



D1.2 Scoping review of scientific virtues for training

WP1 Mapping of scientific virtues

By Ana Marušić, Ružica Tokalić, Vicko Tomić, Marin Vidak, Rea Ščepanović, Ivan Buljan, Ana Utrobičić

VIRT2UE Consortium



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D1.2 Scoping review of scientific virtues for training

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Work package leader	MEFST Sveuciliste u Splitu, Medicinski Fakultet
Responsible for the deliverable	Ana Marušić
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List of contributors	Ana Marušić, Ružica Tokalić, Vicko Tomić, Marin Vidak, Rea Ščepanović, Ivan Buljan, Ana Utrobičić
List of reviewers	Kris Dierickx, Daniel Pizzolato

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1 About the VIRT²UE project

The VIRT²UE project aims to develop a sustainable train-the-trainer blended learning programme enabling contextualized ethics and research integrity (ERI) teaching across Europe focusing on understanding and upholding the principles and practices of the European Code of conduct for Research Integrity (ECoC).¹ The training programme will be delivered using a blended learning approach: combining online and face-to-face teaching. This innovative blended learning programme will provide a toolbox of educational resources, based on an inventory of existing ERI educational resources, and incorporates an e-learning course with face-to-face sessions. VIRT²UE's online component will be delivered through the EC funded platform currently being developed in the EnTIRE project (http://cordis.europa.eu/project/rcn/210253_en.html).

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

This work package is responsible for meeting the overall objective 1: Conduct a conceptual mapping about virtues that are crucial for good scientific practice and their relation to the principles of the ECoC. The ECoC formulates principles that are related to virtues, and these will be central to the development of VIRT²UE's training programme.

In order to develop a holistic virtue-based training programme and provide researchers with more adequate guidance, it is necessary to further develop the evidence base regarding which virtues should be stimulated and developed in training for good research practice. The aim of this Deliverable was to identify virtues that have been addressed through research ethics (RE) and research integrity (RI) training, through systematic search of scientific databases and grey literature sources.

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

2 Methods

2.1 Design and description of the scoping review

To map out virtues addressed in RE and RI training, we wanted to include a broad range of potential sources, but also stay in scope of the principles outlined in ALLEA Code of Conduct. In collaboration with a librarian experienced in systematic reviews, we developed a detailed, sensitive search strategy ([Appendix 1](#)), based on following concepts: 1) research integrity, 2) research ethics, 3) principles of European Code of Conduct for Research Integrity, 4) scientific virtues. We performed a systematic search of Medline, Scopus, Web of Science, PsychInfo and Education Resources Information Center (ERIC) bibliographical databases. We also performed a search of grey literature through Open Science Framework ([osf.io](#)) and Open Grey ([opengrey.eu](#)).

Publications that were considered relevant for inclusion evaluated interventions aimed at improvement of research ethics and/or research integrity. We considered articles that aimed at research ethics, research integrity, responsible conduct of research (RCR) or prevention of research misconduct. Research integrity was differentiated from academic integrity, which is broader in scope^{2,3}. Articles on academic integrity were included if they focused on plagiarism, which is an important part of authorship conduct². We considered any kind of educational approach and delivery mode of trainings. We included experimental, quasi-experimental, controlled before-and-after, interrupted time series, pre-test and post-test, and one group post-test study designs. There were no language, geographical or limitations for participants regarding their levels of education and areas of research.

² International Center for Academic Integrity, Fishman T (editor). The Fundamental Values of Academic Integrity. International Center for Academic Integrity, 2013.

³ 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.

2.2 Extraction and analysis of the data

Two reviewers independently screened the search results for titles and abstracts of relevant publications. After that, articles for full text analysis were reviewed and selected for final analysis, in agreement with both reviewers.

For the final list of articles, we extracted information on authors, country of origin, year of publication, study design and main focus of topic (research integrity (RI), research ethics (RE), responsible conduct of research (RCR), academic integrity (AI), or a combination of those). We looked at the field of development of the intervention and the target population it addressed. We also extracted information on study aims, methods, sample, outcomes and key findings of the publications. We specifically looked at the intervention description, educational approach, delivery mode and its duration. Finally, for each included article, we looked at virtues that were addressed and/or recognised as a part of the intervention, its process and evaluation. For guidance, we used preliminary list of virtues ([Appendix 2](#)) from our stakeholders Delphi consultation (Deliverable 1.3), as well as results from stakeholder focus groups (Deliverable 1.1).

3 Results

3.1 Flowchart of the literature review

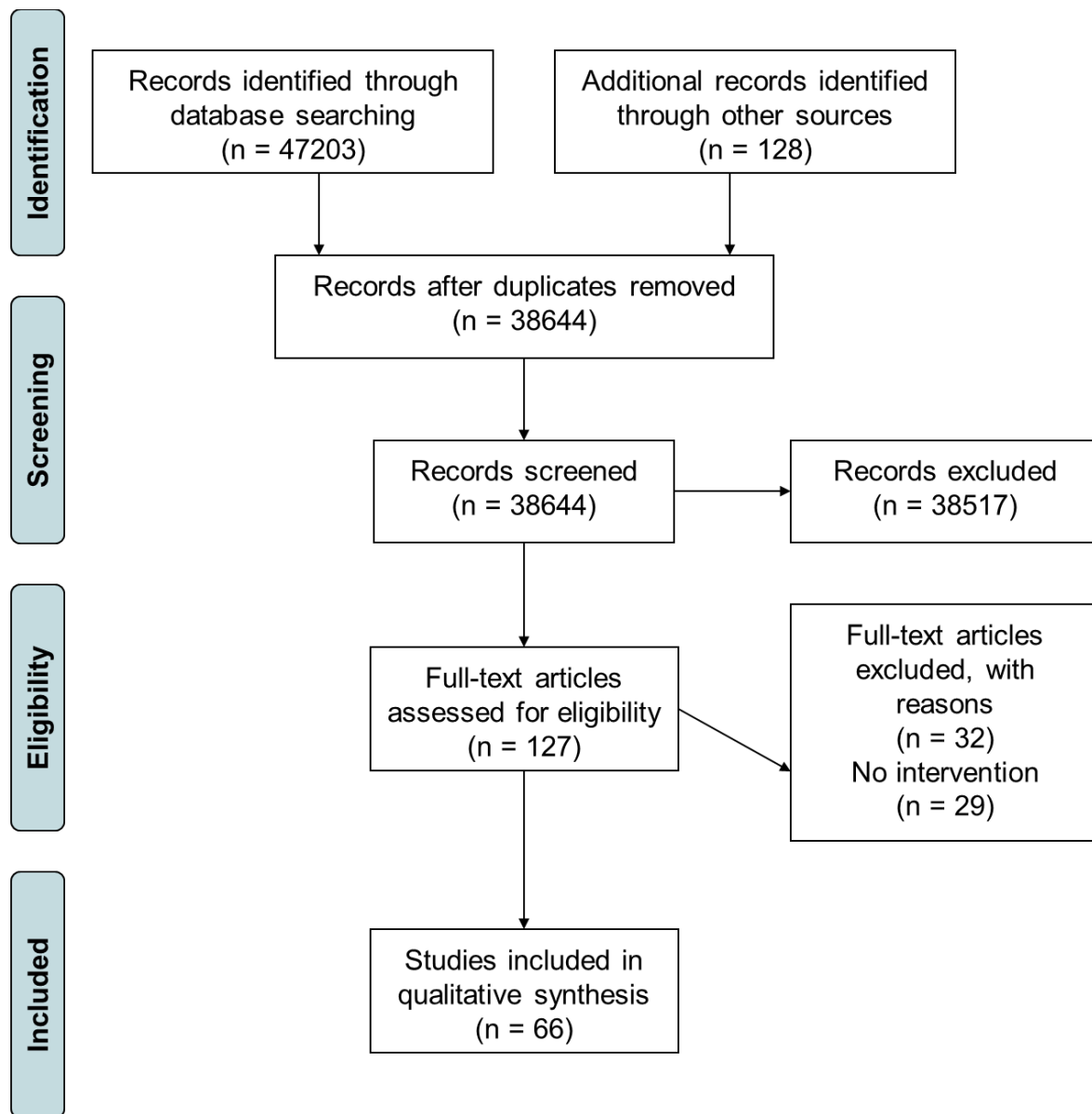


Figure 1. Flow chart of the literature review

We searched through Medline, Scopus, Web of Science, PsychINFO and ERIC databases in February 2019, and retrieved 47 203 results, 38 516 after removing the duplicates (**Figure 1**). Search of grey literature databases retrieved 128 results which resulted in 38 644 screened documents. After screening of titles and abstracts by two independent reviewers, 127 articles were selected for full text assessment. Further 61 article was excluded at that step, leaving 66 articles for full inclusion and analysis. Two of those articles were retrieved

form the grey literature databases, and 64 were retrieved from Medline, Scopus, Web of Science, PsychINFO and ERIC databases.

3.2 Data extraction

Full list of extracted resources is available in **Appendix 3**. Extraction tables with all the data and list of articles excluded in full text analysis is available in **Supplement A**.

Here we present the main characteristics of the interventions in the domains of the focus of interventions and study design, research area of development and target audience, educational approach, delivery and duration of the interventions, and virtues addressed in the articles.

3.2.1 Focus of interventions and study design

Extracted articles describing interventions were declaratively mainly focused on research ethics (RE) only, academic integrity (AI) only, responsible conduct of research (RCR) only, or research integrity (RI) only. A few of the articles referred to a combination of RE and RI; RE, RCR, and RI; or AI, RE, and RI (**Table 1**).

Majority of articles were designed as post-test evaluations, followed by pre and post-test study designs. Quasi experimental and randomized controlled trials were fewer, followed by controlled before and after studies.

Table 1. Focus of interventions and study design of included articles

Focus of the interventions (n of articles)	
RE	19
AI	27
RCR	6
RI	5
RE + RI	4
RE, RI, RCR	4
RE, RI, AI	1
Study design (n of articles)	
Post-test	32
Pre and post-test	19
Quasi experimental and RCT	13
Controlled before and after	2

3.2.2 Research area of development and target audience

Educational interventions were primarily developed in the biomedical and health sciences. They were closely followed by social sciences, engineering and technology, and natural sciences. Only few interventions were developed multidisciplinary, and some were from the field of humanities (**Table 2**).

Target audiences of the interventions were predominately students (undergraduate, graduate, PhD) (n=56). Some of those interventions involved researchers as well (n=11), and only a few included academic staff (n=4).

Table 2. Research area of development of the interventions

Research area of development (n of articles)	
Biomedical and health sciences	25
Social sciences	25
Engineering and technology	7
Natural sciences	4
Humanities	4
Multidisciplinary	2

3.2.3 Educational approach, delivery and duration of interventions

Majority of interventions were delivered face to face (n=36), some of them were completely online (n=18), and some of them were blended, i.e. partly online and partly offline (n=11). Delivery activities, or educational approaches of the interventions were mostly focused on lectures, cases and discussion. Almost all of the interventions used more than one educational approach (n=35). More detailed list of used educational approaches is presented in **Table 3**.

Table 3. Educational approaches used in analysed interventions

Educational approach	No.
Lectures	24
Group based, workshops	13
Case based, scenario, role-play	11
Discussion	10
Video	7
Problem based learning	5
Peer led	4
Collaborative writing	4
Gaming, applications, artificial intelligence	3
Card game	1
Interactive tutorial	1
ePortfolio	1

Information on duration of training was not always available (24/66). Reported duration of training varied from 15 minutes, a full semester, to up to three years. We categorized the duration to three groups:

- training in duration of 2 hours or less (n=16),
- training in duration of one day up to one week (n=15), and
- training in duration of more than a week and/or dispersed throughout the semester (n=11).

3.2.4 Virtues addressed in the interventions

Interventions for that focus on research and academic integrity very rarely explicitly address virtues as means to achieve prevention of research misconduct and establish good research practices. However, majority of them do incorporate virtues and values that are found to be important for those goals. Virtues were addressed, explicitly or implicitly, 298 times throughout the included articles. To extract information on which virtues they mention, and how often, we have used a preliminary list of virtues collected by our team during the stakeholder focus groups and Delphi survey. The full list of the 50 virtues we identified is presented in **Table 4**, along with the frequency with which they appeared in the included articles.

Table 4. List of virtues addressed in analysed interventions

Virtues addressed in analysed interventions (frequency)		
Integrity (n=30)	Responsibility (n=28)	Honesty (n=25)
Respect (n=17)	Critical (being critical) (n=15)	Morality (n=14)
Collaborative (being collaborative) (n=12)	Accountability (n=11)	Honor (n=11)
Reflexivity (n=11)	Fairness (n=10)	Competence (n=8)
Trust (n=8)	Openness (n=7)	Accuracy (n=7)
Goodness (n=6)	Justice (n=5)	Truthfulness (n=5)
Communicativeness (n=5)	Courage (n=4)	Transparency (n=4)
Carefulness (n=4)	Beneficence (n=3)	Reliability (n=3)
Humility (n=3)	Scepticism (n=3)	Consistency (n=3)
Positivity (n=3)	Altruism (n=3)	Self-discipline (n=2)
Curiosity (n=2)	Creativity (n=2)	Comprehensiveness (n=2)
Clarity (n=2)	Prudence (n=2)	Rigorousness (n=2)
Compliance (n=2)	Commitment (n=2)	Unselfishness (n=1)
Lawful (n=1)	Courtesy (n=1)	Perseverance (n=1)
Objectivity (n=1)	Meticulousness (n=1)	Compassion (n=1)
Impartiality (n=1)	Responsiveness (n=1)	Cognizance (n=1)
Thoroughness (n=1)	Empathy (n=1)	

Most of the included articles addressed less than 10 virtues (60/66), and only a few put more emphasis on virtues in good research practices (Atkinson 2008, Baetz 2011, Berling 2018, Cronan 2017, Pennock 2017, Quigley 2014).



Figure 2. Word cloud of most commonly addressed virtues.

4 Conclusion

Aim of this review was to help the development of a holistic virtue-based training programme and provide researchers with more adequate guidance, by identifying which virtues should be stimulated and developed in training for good research practice.

We looked at findings from this scoping review in the light of results from the stakeholder focus groups (Deliverable 1.1).

Through those focus groups, stakeholders identified honesty and accountability as most important virtues for good research practice, which are also main principles of the European Code of Research Integrity (ECoC). These virtues were one of the more frequent ones in this review, but the other two ECoC principles, reliability and respect, were less represented. There is still a need for trainings that fully include all of the ECoC principles and values.

Stakeholders identified case studies as an important asset in teaching research integrity, and while that approach was present in interventions included in this review, there is a lot of room for improvement. Interventions still strongly rely on lectures and less interactive approaches to education.

Disciplines that prevail in developing interventions for RE and RI were biomedical and social sciences. Other fields of research are underrepresented, and very few interventions are multidisciplinary. When this is considered in terms of target audiences of these interventions, which are mainly students, there is a clear gap in training of RE and RI that can be applied to different disciplines and for more experienced researchers, who could train others. For this, online or blended approach could be more suitable.

5 Appendix 1. Search strategies

5.1 Medline search strategy

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily <1946 to February 05, 2019>

Search Strategy:

-
- 1 (respect or reliability or honesty or accountability or skepticism or perseverance or meticulousness or "humility to evidence" or curiosity or collaborative or skeptical or patience or observant or objectivity or meticulous or integrity or humility or courage or attentiveness or virtue or virtues).tw. (689564)
 - 2 (open-mindedness or "truth seeking" or self-critical or precision or persistence or openminded or non-dogmatic or inventive or inquisitive or impartiality or iconoclastic or empathy or diligence or creativity or cooperative or compassion or communal or cleanliness or cooperation).tw. (316148)
 - 3 virtues/ (1128)
 - 4 or/1-3 (987798)
 - 5 Scientific Misconduct/ (5022)
 - 6 Fraud/ (7036)
 - 7 exp Ethics, Research/ (7566)
 - 8 (research adj3 (integrity or ethics or conduct or misconduct or malpractice or manipulation or misleading or mispresent\$ or bias\$ or fraud\$ or honest\$ or reliab?I\$ or fair\$ or impartial\$ or selective\$)).tw. (15998)
 - 9 ((scientific or academic) adj3 (fraud or ethics or integrity or misconduct or malpractice or manipulation or honesty or dishonesty)).tw. (2420)
 - 10 ((researcher\$ or scientist\$) adj3 (integrity or honest\$)).tw. (92)
 - 11 Plagiarism/ (1213)
 - 12 (plagiari\$ or falsif\$).tw. (3119)
 - 13 Publication Bias/ (4693)
 - 14 Duplicate Publication as Topic/ (757)
 - 15 Retraction of Publication as Topic/ (594)
 - 16 Peer Review, Research/ (6324)

- 17 (data adj3 (interpretat\$ or inaccura\$ or inadequa\$ or deceptive or deceit or bias\$ or impartial or manipul\$ or misus\$ or misleading or mispresent\$ or mistreat\$ or selective or suppress\$ or fabricat\$ or fraud\$ or falsif\$ or false)).tw. (27204)
- 18 Research Report/ (2768)
- 19 (report\$ adj3 (selective or deceptive or deceit or misleading or inadequate or independent)).tw. (6965)
- 20 (research adj3 (underreport\$ or under-report\$)).tw. (42)
- 21 ((publication\$ or publishing) adj3 ethics).tw. (485)
- 22 (bias adj3 (publication\$ or publishing or analys#s or design)).tw. (13076)
- 23 (publication\$ adj3 (redundant or duplicate or multiple or salami or undeserving)).tw. (873)
- 24 (inaccura\$ adj3 citation\$).tw. (17)
- 25 Authorship/ (5534)
- 26 ((author\$ or contribut\$) adj3 (undeserv\$ or ghost or guest or gift\$)).tw. (259)
- 27 Conflict of Interest/ (9248)
- 28 (interest adj3 (conflict or competing)).tw. (4280)
- 29 or/5-28 (108917)
- 30 4 and 29 (9971)

5.2 Scopus search strategy

(TITLE-ABS-KEY (respect OR reliability OR honesty OR accountability OR skepticism OR perseverance OR meticulousness OR "humility to evidence" OR curiosity OR collaborative OR skeptical OR patience OR observant OR objectivity OR meticulous OR integrity OR humility OR courage OR attentiveness OR virtue OR virtues) OR TITLE-ABS-KEY (open-mindedness OR "truth seeking" OR self-critical OR precision OR persistence OR openminded OR non-dogmatic OR inventive OR inquisitive OR impartiality OR iconoclastic OR empathy OR diligence OR creativity OR cooperative OR compassion OR communal OR cleanliness OR cooperation)) AND (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*)))))

5.3 Web of Science search strategy

10 #9 AND #3

9 #8 OR #7 OR #6 OR #5 OR #4

8 TS=((author* OR contribut*) NEAR/3 (undeserv* OR ghost OR guest OR gift*))

7 TS=((publication* OR publishing) NEAR/3 (ethics OR plagiari* OR falsif*))

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

5 TS=((scientific OR academic) NEAR/3 (fraud OR ethics OR integrity OR misconduct OR honesty OR dishonesty))

4 TS=(research NEAR/3 (integrity OR ethics OR conduct OR misconduct OR malpractice OR manipulation OR fraud* OR honest*))

3 #2 OR #1

2 TS=(open-mindedness OR "truth seeking" OR self-critical OR precision OR persistence OR openminded OR non-dogmatic OR inventive OR inquisitive OR impartiality OR iconoclastic OR empathy OR diligence OR creativity OR cooperative OR compassion OR communal OR cleanliness OR cooperation)

1 TS= (respect OR reliability OR honesty OR accountability OR skepticism OR perseverance OR meticulousness OR "humility to evidence" OR curiosity OR collaborative OR skeptical OR patience OR observant OR objectivity OR meticulous OR integrity OR humility OR courage OR attentiveness OR virtue OR virtues)

Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

5.4 PsychINFO search strategy

Database: PsycINFO <1806 to January Week 4 2019>

Search Strategy:

-
- 1 (respect or reliability or honesty or accountability or skepticism or perseverance or meticulousness or "humility to evidence" or curiosity or collaborative or skeptical or patience or observant or objectivity or meticulous or integrity or humility or courage or attentiveness or virtue or virtues).tw. (276060)
 - 2 (open-mindedness or "truth seeking" or self-critical or precision or persistence or openminded or non-dogmatic or inventive or inquisitive or impartiality or iconoclastic or empathy or diligence or creativity or cooperative or compassion or communal or cleanliness or cooperation).tw. (133774)
 - 3 virtue/ (1530)
 - 4 or/1-3 (396653)
 - 5 fraud/ (809)
 - 6 professional ethics/ (18325)
 - 7 (research adj3 (integrity or ethics or conduct or misconduct or malpractice or manipulation or misleading or mispresent\$ or bias\$ or fraud\$ or honest\$ or reliab?I\$ or fair\$ or impartial\$ or selective\$)).tw. (11348)
 - 8 ((scientific or academic) adj3 (fraud or ethics or integrity or misconduct or malpractice or manipulation or honesty or dishonesty)).tw. (1344)
 - 9 ((researcher\$ or scientist\$) adj3 (integrity or honest\$)).tw. (77)
 - 10 plagiarism/ (239)

- 11 (plagiari\$ or falsif\$).tw. (2531)
- 12 peer evaluation/ (2756)
- 13 peer review\$.tw. (7857)
- 14 (data adj3 (interpretat\$ or inaccura\$ or inadequa\$ or deceptive or deceit or bias\$ or impartial or manipulats\$ or misus\$ or misleading or mispresent\$ or mistreat\$ or selective or suppress\$ or fabricat\$ or fraud\$ or falsif\$ or false)).tw. (7587)
- 15 (report\$ adj3 (selective or deceptive or deceit or misleading or inadequate or independent)).tw. (1704)
- 16 (research adj3 (underreport\$ or under-report\$)).tw. (17)
- 17 ((publication\$ or publishing) adj3 ethics).tw. (183)
- 18 (bias adj3 (publication\$ or publishing or analys#s or design)).tw. (2635)
- 19 (publication\$ adj3 (redundant or duplicate or multiple or salami or undeserving)).tw. (150)
- 20 (inaccura\$ adj3 citation\$).tw. (13)
- 21 ((author\$ or contribut\$) adj3 (undeserv\$ or ghost or guest or gift\$)).tw. (452)
- 22 Conflict of Interest/ (564)
- 23 (interest adj3 (conflict or competing)).tw. (1343)
- 24 or/5-23 (54933)
- 25 4 and 24 (9167)

5.5 Education Resources Information Center (ERIC) search strategy

(virtue OR virtues) AND (research integrity OR research ethics)

5.6 Open Science Framework (osf.io) search strategy

(training OR tutorial OR curriculum OR education OR lecture OR teach OR learning OR course OR school OR lesson) AND (ethics OR "research integrity" OR "academic integrity" OR "scientific integrity" OR misconduct OR plagiarism) AND (intervention OR experiment OR experimental OR trial OR "pre-post" OR "pre-test" OR "post-test" OR test OR survey OR questionnaire OR "before and after")

5.7 Open Grey (opengrey.eu) search strategy

(training OR tutorial OR curriculum OR education OR lecture OR teach OR learning OR course OR school OR lesson) AND (ethics OR "research integrity" OR "academic integrity" OR "scientific integrity" OR misconduct OR plagiarism) AND (intervention OR experiment OR experimental OR trial OR "pre-post" OR "pre-test" OR "post-test" OR test OR survey OR questionnaire OR "before and after")

6 Appendix 2. Preliminary list of virtues

1. Accountability
2. Accuracy
3. Altruism
4. Carefulness
5. Clarity
6. Collaborative (being collaborative)
7. Commitment
8. Communicativeness
9. Compassion
10. Competency
11. Compliance
12. Comprehensiveness
13. Consistency
14. Courage
15. Courtesy
16. Creativity
17. Critical (being critical)
18. Curiosity
19. Determination
20. Diligence
21. Empathy
22. Enthusiasm
23. Fairness
24. Generosity
25. Goodness
26. Honesty
27. Honourability (being honourable)
28. Humility
29. Impartiality
30. Integrity

31. Kindness
32. Loyalty
33. Meticulousness
34. Modesty
35. Morality
36. Objectivity
37. Open-mindedness
38. Openness
39. Patience
40. Perseverance
41. Positivity
42. Prudence
43. Reflexivity
44. Reliability
45. Respect
46. Responsibility
47. Rigorousness
48. Skeptical (being skeptical)
49. Temperance
50. Thoroughness
51. Transparency
52. Trust
53. Truthfulness
54. Unselfishness

7 Appendix 3. List of included articles

No	Article reference
1	Ajuwon AJ, Kass N. Outcome of a research ethics training workshop among clinicians and scientists in a Nigerian university. <i>BMC Med Ethics</i> . 2008;9.
2	Arnott E, Hastings P, Allbritton D. Research Methods Tutor: evaluation of a dialogue-based tutoring system in the classroom. <i>Behav Res Methods</i> . 2008;40(3):694-8.
3	Atkinson TN. Using creative writing techniques to enhance the case study method in research integrity and ethics courses. <i>J Acad Ethics</i> . 2008;6(1):33-50.
4	Azulay Chertok IR, Barnes ER, Gilleland D. Academic integrity in the online learning environment for health sciences students. <i>Nurse Educ Today</i> . 2014;34(10):1324-9.
5	Baer W, editor. Using videos to teach the ethical use of engineering information. 2008 ASEE Annual Conference and Exposition; 2008; Pittsburg, PA: American Society for Engineering Education.
6	Baetz M, Zivcakova L, Wood E, Nosko A, De Pasquale D, Archer K. Encouraging Active Classroom Discussion of Academic Integrity and Misconduct in Higher Education Business Contexts. <i>J Acad Ethics</i> . 2011;9(3):217-34.
7	Ballard IB. The impact of an academic integrity module and turnitin on similarity index scores of undergraduate student papers. <i>Dissertation Abstracts International Section A: Humanities and Social Sciences</i> . 2014;74(8-A(E)).
8	Berling E, McLeskey C, O'Rourke M, Pennock RT. A New Method for a Virtue-Based Responsible Conduct of Research Curriculum: Pilot Test Results. <i>Sci Eng Ethics</i> . 2018:1-12.
9	Braunschweiger P, Goodman KW. The CITI program: an international online resource for education in human subjects protection and the responsible conduct of research. <i>Acad Med</i> . 2007;82(9):861-4.
10	Callaghan L, Lea SJ, Mutton L, Whittlesea E. Enhancing health students' understanding of generic research concepts using a web-based video resource. <i>Nurse Educ Pract</i> . 2011;11(6):375-9.
11	Chauhan PK, Wood E, Plummer T, Forsyth G. Peer-Based Interventions on Academic Integrity: Assessing Immediate and Long Term Learning. <i>J Acad Ethics</i> . 2018;16(2):133-49.
12	Chertok IRA, Barnes ER, Gilleland D. Academic integrity in the online learning environment for health sciences students. <i>Nurse Educ Today</i> . 2014;34(10):1324-9.
13	Coffey S, Anyinam C. Trialing a contextual approach to academic honesty. <i>Nurse Educ</i> . 2012;37(2):62-6.
14	Cronan TP, McHaney R, Douglas DE, Mullins JK. Changing the academic integrity climate on campus using a technology-based intervention. <i>Ethics Behav</i> . 2017;27(2):89-105.
15	Curtis GJ, Gouldthorp B, Thomas EF, O'Brien GM, Correia HM. Online academic-integrity mastery training may improve students' awareness of, and attitudes toward, plagiarism. <i>Psychology Learning & Teaching</i> . 2013;12(3):282-9.
16	Danowitz AM, Taylor CE. Integrating a peer-taught module on practical research ethics into the graduate student orientation curriculum. <i>Journal of Chemical Education</i> . 2011;88(8):1090-3.
17	Dee TS, Jacob BA. Rational Ignorance in Education: A Field Experiment in Student

	Plagiarism. NBER Working Paper No. 15672. 2010, JEL No. I2, K4.
18	DuBois JM, Chibnall JT, Tait R, Vander Wal JS. The Professionalism and Integrity in Research Program: Description and Preliminary Outcomes. <i>Acad Med</i> . 2018;93(4):586-92.
19	East J, Donnelly L. Taking Responsibility for Academic Integrity: A collaborative teaching and learning design. <i>J Univ Teach Learn Pract</i> . 2012;9(3).
20	Edwards M. Stop cheating! An evaluation of a scientific integrity writing strategy in General Chemistry I. <i>Abstr Pap Am Chem Soc</i> . 2015;249.
21	Eisen A, Parker KP. A model for teaching research ethics. <i>Sci Eng Ethics</i> . 2004;10(4):693-704.
22	Estow S, Lawrence EK, Adams KA. Practice Makes Perfect: Improving Students' Skills in Understanding and Avoiding Plagiarism With a Themed Methods Course. <i>Teaching of Psychology</i> . 2011;38(4):255-8.
23	Fernandes LB. Embedding responsible conduct in learning and research into an Australian undergraduate curriculum. <i>Biochem Mol Biol Educ</i> . 2017;45(1):53-9.
24	Fleetwood JE. Teaching Ethics in Research: A Multidisciplinary Model. <i>Teaching and Learning in Medicine</i> . 1994;6(4):274-6.
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