, C	Case analy	ASEE Annu	2009	No (conference report)
239.	Valdes DM	Work in p	38th ASEE	2008	No (conference report)
24.	Briggle A, H	Research E	Sci Eng Eth	2016	No (It is mostly historical review and secondary report of the two other studies)
242.	Vlcek BL, H	Case studi	ASME 201	2012	No (conference report)
244.	Vuckovic-D	Science Et	J Buon	2012	No (no intervention description)
246.	Walter WV	Experienc	119th ASE	2012	No (conference report)
250.	Weyrich LS	Teaching E	Account R	2013	No (a commentary)
252.	Wickson F,	The Walks	Sci Eng Eth	2014	No (Not focused on research ethics or integrity, more on the walkshop as an activity in itself)
254.	Wilson SE,	Teaching r	10th ASME	2009	No (conference report)
255.	You M, Lee	Design eth	4th Intern	2011	No (conference report)
256.	Zivcakova I	Investigati	J Acad Eth	2014	No (generally on academic integrity)
257.	Zunino C, C	Inclusion c	InterCamb	2016	NA
27.	Buhler AG,	Using gam	120th ASE	2013	No (It is a demo description of the game, which needs to be developed).
28.	Bullard LG,	Using a ro	Adv Eng E	2011	No (Not related to research ethics)
29.	Burns DJ, T	The effect	Research	2015	No (Not related to research ethics)
3.	Agheorghie	"Ethics by	Rev Cerce	2016	No (Not related to research ethics)
31.	Cadwell K,	Training u	ASEE Annu	2008	No (conference report)
32.	Canary HE,	Microethic	119th ASE	2012	No (conference report)
33.	Champion	Teaching s	Chemist	1998	NA
34.	Chen DT	Curricular	Psychopha	2003	No (Mostly related to ethics in general and research ethics in psychiatry, for which no evidence was found to begin developing the course)
35.	Chertoff J,	Core Curri	Acad Radi	2009	No (It is a proposal for implementation of research ethics in radiology)
38.	Cibulka NJ	Educating	J Contin E	2011	No (the articles is mostly focused on nursing ethics)
39.	Coetzee T,	An Evaluat	J Empir Re	2015	No (There is no intervention nor description of the intervention)
40.	Committee	On being a	1-82 p	2009	No (a book, no intervention)
41.	Comstock	Research e	Cambridge	2013	No (a book, no intervention)
42.	Conway-Kl	Discouragi	Clin Lab Sc	2010	No (It is a case description, academic dishonesty)
45.	Davis M, e	From prac	6th Resea	2015	No (conference report)
46.	DeBruin DA	Education	Acad Med	2007	No (Does not contain the description of the intervention)
47.	Dietrich S	Workshop	15th Inter	2011	No (conference report)
48.	Dilevko J, E	Teaching t	J Inf Ethics	2014	No (Mostly focuse on research methodology only)
49.	DiLorenzo	Education	Account R	2014	No (The article only emphasisises that there is lack of education about RCR in curriculum)
5.	Allan A	Applying R	Ethics and	2018	No (The article is mainly descriptive, not clearly research ethics)
51.	DuBois JM,	Teaching a	J Res Adm	2009	No (There is no description of the intervention)
53.	Dummer G	Mentoring	Res Q Exe	2005	No (Not related to research ethics)
54.	Durham H,	Generic le	E-Learnin	p	No (Not related to research ethics)
55.	East J	Education	Handbool	p	No (a book, academic integrity)
56.	East J, Don	Taking Res	J Univ Tea	2012	No (The article focuses on policy development about academic integrity)
57.	Eisen A, Pa	A model fo	Sci Eng Eth	2004	It is just a brief overview of the course offered by Emory University
58.	Ekberg ME	Exploring t	J Acad Eth	2016	No (Not related to research ethics)
59.	Elliott D	Case studi	Prof Ethics	1995	No (professional and applied ethics)
6.	Andrews U	House Rul	Commun	2013	No exclusivly related to medical ethics)

60.	Elliott D, Bl	Scientific r	Prof Ethics	1995	NA
62.	Estow S, La	Practice M	Teach Psy	2011	No (not related to research ethics)
63.	Fenster J	Teaching M	J Soc Worl	2016	No (not related to research ethics)
65.	Fischbach I	Creating a	J Microbio	2014	No (Not related to research ethics)
66.	Fischer BA,	Promoting	Sci Eng Eth	2001	No (It is a promotion of a workshop, rather than the description)
67.	Fisher CB, I	Integrating	Teach Psy	1997	No (The articles is focused on ethics in general, less on research ethics)
69.	Frey WJ, Ri	Bringing re	IEEE Intern	2014	No (conference report)
7.	Anestidou	Undergrad	Faseb Jour	2006	No (It is only a description of the courses taught at Vanderbilt University)
70.	Funk CL, Ba	Authorship	Account R	2007	No (It is a cross sectional study which describes the characteristics of postdoctoral trainees)
71.	Galloway J	The ethics	Nature	1997	No (a book review)
72.	Gasparich (	Integration	J Microbio	2014	No (related to bioethics and professional ethics)
73.	Gerodetti N	Students a	Proceedin	2014	No (conference report)
74.	Gibson MA	Teaching s	Journal of	1994	No (no intervention)
75.	Gladwin TE	Educating	Int J Educ	2018	No (It is a commentary and a brief overview)
76.	Greer K, Sv	Beyond th	J Acad Libr	2012	No (Not related to research ethics)
77.	Griggins C,	Bioethics T	HEC Forun	2011	No (Not related to research ethics)
78.	Gunnarsso	Teaching I	J Acad Libr	2014	No (It is not an intervention, but only a survey)
8.	Antes AL	A Systema	Account R	2014	No (Not related to research ethics)
80.	Halkoaho A	Education	BMC Med	2013	A duplicate, included
81.	Halupa CM	A Self-Plag	J Acad Eth	2016	No (The article is descriptive, and not an intervention)
82.	Han H, Jeo	Improving	Sci Eng Eth	2014	No (Not related to research ethics)
83.	Hanson MJ	Introducin	Biochemis	2015	No (Not related to research ethics)
84.	Heitman E,	Assessing	Account R	2005	No (there is no description of the intervention)
85.	Herman IP,	Introducin	IEEE Intern	2014	No (conference report)
86.	High MS, H	Tools to cr	ASEE Annu	2011	No (conference report)
87.	Hochstedt	The impac	122nd ASE	2015	No (conference report)
88.	Hoffmann	Understan	Sci Eng Eth	2014	No (Not related to research ethics)
89.	Honeycutt	Building b	24th ACM	2006	No (conference report)
9.	Antes AL, D	Aligning O	J Microbio	2014	No (Not related to research ethics)
90.	Hoshiko T	RESPONSI	Faseb Jour	1992	No (It is only a description of the course offered by the university)
91.	Hoshiko T	Responsib	Am J Phys	1993	No, duplicate
93.	Hyytinen H	Reactively	J Acad Eth	2017	No (it is a descriptive study about participants' experiences)
94.	Iribarne A,	ADDRESSI	Ann Thora	2015	No (It is a commentary)
95.	Iseda T	How to tea	Promotin	2011	No (It is a book chapter, relevant for RE/RI promotion, rather than learning, which is not the scope of this review)
96.	Jeffers BR	Continuing	J Contin Ec	2002	No (no intervention, a review of nurse roles in ethics)
97.	Jiménez LC	An introdu	39th Annu	2009	No (conference report)

Name	Type of content	Year of development	Type of resource	RE/RI/RCR	Target audience	Link
					Bachelor, masters, PhD, train the trainers, secondary school teachers	
HEIRRI cou	project	2018	Training programmes	RRI		https://www.rri-tools.eu/heirri-training-prog
IMAGINE R	Article	2017	Card game	RRI	Researchers	https://www.tandfonline.com/doi/full/10.10
EnRRIch pr	Project	2017	Case studies	RRI	Aacademics, students	http://www.livingknowledge.org/fileadmin/I
Fiction Mo	Web page	2017	List of movies	RCR	Students and researcl	https://www.nrin.nl/fiction-movies-for-rcr-e

grammes
080/23299460.2018.1457402
Dateien-Living-Knowledge/Dokumente_Dateien/EnRRICH/D3.1_Resources_for_enhancing_RRI_understanding_and_prompting_debate_on_societal_issues_
ducation/

in_the_curriculum_for_early_stage_students.pdf

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1	Name of the educational material	Resource type (online training, card games, role-play scenarios, videos, movies, case studies, infographics and flowcharts, podcasts, textbooks, guidances, reports, visual arts, flash cards collections, checklist, PPT presentation, glossary, codes collection, instructor materials)	Author/ Institution	Date	Country	URL	Virtues/Vices mentioned	Targeted audience	Topics/contents (research misconduct, questionable research practices, falsification, fabrication, plagiarism, authorship, peer review, publication ethics, mentor/trainee relationship, collaborative research, research with humans, research with animals, data management, conflict of interest, patenting, reproducibility, financial responsibilities, social responsibilities, safety, work environment, grant application, allegation of misconduct, open access, whistleblowing, intellectual property, environmental responsibilities, image manipulation, moral reasoning, biosecurity, responsible research)	Language
2	Research integrity basic	online training	EPIGEUM	2012	UK	N/A	honesty, accountability, professional curtesy, good stewardship	biomedical science, humanities, social siences, engineering, natural sciences and physics	research misconduct, questionable research practices, falsification,fabrication, plagiarism, collaborative research, research with humans, research with animals, data managemet, financial responsibilities, work environment, authorship, peer review, social responsibilities, mentor/trainee relationship	English
3	Research integrity concise	online training	EPIGEUM	2016	UK	N/A	honesty, accountability, professional curtesy, good stewardship	N/A	Intellectal property, conflict of interest, safety, research with humans, research with animals, research misconduct, questionable research practices, social responsibilities	English
4	RCR basic	online training	CITI program	2007	U.S	N/A	honesty, fairness	biomedical science, humanities, social sciences, engineering, natural sciences and physics, administrative sector	research misconduct, questionable research practices, falsification,fabrication, plagiarism, mentor/trainee relationship, research with humans, research with animals, collaborative research, data managemet, financial responsibilities, work environment, authorship, peer review, social responsabilities, environmental responsibilities	English
5	RCR refresh	online training	CITI program	2007	U.S	N/A	honesty, fairness	biomedical science, humanities, social siences, engineering, natural sciences and physics	research misconduct, questionable research practices, falsification,fabrication, plagiarism, mentor/trainee relationship, research with humans, research with animals, , collaborative research, data managemet, financial responsibilities, work environment, authorship, peer review, social responsabilities	English
6	Administrators and RCR	online training	Boston college	N/A	U.S	https://ori.hhs.gov/education/products/rcradmin/index.html	N/A	administrative sector	conflist of interest, financial responsibilities, mentor/trainee relationship, collaborative research, data management	English
7	Resources for research ethics education	online training	UC San Diego	last update 2010	U.S	http://research-ethics.org/topics/overview/	N/A	biomedical science	research misconduct, authorship, data management, research with humans, research with animals, biosecurity, societal responsibilities, peer review, stem cell researchm whistleblowing	English
8	E-course on plagiarism for students	online training	Radbound University	2018	The Netherlands	https://www.ru.nl/library/library/library-locations/library-science/news/library-science/learning-modules-about-plagiarism-teaching/	N/A	N/A	plagiarism, citing, paraphrasing	English
9	Mantra (research data management training)	online training	University of Edinburg	N/A	U.K.	https://mantra.edina.ac.uk/	N/A	N/A	data management	English

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10	Academic integrity tutorial with quiz	online training	University of Maryland	N/A	U.S	https://www.umuc.edu/current-students/learning-resources/academic-integrity/tutorial/interactive.html	honesty	N/A	plagiarism	English
11	Open learning research ethics	online training	Finnish doctoral training network	N/A	Finland	https://findocnet.fi	honesty, fairness, trustworthyness, integrity, meticolousness, accuracy	N/A	research misconduct, falsification, fabrication, plagiarism, data management, financial responsibilities, authorship, publication ethics, mentor/trainee relationship, collaborative research	English, Finnish
12	ORI introduction to RCR	online training	Office of Research Integrity (ORI)	2007	U.S	http://www-personal.umich.edu/~nsteneck/researchintegrity/RCRintro/index.html	honesty, accuracy,efficiency, objectivity	biomedical science, social sciences	research misconduct, questionable research practices, falsification,fabrication, plagiarism, mentor/trainee relationship, research with humans, research with animals, data managemet, work environment, authorship, peer review, social responsabilities	English
13	COPE core practices	online training	COPE	N/A	U.K.	https://publicationethics.org/core-practices	N/A	N/A	publication ethics, research misconduct, authorship, conflict of interest, data management, reproducibility, peer review, intellectual property, allegation of misconduct	English
14	Printeger Upright	online training	Printeger EU project	2015/2018	Europe	https://printeger.eu/upright/toc/	reliability, honesty, respect, accountability	biomedical science	research misconduct, peer review, authorship, open acces, fabrication, falsification, plagiarism, research with animals, conflict of interest, data management	English
15	Human subject research	online trainings	ORI	N/A	U.S.	https://ori.hhs.gov/index.php/human-subject-research	N/A	biomedical science, social sciences	research with humans	English
16	Publication/Authorship	online trainings	ORI	N/A	U.S.	https://ori.hhs.gov/publicationsauthorship	N/A	N/A	authorship, publication ethics	English
17	Research misconduct	online trainings	ORI	N/A	U.S.	https://ori.hhs.gov/research-misconduct	N/A	N/A	research misconduct	English
18	Animal resources	online trainings	ORI	N/A	U.S.	https://ori.hhs.gov/animal-resources	N/A	biomedical science	research with animals	English
19	Mentorship	online trainings	ORI	N/A	U.S.	https://ori.hhs.gov/index.php/mentorship	N/A	N/A	mentor/trainee relationship	English
20	Data management	online trainings	ORI	N/A	U.S.	https://ori.hhs.gov/data-management	N/A	N/A	data management	English
21	Collaborative science	online trainings	ORI	N/A	U.S.	https://ori.hhs.gov/collaborative-science-0	N/A	N/A	collaborative science	English
22	Conflict of interest and commitment	online trainings	ORI	N/A	U.S.	https://ori.hhs.gov/index.php/conflicts-interest-and-commitment	N/A	N/A	conflict of interest	English
23	Peer review	online trainings	ORI	N/A	U.S.	https://ori.hhs.gov/index.php/peer-review-0	N/A	N/A	peer review	English
24	Dilemma game	card game	Erasmus University Rotterdam	2013	The Netherlands	https://www.eur.nl/en/about-eur/strategy-and-policy/scientific-integrity/dilemma-game	N/A	N/A	publication ethics, data management, plagiarism, authorship, QRPs	English
25	Peer review card exchange game	card game	University of Split school of Medicine (Ružica Tokalić and Ana Marušić)	2018	Croatia	http://europeanscienceediting.eu/articles/a-peer-review-card-exchange-game/	responsiveness, competence, impartiality, confidentiality, constructive criticism, responsibility to science	N/A	peer review, publication ethics	English

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26	RCR Casebook	case studies collection	St. Luis University (James M. Dubois)/ funded by ORI	N/A	U.S.	https://ori.hhs.gov/rcr-casebook-stories-about-researchers-worth-discussing	N/A	N/A	authorship, publication ethics, research misconduct, collaborative research, data management, conflict of interest, peer review, social responsibilities, mentor/trainee relationship	English
27	COPE cases	case studies collection	COPE	1997-	U.K.	https://publicationethics.org/cases	N/A	N/A	research misconduct, questionable research practices, plagiarism, authorship, conflict of interest, publication ethics, financial responsibilities, whistleblowing, peer review, copyright, collaborative research	English
28	Case study pack No. I	case studies collection	UKRIO	N/A	U.K.	https://ukrio.org/wp-content/uploads/UKRIO-Case-study-pack-No.-1.pdf	N/A	N/A	allegation of misconduct	English
29	Case studies for small group discussion	case studies collection	Memorial sloan Kettering, the Rockfeller University, Cornell University	oct. 2018	U.S.	https://www.mskcc.org/sites/default/files/node/26556/documents/oct-cases-2018-final-7-9-18.pdf	N/A	biomedical science	safety, whistleblowing, fabrication, falsification, data management, research with animals, research with humans, publication ethics, conflict of interest, mentor/trainee relationaship,	English
30	Educating yourself about plagiarism – Case studies on Grey areas	case studies collection	Nottingham Trent University, United Kingdom, University of Derby, United Kingdom/ ENAI	2019	Europe	http://www.academicintegrity.eu/wp/wp-content/uploads/2019/01/ENAI_Case_studies_on_Grey_areas.pdf	N/A	N/A	plagiarism	English
31	ENRIO collection	case studies collection	ENRIO	N/A	Europe	http://www.enrio.eu/resources/?cat=4 , http://www.enrio.eu/resources/?cat=5	N/A	N/A	authorship, plagiarism, mentor/trainee relationship, peer review, data managemet, conflict of interest, research misconduct, fabrication, falsification, QRPs	Emglish
32	Annual review of ethics (case studies)	case studies collection	NIH	2001-2018	U.S.	https://oir.nih.gov/sourcebook/ethical-conduct/responsible-conduct-research-training/annual-review-ethics-case-studies	N/A	biomedical science	research misconduct, authorship, mentor/trainee relationship, collaborative research, data management, plagiarism, social responsibilities, reproducibility,	English
33	cases for teaching engineering ethics	case studies	the ethics center for engineering and science	N/A	U.S	https://www.onlineethics.org/Resources/csaindex.aspx	N/A	engineering	N/A	English
34	Case studies for small group discussion	case studies collection	Memorial sloan Kettering, the Rockfeller University, Cornell University	oct. 2018	U.S.	https://www.mskcc.org/sites/default/files/node/26556/documents/oct-cases-2018-final-7-9-18.pdf	N/A	biomedical science	safety, whistleblowing, fabrication, falsification, data management, research with animals, research with humans, publication ethics, conflict of interest, mentor/trainee relationaship,	English
35	Case study collection	case studies collection	Ethics education library	N/A	U.S.	http://ethics.iit.edu/eelibrary/case-study-collection	N/A	biomedical science, engineering, social sciences	research with animals, authorship,research misconduct, conflict of interest, date managemet, research with humans, mentor/trainee relationship,publication ethics, intellectual property, safety, social and professional responsibilities,	English
36	2MCs for students	role-play scenarios	NCPRE (National Centre for Professional & Research Ethics)	N/A	U.S.	https://ethicscenter.csl.illinois.edu/research-ethics-resources/role-specific-resources/resources-for-instructors/two-minute-challenges/2mcs-for-students/	N/A	engineering	authorship, intellectual property, allegation of misconduct, research misconduct, whistleblowing,	English

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37	NCPRE research role-ply scenarios	role-play scenarios	NCPRE (National Centre for Professional & Research Ethics)	N/A	U.S.	http://ethicscenter.csl.illinois.edu/research-ethics-resources/educational-materials/active-learning-exercises/	N/A	biomedical science, engineering	research with animals, authorship, conflict of interest, hazardous substances, research with humans, mentor/trainee relationship, peer review, data management, whistleblowing	English
38	Scenarios for ethics modules in RCR	role-play scenarios	The online ethics center (OEC)	2015 (last update)	U.S.	https://www.onlineethics.org/Topics/RespResearch/ResCases/ethicsmodscen.aspx	N/A	biomedical science, engineering, natural science and physics	data management, research with humans, authorship, peer review, grant application, mentor/trainee relationship, research with animals	English
39	Journal peer review	infographics and flowcharts	QUT (Queensland university of tecnhology and OREI)	2018	Australia	https://figshare.com/articles/Journal_Peer_Review/5782815	fairness, transparency, competence, confidentiality	N/A	authorship, conflict of interest, plagiarism, data managemet	English
40	Authorship and publication	infographics and flowcharts	QUT (Queensland university of tecnhology and OREI)	2018	Australia	https://figshare.com/articles/Authorship_and_Publication/5801682	responsibilities	N/A	peer review	English
41	ORI Infographics	infographics and flowcharts	ORI	N/A	U.S.	https://ori.hhs.gov/infographics	honesty, availability	N/A	data management, fabrication, falsification, research misconduct, whistleblowing, questionable research practices, allegation of misconduct, plagiarism, authorship, mentor/trainee relationship, social responsibilities, grant application	English
42	COPE flowcharts	infographics and flowcharts	COPE	N/A	U.K.	https://publicationethics.org/resources/flowcharts	N/A	N/A	authorship, publication ethics, peer review, conflict of interest, intellectual property, data management, allegation of misconduct	English, Arabic, Chinese, Croatian, French, Italian, Japanese, Persian, Polish,
43	Data management checklist	checklist	UK data service	N/A	U.K.	https://www.ukdataservice.ac.uk/manage-data/plan/checklist	N/A	N/A	data management	English
44	Research Integrity and the Responsible Conduct of Research - Checklist for Research Students and their Supervisors at the University of Oxford	checklist	University of Oxford	2014	U.K.	https://www.learning.ox.ac.uk/media/global/wwwadminoxacuk/localsites/oxfordlearninginstitute/documents/overview/rsv/Integrity_checklist_August_2014.pdf	N/A	N/A	research with humans, authorship, publication ethics, research with animals, research misconduct, mentor/trainee relationship, data management, collaborative research, conflict of interest, peer review, moral reasoning, social responsibilities	English
45	Research interity list at KU Leuven	checklist	KU Leuven	N/A	Belgium	https://www.kuleuven.be/english/research/integrity/Checklist	Rigour, reliability, verifiability, independence, impartiality, honesty, fairness	N/A	authorship, conflict of interest, plagiarism, data management, allegation of misconduct	English, Ducht
46	Academic integrity checklist	checklist	Utrecht University	N/A	The Netherlands	https://students.uu.nl/sites/default/files/uu-academicintegrity.pdf	reliability, responsibilities, impartiality, scrupolousness, collaboration, ambition	N/A	data management, plagiarism, authorship, collaborative research	English

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47	The Lab-avoiding research misconduct	movie	ORI	2017	U.S.	https://ori.hhs.gov/content/thelab	N/A	biomedical science	research misconduct, collaborative research, whistleblowing, mentor/trainee relationship, allegation of misconduct, data management, authorship and QRPs	English, Chinese, Japanese, Spanish
48	Fiction movies for RCR education	movie	NRNI collection	N/A	The Netherlands	https://www.nrin.nl/fiction-movies-for-rcr-education/	N/A	N/A	depending on the movie: conflict of interest, intellectual property, mentor/trainee relationship, reproducibility, publication ethics, plagiarism	English
49	On being a scientist	movie	Leiden University	2016	The Netherlands	https://www.youtube.com/watch?v=tCgZSjoxF7c&feature=youtu.be	reliability, honesty, respect, accountability	biomedical science	research misconduct, fabrication, plagiarism, authorship, mentor/trainee relationship, data management, intellectual property, conflict of interest, social responsibilities	English
50	Case study videos	video	WestVirginia University, CITI	N/A	U.S.	https://oric.research.wvu.edu/services/responsible-conduct/core-areas	N/A	biomedical science	data management, conflict of interest, research with animals, research with humans, research misconduct, authorship, mentor/trainee relationship, peer review, collaborative research	English
51	First Insubria International school in methodology, ethics and integrity in biomedical science	video	Insubria University	2014	Italy	https://www.youtube.com/playlist?list=PL9wdu0_Er9E1ezVGdBUBE4rSvpSb-TVWs	N/A	biomedical science	reproducibility, research misconduct, conflict of interest, research with animals, work environment, publication ethics, open access	English, Italian
52	Reproducibility training	video	NIH (national institute of health)	N/A	U.S.	https://oir.nih.gov/sourcebook/ethical-conduct/responsible-conduct-research-training/instruction-responsible-conduct-	transparency	biomedical science	reproducibility, data management	English
53	Top 10 tips for robust & ethical research	video	LARI (Luxembourg Agency for RI)	N/A	Luxembourg	https://www.youtube.com/watch?v=PCJ0GdFWje4	N/A	N/A	authorship, copyright, data management, plagiarism	English
54	Responsible conduct of biomedical research : collaborative research	video	University of Puerto Rico	2010	Puerto Rico	https://www.youtube.com/watch?v=vnBPxhCq-FY	responsibilitied, fairness, accountability,	biomedical science	collaborative research, authorship	English
55	Authorship	video	university of Utah	2015	U.S.	https://www.youtube.com/watch?v=UMUFWuWHUt0	N/A	N/A	authorship	English
56	Ethics Defined (a glossary)	video	Mc Combs school of Business, Texas	N/A	U.S.	https://ethicsunwrapped.utexas.edu/glossary	honesty, integrity, fairness, accountability, objectivity, decency	N/A	moral reasoning, behavioral ethics	English
57	Is there a reproducibility crisis in science?	video	Matt Anticole (TEDEd)	2016	N/A	https://ed.ted.com/lessons/is-there-a-reproducibility-crisis-in-science-matt-anticole#watch	N/A	biomedical science, natural science and physics	reproducibility	English
58	Academic Misconduct:my story	video	Mr. Thesing	2015	N/A	https://www.youtube.com/watch?v=O9XJ-jaiEc4	N/A	N/A	plagiarism	English
59	Image manipulation research	video	HEADT centre Berlin	N/A	Germany	https://www.youtube.com/watch?time_continue=68&v=2i8vuEVyMK4	N/A	N/A	image manipulation	English

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60	Integrity in scientific research videos	video	ORI	N/A	U.S.	https://ori.hhs.gov/integrity-scientific-research-videos	N/A	N/A	authorship, mentor/trainee relationship, grant application, research misconduct	English
61	Et Plagieringseventyr	video	University of Bergen	2010	Norway	https://www.youtube.com/watch?time_continue=1&v=Mwbw9KF-ACY	N/A	N/A	plagiarism	Norwegian Sub English
62	COPE seminar, webinar and ppt presentation	video	COPE	N/A	U.K.	https://publicationethics.org/resources/seminars-and-webinars	transparency	N/A	publication ethics	English
63	Misconduct and Fraud in in clinical research	podcast or podcasts colletion	NIH ,Allan Gaw, University of Leeds	2018	U.K.	https://soundcloud.com/allangaw/podcast-7-allan-and-richard-smith-discuss-research-misconduct	reproducibility, trustworthyness	biomedical science	research misconduct, falsifation, fabrication, plagiarism, COI, data management	English
64	Nine pitfalls of research misconduct	podcast or podcasts colletion	Nature podcast series (2018)	2018	N/A	https://www.nature.com/articles/d41586-018-05145-6	reliability	N/A	research misconduct, mentor/trainee relationship	English
65	Research Integrity series	podcast or podcasts colletion	University of Oxford	2009-2011	U.K.	https://podcasts.ox.ac.uk/series/research-integrity	transparency, accurancy	biomedical science	publication ethics, data management, research misconduct, questionable research practices,	English
66	Bioethics: an introduction	podcast or podcasts colletion	University of Oxford	2012	U.K.	https://podcasts.ox.ac.uk/series/bioethics-introduction	N/A	biomedical science	moral reasoning, behavioral ethics	English
67	3 things societies can do to promote research integrity	podcast or podcasts colletion	The Wiley network	2016	N/A	https://soundcloud.com/wilesocietyupdates/episode-6-3-things-societies-can-do-to-promote-research-integrity	openess, integrity, transparency, credibility and reproducibility	N/A	reproducibility, COI, publication ethics, data management, open access	English
68	Fostering Integrity in Research	textbook	the National academies of sciences, engineering and medicine	2017	U.S.	https://www.nap.edu/catalog/21896/fostering-integrity-in-research	objectivity, honesty, openess, accountability, fairness, stewardship	biomedical science, engineering, physics	research misconduct, questionable research practices, data management, mentor/trainee relationship, authorship, peer review, research with humans, research with animals, safety, conflict of interest	English

	A	B	C	D	E	F	G	H	I	J
69	Responsible conduct of research toolkit	textbook	National postdocs association	2010	U.S.	https://cdn.ymaws.com/www.nationalpostdoc.org/resource/resmgr/npa-rcr-toolkit.pdf	N/A	N/A	data management, mentor/trainee relationship, publication ethics, authorship, peer review, collaborative science, research misconduct,	English
70	Integrity in scientific research	textbook	Swiss academies of arts and sciences	2018	Switzerland	www.enrio.eu/wp-content/uploads/2017/03/swiss-academies-integrity-in-scientific-research-principles-and-procedures.pdf	honesty, openess, veracity, transparency, fairness	N/A	conflict of interest, data management, publication ethics, research misconduct, allegation of misconduct	English
71	Responsible science: vol. 1	textbook	the National academies of sciences, engineering and medicine	1992	U.S.	https://www.nap.edu/catalog/1864/responsible-science-volume-i-ensuring-the-integrity-of-the-research	respect for the integrity of knowlegde, honesty, objectivity, openess	biomedical science, natural science and physics, engineering	research misconduct, allegation of misconduct, data management, publication ethics, mentor/trainee relationship	English
72	Responsible science: vol. 2	textbook	the National academies of sciences, engineering and medicine	1993	U.S.	https://www.nap.edu/catalog/2091/responsible-science-volume-ii-background-papers-and-resource-documents	N/A	biomedical science, natural science and physics, engineering	social responsibilities, mentor/trainee relationship, allegation of misconduct,	English
73	RCR- A Danish textbook for courses in RCR	textbook	University of Copenhagen	2018	Denmark	https://ifro.ku.dk/rcr.pd	honesty, transparency, accountability, professional courtesy, good stewardship	N/A	research misconduct, questionable research practices, authorship, publication ethics, data management, intellectual property, conflict of interest, social responsibility	English
74	A guidebook for teaching selected responsible conduct of research topics to a culturally diverse trainee group	textbook	Madeline Alexander, Wendy Reed Williams, the Children's Hospital of Philadelphia	N/A	U.S.	https://ori.hhs.gov/images/ddblock/Alexander.RCR%20Guidebook.BW_.pdf	N/A	N/A	data management, intellectual property, research misconduct	English
75	Best practices in graduate education for the responsible conduct of research	textbook	Council of graduate school	2008	U.S.	file:///C:/Users/u0123179/Downloads/FS_Best_Practices_Research.pdf	transparency, honesty, accuracy, efficiency, objectivity	N/A	research misconduct, questionable research practices	English

	A	B	C	D	E	F	G	H	I	J
76	Academic integrity at MIT, a handbook for students	textbook	MIT	N/A	U.S.	https://integrity.mit.edu/sites/default/files/documents/AcademicIntegrityHandbook2018-color.pdf	N/A	N/A	plagiarism	English
77	On being a Scientist	textbook	the National academies of sciences, engineering and medicine	2009	U.S.	https://www.nap.edu/catalog/12192/on-being-a-scientist-a-guide-to-responsible-conduct-in	honesty, fairness, objectivity, openess, tustworthiness, respect	biomedical science, natural science and physics, engineering	mentor/trainee relationship, data management, research misconduct, allegation of misconduct, research with humans, research with animals, safety, authorship, collaborative research, intellectual property, conflict of interest, social responsibilities	English
78	Doing Global science	textbook	Princeton University press	2015	U.S.	https://www.researchgate.net/publication/305496842_Doing_Global_Science_A_Guide_to_Responsible_Conduct_in_the_Global_Research_Enterprise	honesty, fairness, objectivity, reliability, skepticism, accountability, openess	N/A	mentor/trainee relationship, plagiarism, peer review, collaborative research, research with humans, data management, open science, social responsibility, safety and environment, allegation of misconduct, conflict of interest, authorship,	English
79	ENERI manual-research integrity and ethics	textbook	Maastricht university/ Penders, Shaw, Lutz, Townend, Akrong, Zvonareva	N/A	The Netherlands	http://eneri.eu/e-manual/	trustworthyness	N/A	research misconduct, questionable research practices, falsification, fabrication, plagiarism, social responsibilities, peer review, authorship, RE	English
80	Supervision of doctoral dissertations and their review process in Finland with a special emphasis on research integrity	guidance	Finnish advisory board on research integrity	2017	Finland	https://www.tenk.fi/sites/tenk.fi/files/TENK_UNIFI_recommendations_supervision_of_doctoral_dissertations.pdf	N/A	N/A	mentor/trainee relationship, copyright, authorship, data management, plagiarism,	English
81	How to handle authorship disputes: a guide for new researchres	guidance	COPE	2003	U.K.	https://publicationethics.org/files/2003pdf12.pdf	N/A	N/A	authorship	English
82	ICMJE recommendations	guidance	ICMJE	2018	Worldwide	http://www.icmje.org/recommendations/	N/A	biomedical science	publication ethics, peer review, authorship	English

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83	ICMJE conflict of interest	guidance	ICMJE	N/A	Worldwide	http://www.icmje.org/conflicts-of-interest/	N/A	biomedical science	conflict of interest	English
84	Detecting and determining greyscales	guidance	Headtcentre	N/A	Germany	https://headt.eu/Research-Integrity	N/A	N/A	plagiarism, falsification, image manipulation	English
85	Five simple rules	guidance	Ober H., Simon S.I., Elson D.	2012	U.S./U.K.	https://link.springer.com/article/10.1007/s10439-012-0662-9	N/A	N/A	plagiarism	English
86	Responsible conduct in global research enterprise	report	Interacademy council	2012	Europe	http://www.interacademies.org/33362.aspx	honesty, fairness, objectivity, reliability, skepticism, accountability, openess	N/A	research misconduct, questionable research practices	English
87	Research integrity practices in science europe member organizations	report	ScienceEurope	2016	Europe	https://www.scienceeurope.org/wp-content/uploads/2016/07/Science-_Europe_Integrity_Survey_Report_July_2016_FINAL.pdf	trustworthyness, integrity	N/A	N/A	English
88	The concordat to support research integrity	report	several English signatoires	2012	U.K.	https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2012/the-concordat-to-support-research-integrity.pdf	integrity, rigour, transparency, fairness	N/A	N/A	English
89	Reproducibility and reliability of biomedical research: improving research practices	report	the academy of biomedical science, BBSRC, Medical research council, wellcometrust	2015	U.K.	https://acmedsci.ac.uk/viewFile/56314e40aac61.pdf	openess, transparency, collaboration, reproducibility	N/A	reprobucibility	English

	A	B	C	D	E	F	G	H	I	J
90	Tri-agency framework:RCR	report	Panel on Responsible conduct of research	2016	Canada	http://www.rcr.ethics.gc.ca/eng/policy-politique/framework-cadre/	accountability, transparency, trust, honesty, transparency	N/A	N/A	English
91	Good scientific practice for courses in science and medicine	report	Gerlinde Sponholz	2011	Germany	http://www.ombudsman-fuer-die-wissenschaft.de/fileadmin/Ombudsman/Dokumente/Downloads/Curriculum/German_Curriculum.pdf	N/A	biomedical science	N/A	English
92	Research integrity and research misconduct policy	report	Australian research council	2017	Australia	https://www.arc.gov.au/policies-strategies/strategy/arc-research-integrity-and-research-misconduct-policy	transparency, integrity	N/A	N/A	English
93	Plenaries 4th WRCI 2015	ppt presentations, video	WRCI	2015	Worldwide	https://wcrif.org/2015-plenaries	N/A	N/A	N/A	English
94	PPT presentations 3rd WCRI 2010	PPT presentations	WRCI	2010	Worldwide	https://wcrif.org/2010-resources/2010-conference-materials	N/A	N/A	N/A	English
95	How trustworthy?	visual art	Headtcentre	N/A	Germany	https://headt.eu/How-Trustworthy	N/A	N/A	image manipulation, fabrication, falsification, plagiarism, QRPs	English
96	Integrity factor glossary	glossary	UMCG, MCL	N/A	The Netherlands	http://integrityfactor.nl/glossary	N/A	N/A	N/A	English
97	ENAI glossary	glossary	ENAI	2018	Europe	http://www.academicintegrity.eu/wp/glossary/	N/A	N/A	N/A	English
98	Research Integrity flashcards	Flashcard collection	N/A	N/A	N/A	https://quizlet.com/subject/research-integrity/	N/A	N/A	research with humans, authorship, publication ethics, research with animals, research misconduct, mentor/trainee relationship, data management, collaborative research, conflict of interest, peer review, moral reasoning, social responsibilities	English
99	Getting started in teaching about ethical issues in physics	instructor material	the ethics center for engineering and science	2018	U.S.	https://www.onlineethics.org/Resources/40675.aspx	N/A	physics	N/A	English
100	Instructor's guide to prepare research group leader as RCR Mentors	instructor material	the ethics center for engineering and science	2016	U.S.	https://www.onlineethics.org/Resources/34199.aspx	N/A	N/A	N/A	English
101	The Ethics Codes collection	codes collection	Illinois Institute of Technology Hermann Hall	N/A	U.S.	http://ethicscodescollection.org/	N/A	N/A	N/A	English

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1	Name of the Intitution	RI training	level	target	mandatory/voluntary	format (online, face-to-face, blenced	frequency and duration	who are the trainers	topics (research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans, research with animals, others)	background (humanities, biomedical science, engineering, social sciences, natural sciences and physics, other)	customization level	educational material (textbook, PPT presentation, guidelines, published articles, cases studie, card games, role-play scenarios, videos, movies, others)	material developed	free available?
2	VUB	yes	university wide	PhDs	mandatory/ voluntary	face-to-face	N/A	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship	biomedical science	PhDs, masters	PPT presentation, case studies, guidelines, pubblished articles	Upright	yes
3	Leiden university	yes	university wide, faculty, doctoral school	PhDs, master	mandatory	blended	once at the early stage	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans	all	PhDs	PPT presentation, guidelines, case studies	yes	no
4	University of Helsinki	yes	doctoral school	PhDs	mandatory	blended	3H	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans	all	PhDs	PPT presentation, guidelines, case studies, role-play scenarios, videos	Findocnet	yes
5	University of Athens	yes	departme nt	PhDs, master	mandatory	face-to-face	once per semeste	experts	research misconduct, authorship and publication, conflict of interest, peer review, mentor/trainee relationship, collaborative research, guidelines in europe	engineering, natural sciences and physics	PhDs, masters	PPT presentation, guidelines, case studies, published articles	yes	no
6	Porto	yes	university wide, faculty, doctoral school	all level	voluntary	face-to-face	once	experts	research misconduct, authorship and publication, data management practices, mentor/trainee relationship, research with humans, research with animals	biomedical science	no customization	PPt presentation, movie	yes	no
7	Vumc	yes	faculty	PhDs	mandatory	blended	6 modules per year	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, replication crisis	biomedical science	PhDs	PPt presentation, guidelines, case studies, videos, movies	yes	yes
8	University of Latvia	yes	faculty, doctoral school	PhDs, master	mandatory	blended	one semester for PhD/1-2 lectures for under and graduated	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, research with humans, research with animals, patenting	biomedical science, social sciences	PhDs, masters	textbook, PPt presentation, guidelines, case studies, role-play scenarios	yes	no
9	University of Oslo	yes	doctoral school	PhDs	mandatory	face-to-face	once	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans, research with animals	biomedical science	PhDs, masters	PPT presentation, guidelines, case studies, movie	yes	yes
10	KU Leuven	yes	doctoral school	PhDs	mandatory	blended	4h+ 5h	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans, research with animals	all	PhDs	PPT presentation, case studies	yes	no
11	MESFT	yes	faculty	bachelors,masters	voluntary	blended	once a year/5day	experts	research misconduct, authorship and publication, research with humans, research with animals	biomedical science	bachelors, masters	PPt presentation, guidelines, case studies, card game, movies	RRI Tools	yes
12	MESFT	yes	departme nt	masters	mandatory	face-to-face	once a year/5days	experts	research misconduct, data management practices, conflict of interest, mentor/trainee relationship, collaborative research, research with humans	biomedical science	masters	PPT presentation	yes	no
13	MESFT	yes	doctoral school	PhDs	voluntary	face-to-face	in the 3rd yeard for 90 min	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship	humanities, biomedical science, social sciences, natural sciences and physics	PhDs	PPT presentation, case studies, card game, movies	yes	no
14	Insubria	yes	doctoral school	PhDs	voluntary	face-to-face	N/A	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans, research with animals	biomedical science	PhDs	PPT presentation, published articles	yes	webinar
15	LARI	yes	university wide, local research intitutes	all level	mandatory for PhDs	face-to-face	on request	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans, research with animals, open access	all	no customization	PPT presentations, guidelines, case studies, videos, visual art	yes	some
16	Tean scientific integrity	yes	doctoral school	all level	N/A	face-to-face	on request	experts	research misconduct, authorship and publication, data manageme	all	masters,PhDs, postdocs	PPT presentations, guidelines, case studies	yes	some
17	OeAWI	yes	all	all level	N/A	face-to-face	on request	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, allegation of misconduct	all	no customization	PPT presentations, guidelines, case studies, role-play scenarios, movies	yes	no
18	University of Crete	no												
19	Swiss academies	no												

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
20	Debrecen	Integrated in other courses	department, doctoral school	PhDs masters	mandatory (master)/voluntary (PhDs)	face-to-face	Msc (14hseminars+14h lectures) PhD 26h in total	experts	research misconduct, authorship and publication, data management practices, conflict of interest, research with humans, research with animals, open access	biomedical science	PhDs, masters	textbook, PPt presentation, guidelines, case studies, role-play scenarios	yes	no
21	Dublin City University	yes	university wide	masters, PhDs, seniors	mandatory online	blended	N/A	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans, research with animals, open access	all	no customization	PPt presentations, guidelines, case studies, card game, role-play scenario, videos, movies	yes	no
22	University of Amsterdam	no												
23	Cambridge	yes	university wide	all level	voluntary	face-to-face	two cental courses	experts	research misconduct, authorship and publication, data management practices, research with humans	department customization	no customization	PPt presentations, guidelines, case studies, published articles, card game, role-play scenario	yes	no
24	University of Zurich	yes	university wide, doctoral school	PhDs, postdocs	mandatory for some	blended	8 hours/2days	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans, research with animals	all	no customization	PPt presentations, guidelines, case studies, card game, videos	no	no
25	Trinity college Dublin	yes	all staff and postgraduate student	staff(voluntary unless they do not have grants)mandatory for the students	selfdirected and on line	epigeum normal training	N/A	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans, research with animals	all	no customization	PPt presentations, case studies, published articles	no	no
26	imperial college London	yes	Graduate school	PhDs and Master students	Mandatoty only the course in Plagiarism awarness, the others or optional	on-line and face-to-face workshop	2-3 hour	experts	research misconduct, authorship and publication, data management practices, peer review, mentor/trainee relationship	all	PhDs, masters	PPT presentation, guidelines, case studies, published articles, role-play scenarios, videos	yes	no
27	Oxford	yes	university wide	PhDs and senior	voluntary	online+face to face	3-5 h/ once	experts	research misconduct, authorship and publication, data management practices, conflict of interest, collaborative research, research with humans, research with animals	all	no customization	N/A	no	no
28	AARHUS	yes	doctoral scholl	doctoral students	mandatory	on line + seminars lectures and workshops	depending on the customization	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans	all	PhDs	PPT presentations, guidelines, case studies, role-play scenarios	yes	Danish book
29	Tampere	yes	university wide, faculty, doctoral school	all level	mandatory for PhDs and medical faculties	blended	N/A	experts	research misconduct, authorship and publication, data management practices, conflict of interest, peer review, mentor/trainee relationship, collaborative research, research with humans, open science	all	no customization	PPt presentations, guidelines, case studies, published articles	yes	no
30	?	yes	all staff involved in research	PhDs	mandatory	face-to-face	2 h every 2 month	experts	research misconduct, allegation of misconduct	no	no customization	N/A	N/A	N/A

Supplement C

European Commission | Horizon 2020 European Union funding for Research & Innovation

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.

First of all, let me introduce myself.

My name is Daniel Pizzolato and I am part of the KU Leuven team, led by Prof. Kris Dierickx, involved in the European funded project VIRT^{2}UE (https://cordis.europa.eu/project/rcn/214892_en.html). We are part of the Interfaculty Centre of Biomedical Ethics and Law at KU Leuven.

VIRT^{2}UE aims to develop a sustainable train-the-trainer blended learning program enabling contextualized research integrity (RI) teaching across Europe. The VIRT^{2}UE training program aims to affect the behavior of trainers and researchers, developing scientific virtues as well.

One of the objective of the project is to map existing RI training practices in commercial and in non-commercial stakeholders. To do so, we developed a questionnaire in order to collect information about how the training programs are organized, at which level and what kind of educational material is used during those trainings. Collecting this information will allow us to identify good practices, needs and lacunas in the organization of RI educational programs. Moreover, we aim to collect the all RI educational material currently used, free available on-line or not, in order to map to current state of the art.

To achieve our objectives, we would like to ask your collaboration in filling out the questionnaire, in sharing with us information about the educational materials in use in your institution and possibly in sharing with us the material itself.

Please do not hesitate to contact us if you may have some further questions, using the following e-mail addresses: daniel.pizzolato@kuleuven.be.

Supplement D

Participant questionnaire

1. What is your country of residence?

2. What is your gender?

    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. In your opinion, at which level the research integrity training programs should be organized:

    a) Local
    b) National
    c) European