



Research Article

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Mapping of Empirical Studies on Research Integrity in University Institutions

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Abstract

The purpose of the study was to systematically map the available knowledge on the characteristics of the primary studies of integrity in research (RI) in universities. A systematic mapping of empirical studies indexed Scopus and Web of Science databases over the past ten years. Among the findings is the growing trend of producing original articles on IR, although it remains low compared to other types of document found in the initial search. There is also in exploring perspectives and attitudes integrity violations and the ways to prevent them. This study serves as a reference to other researchers wish to study with mixed methods or integrate approaches ethical approaches in order to better understand and develop new ways of promoting and educating academics, researchers and stakeholders in the university environment worldwide in relation to ethics and research integrity.

Keywords: Integrity; research integrity; scientific integrity; systematic mapping

1. Introduction

The discussion and concern about research integrity (RI) has been occurring since studies on academic and scientific honesty, contrary to the sanctioning of misconduct (Engel, 2015; May & Loyd, 1993). However, universities acting as entities dedicated to sustainable research, training, and knowledge transfer continue to present improper practices (Abdi et al., 2021; Bouter et al., 2016; Olesen et al., 2019; Pizzolato et al., 2020) It is more noticeable today than in the past, probably in part due to the availability of web publishing, through open online repositories and databases, which allows due and deviant integrity behaviors to be known with some speed (El Bairi et al., 2022; Fanelli et al., 2022; Pruschak & Hopp, 2022).

Guidelines on research integrity-are published from time to time and are of the utmost importance for scientific research (ALLEA, 2017; Kretser et al., 2019; Resnik & Shamoo, 2011).

However, much of the research is associated with scientific or research integrity terms that tends to explore and focus on misconduct or noncompliance with integrity such as, fabrication, falsification, and plagiarism (FFP) (Armond et al., 2021; Grey et al., 2019; Hofmann et al., 2020; Hofmann & Holm, 2019) or questionable research practices (QRP) (John et al., 2012; Xie et al., 2021), also known as "questionable reporting practices" (Wigboldus & Dotsch, 2016).

The Singapore Declaration does not define research integrity, although it refers to four principles such as "honesty, accountability, professional courtesy and impartiality, and good governance" and 14 responsibilities for the promotion and adherence to research integrity (WCRI, 2010). ALLEA also does not define research integrity, but principles for good research practices are established as "trustworthiness, honesty, respect for colleagues, participants, and accountability for research" (ALLEA, 2017, p. 4). The Department of the Interior (DOI) defines research integrity as "the condition that occurs when individuals [...] adhere to the accepted standards, professional, values and practices of the relevant scientific community [...]" (Nek & Eisenstadt, 2016, p. 11).

According to the responsibilities for good research practices, IR is understood from two perspectives: individual researcher-researcher group or institutional. The first perspective is understood as the internalization of the principles of honesty, reliability, respect, and responsibility of researchers to follow good research practices (ALLEA, 2017; Vie, 2022b). The second perspective, IR is understood as a means of ensuring good research practices based on the standards established by the institution, which allows having confidence in research managers and participants in that institution (Helgesson & Bülow, 2021). In that sense, when an ethical problem or noncompliance with integrity in research appears, it is not enough to attribute and address from the vision of a single actor or performer, even more so if the research is conducted from and for the university institution (Klimsza, 2021).

Previous literature reviews have been found, showing in most cases the occurrence of serious and minor forms of misconduct in biomedical and behavioral research (Armond et al., 2021; Xie et al., 2021; Yi et al., 2019a) In another investigation, 58 IR documents from scientific societies of various scientific disciplines were analyzed. Less than a quarter provide IR guidelines, and there are significant differences between disciplines (Hastings et al., 2022). In addition to these reviews, the study of factors affecting the implementation of IR standards at the investigator, organizational, and science system levels (Roje et al., 2022) and the publication of integrity and research oversight (Muthanna & Alduais, 2021).

Although there are studies that have systematized the knowledge on IR in biometric, social and natural scientific organizations, they are not necessarily linked to universities. Also, it was noted that there is still a literature scattered in various publications and databases. To the best of his knowledge, there is no evidence of systematic mapping reviews of original empirical type articles on research integrity carried out from stakeholders of university institutions.

Based on what has been described, this study had the objective of systematically mapping the available knowledge on the integrity of research in journals indexed in the Scopus and Web of Science (Wos) databases between 2014 and 2023.

2. Methods

To provide an organized overview on the existing literature regarding research integrity, a systematic mapping has been performed including the following steps: research questions, search strategies for relevant articles, article selection, abstract keyword definition, data mining (Petersen et al., 2015, 2008)

2.1 Research Questions

The following research questions have been developed to carry out the systematic mapping process:

Q1 What is the trend of publications between 2014 and 2023, according to year and approaches?

- Q2 Where were research integrity studies published?
- Q3 How many articles were published according to journals, database, and quartiles?
- Q4 What are the methodological characteristics of the studies?
- Q5 What specific topics did they address on RI according to categories and year?

2.2 Strategy for the search of relevant articles

The search protocol for empirical studies in Scopus and Wos data bases are divided into twostages:the firstis an automatic search without filtering and the secondis an automated search with filtering.

In the first phase, in order to obtain the initial result of an automated search without filters, keywords (research integrity, university, science integrity, responsible research) and Boolean operators OR and AND were considered, yielding 4049 Scopus articles and 3110 Wos. In the second phase, the automatic filter applied the following restrictions: 1) search period (January 2014-April 2023), 2) subject area (social sciences), 3) document type (articles), 4) language (English), 5) access type (open), first filter results obtained, Scopus 152 articles and Wos 255, see Table 1. These searches took place in March 2023, with a time limit of ten years (2014–2023).

Table 1: Search string according to word combinations

Combined words	Initial result without filtering	Search strings	Initial result with filtering
"scientific integrity" or "research integrity" and universities	Scopus=4049	TITLE-ABS-KEY ("scientific integrity" OR "research integrity" AND universities) AND PUBYEAR > 2013 AND PUBYEAR < 2024 AND (LIMIT-TO (SUBJAREA , "SOC1")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (EXACTKEYWORD , "Research Integrity")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (OA , "all"))	Scopus = 152
		TITLE-ABS-KEY ("research integrity" OR "scientific integrity" OR "responsible research") AND PUBYEAR > 2013 AND PUBYEAR < 2024 AND (LIMIT-TO (SUBJAREA , "SOC1")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (OA , "all")) AND (LIMIT-TO (EXACTKEYWOR , "Research Integrity"))	
"research integrity" or "scientific integrity" or "responsible research"	Wos= 3110	"research integrity" (All Fields) or "scientific integrity" (All Fields) or "responsible research" (All Fields) Refined By: Ethics or Education Educational Research or Social Sciences Interdisciplinary. Open Access. Document Types: Article. Languages: English Periodo: 2014-2023	Wos= 255
		"research integrity" (All Fields) or "scientific integrity" (All Fields) or "responsible research" (All Fields) Refined By: Open Access. Document Types: Article. Topics Meso: Education & Educational Research or Bibliometrics, Scientometrics & Research Integrity. Research Areas: Social Sciences Other Topics. Languages: English Periodo: 2014-2023	

2.3 Selection of articles

In this phase, the selection criteria were applied as shown in Table 2, with the intention of excluding studies that were not relevant to achieve the objective and answer the research questions. In this sense, the first author filtered and eliminated duplicates. The fourth and fifth authors independently applied the exclusion criteria to the titles, abstracts and keywords of the articles. There were some selections of different articles, which were resolved after discussion and argumentation; the sixth author reviewed all articles, as shown in Figure 1.

Table 2: Selection Criteria

Inclusion criteria	Exclusion criteria
a) Empirical studies (quantitative, qualitative, and mixed). b) Studies available in English. c) In the title, abstract, or key words, the terms appear: RI d) Studies in full version retrieved. e) Empirical studies conducted in universities.	a) Conference proceedings, books or book chapters, notes, comments, letters to the editor, editorial, and review letters. b) Repeated studies. c) The term: RI does not appear in the title, abstract, or keyword. d) Studies in full version not retrieved. e) Studies conducted in nonuniversity contexts.

Figure 1 shows the preliminary results before filtering (Scopus n=4049 articles and Wos n=3110). Likewise, the filters and final filtering carried out according to the inclusion and exclusion criteria determined 44 articles as the final result to proceed with the description and interpretation according to the characteristics of the primary studies.

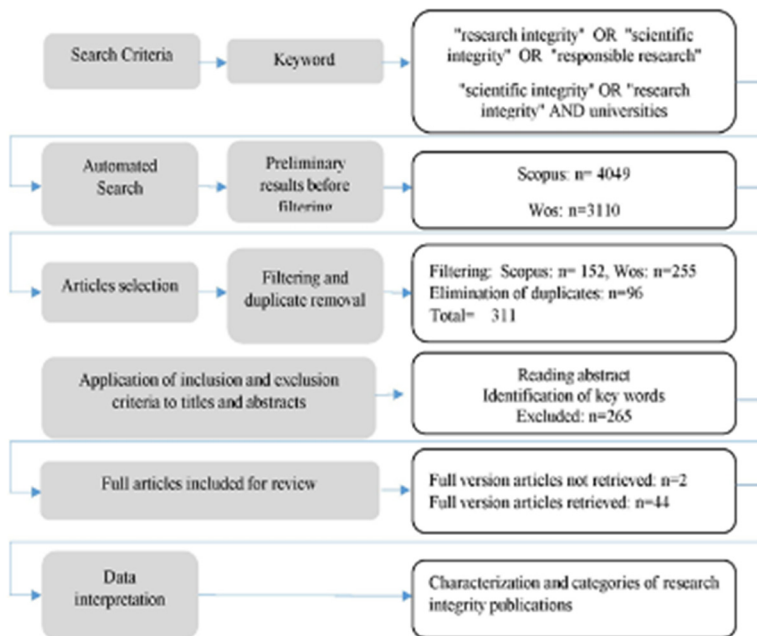


Figure 1: Flow diagram for systematic mapping
Source: Diagram adapted from (Petersen et al., 2015, 2008).

2.4 Definition of key words for abstracts

This was carried out in two phases: (a) reading of the abstracts to verify that the articles were related to the combined words and search strings (Table 1), (b) identification of key words or categories that show the contribution of the research.

The identification of the categories was carried out considering two phases: in the first phase, the categories with the highest repetition of the key words in the articles were selected: research integrity, education, and misconduct. In the second phase, after reading and rereading the abstract of each article, two additional categories were extracted: IR environment and IR policies. The selection

the categories and their definitions are shown in Table 3.

Table 3: RI categories and their definitions

Categories	Definitions
RI Representations	They refer to how researchers and institutional stakeholders understand and respond to what it is like to conduct research with integrity. This may include perceptions, opinions, beliefs, attitudes toward what constitutes proper and improper conduct in research.
RI Education	It alludes to training programs planned to teach investigators and research agents integrity-related standards and principles to encourage responsible practice and prevent serious and minor research infractions (Elliott et al., 2015).
RI Environment	It refers to the climate of responsible research promoted by institutions based on the principles of integrity supported by infrastructure, incentive management, supervision, and appropriate mentoring (ALLEA, 2017; Armond & Kakuk, 2022).
RI Policies	It is a set of guidelines and standards developed by institutions to promote responsible research and prevent FFP and QRP (Anohina-Naumeca et al., 2020; Labib et al., 2022). They usually cover topics such as authorship, data management, research integrity, conflicts of interest, misconduct, reporting misconduct, and procedures to ensure compliance with ethical and legal standards in research.

2.5 Data extraction

Data were extracted according to the research questions using an Excel spreadsheet. In the data collection, an Identifier (ID) was assigned to each article and the following fields: 1) author, 2) year, 3) article title, 4) focus, 5) techniques/instruments, 6) journal name, 7) quartile, 8) Doi, 9) country.

3. Results

Q1: What is the trend of publications during 2014 to 2023 by year and focus?

Between 2014 and March 2023, empirical RI studies (n=44) were published, with the highest production (n=10) being in 2021 and 2022 each year. The 2019 results were (n = 9), and the 2020 results (n = 7), respectively. Interest in publishing more articles has begun since 2019. There is no empirical publication in 2014 and 2015, and according to the research approach, more qualitative research is published annually than quantitative research. Only two mixed studies were published in 2021.

Q2: What is the geographical distribution of the authors who published?

According to the geographical distribution of the first authors, most empirical studies on IR (quantitative, quantitative and mixed) have come from authors from Europe (32 papers), followed by Asia (5 articles), America (6 articles) and Oceania (1).

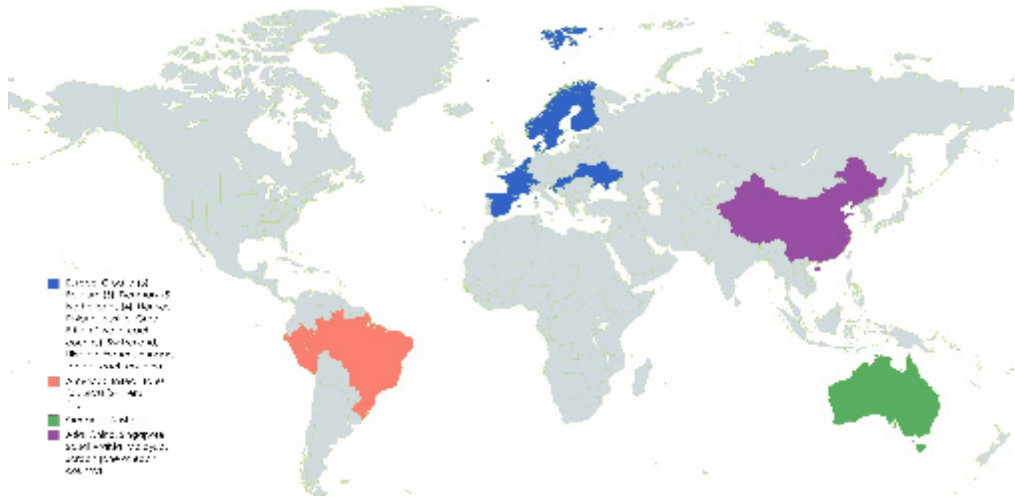


Figure 2. Geographical distribution of the authors who published.

Q3: How many articles have been published according to journals, database and quartiles?

Of the 44 publications, more than 55% were in Q₁ (n=25 articles) followed by 34% (n=15) in Q₂, respectively. The journals with the highest volume of publications were Accountability in research with 25% (n=11 articles), Ethics in science and engineering with 18, 1 % (n=8), Journal of Academic Ethics Journal with 9,1 % (n=4) and Research Integrity and Peer Review with 6,8 % (n=3). Most of the journals are simultaneously indexed in Scopus and Web of Science, and 4 are indexed in Wos.

Table 4: Publications by journal, database and quartiles

Journals	Database	Q ₁	Q ₂	Q ₃	Q ₄	n	%
Accountability in Research	Scopus/Wos		11			11	25
Science and Engineering Ethics	Scopus/Wos	8				8	18.1
BMC Medical Ethics	Scopus/Wos	3				3	6.8
Science and Public Policy	Scopus/Wos	1				1	2.3
Journal of Academic Ethics	Scopus/Wos	4				4	9.1
Research Integrity And Peer Review	Wos	3				3	6.8
International Journal for Academic Development	Scopus/Wos	2				2	4.5
Humanities and Social Sciences Communications	Scopus/Wos		2			2	4.5
Critical Policy Studies	Scopus/Wos		1			1	2.3
Education Sciences	Scopus/Wos		1			1	2.3
Revista brasileira de enfermagem	Scopus/Wos			1		1	2.3
Plos One	Scopus/Wos	1				1	2.3
Research Ethics	Scopus/Wos	1				1	2.3
Revista Da Escola De Enfermagem Da Usp	Wos				1	1	2.3
Independent Journal Of Management & Production	Wos				1	1	2.3
International Journal Of Educational Sciences	Wos				1	1	2.3
International Journal for Academic Development	Scopus/Wos	2				2	4.5
Total		25	15	1	3	44	100

Q4: What are the methodological characteristics of the studies?

Of the 44 publications, we found studies with a qualitative, quantitative and mixed approach; of these, most of the qualitative studies preferred to use the semi-structured interview (n=14 articles),

the focus group and semi-structured interview were also used (n=10). Only one study used participant observation and interview. Most quantitative studies used the survey/questionnaire (n=13), followed by the survey/scale (n=4). Mixed studies used survey/questionnaire and semi-structured interview.

Table 5: Techniques/instruments used according to approach and authors

Approach	Techniques/ Instruments	Authors	n	%
Qualitative	Semi-structured interview	(Antes et al., 2019; Carnero et al., 2017; Davies & Lindvig, 2021; Deniau, 2023; Hyytinen & Löfström, 2017; Knysh et al., 2020; Pizzolato & Dierickx, 2022; Roje et al., 2021; Satalkar & Shaw, 2018, 2019; Shaw & Satalkar, 2018; Stigger et al., 2022; Yi et al., 2019b)	13	29.5
	Participant observation and interview	(Sarauw et al., 2019)	1	2.3
	Focus group and semi-structured interview	(Aubert Bonn & Pinxten, 2021b, 2021a; Evans et al., 2022, 2022; Felt & Frantz, 2022; Kennedy et al., 2023; Labib et al., 2022; Pizzolato & Dierickx, 2021; Sørensen et al., 2021; Tammeleht et al., 2022; Vie, 2022)	11	25
Quantitative	Survey/questionnaire	(Abdi, Fieuw, et al., 2021; Armond & Kakuk, 2022; Bouter et al., 2016; Chua et al., 2022; da Silva et al., 2020; Deniau, 2023; Haven et al., 2019; Hofmann et al., 2020; Hofmann & Holm, 2019; Kalichman, 2020; Malički et al., 2019; Olesen et al., 2019; Simon et al., 2019; Tomić et al., 2022)	13	29.5
	Survey/scale	(Chua et al., 2022; Hofmann et al., 2023; Huybers et al., 2020; Labib et al., 2021; Sarauw, 2021).	4	9.1
Mixed	Semi-structured survey/interview	(Sarauw, 2021; Telha, 2021)	2	4.6
Total			44	100

Q5: What specific IR topics did you address by category and year?

In the category (Representations about IR), from 2016 to 2020 and 2023, studies addressed topics related to perceptions, knowledge, and attitudes towards IR breaches, and also dealt extensively with misconduct, questionable investigative practices and whistleblowing cases (Ababneh et al., 2020; Bouter et al., 2016; da Silva et al., 2020; Hofmann & Holm, 2019; Huybers et al., 2020; Kalichman, 2020; Olesen et al., 2019; Yi et al., 2019a). In 2018, 2021 and 2022, studies address research integrity itself rather than infringements (Armond & Kakuk, 2022; Aubert Bonn & Pinxten, 2021a, 2021b; Satalkar & Shaw, 2018; Telha, 2021).

In the category (Education for IR), most studies value training in integrity-related standards and principles to foster good research practices and prevent research violations. However, some studies

(Knysh et al., 2020; Pizzolato & Dierickx, 2021; Satalkar & Shaw, 2019; Simon et al., 2019) indicate that training programs do not immediately solve IR problems. In 2017, a study was conducted that highlighting the existence of proactive and reactive approaches to integrity and research misconduct (Hyytinen & Löfström, 2017).

In 2019, Simon et al., (2019) reported the experience of implementing an educational program from the presence of undue research. For their part (Satalkar & Shaw, 2019) point out that to reduce misconduct, it is necessary to promote personal integrity in schools and, at the same time, continuously train at the university level. In that line, (Sarauw et al., 2019) highlight reflexivity as a key element in teaching IR. In 2020, simulations, case analyses, and role-plays are recognized as active and effective strategies to foster integrity in research (Knysh et al., 2020). In the study of ((Abdi et al., 2021), after the mandatory course developed, they show a modest improvement in knowledge and attitude about IR. According to the article by (Sarauw, 2021), creating a culture of research integrity, integrity training is not enough, improvements in professional incentives are needed.

Pizzolato and Dierickx, in their research, provide an overview of aspects to consider for planning IR training sessions (Pizzolato & Dierickx, 2021). During 2022, (Tomić et al., 2022) did a study in which they made known the existence of approaches to ethics and integrity training in research, one based on the teaching of norms and another based on virtue. In addition, studies were found highlighting respondents' favorable perception of IR education, different preferences on teaching modes, and integrity problem resolutions (Chua et al., 2022; Evans et al., 2022; Felt & Frantz, 2022; Tammeleht et al., 2022). In the years 2014 to 2016, 2018 and 2023 to March, no studies were entered.

In the category (IR Environment), studies conducted during 2019, 2020 and 2022 show barriers not conducive to a responsible research environment such as: lack of support from research institutions due to excessive bureaucracy, unfair evaluation policies, overwork, insufficient supervision of researchers, and little commitment to address integrity (Haven et al., 2019, 2020). Furthermore, individual, group, or organizational pressures on horship or co-authorship and questionable research practices are appreciated in their environment (Hofmann & Holm, 2019; Malički et al., 2019), pressure to engage in commissioned or externally funded research that may have positive or negative effects, pressure to publish more without sacrificing quality (Kennedy et al., 2023; Vie, 2022). From 2014 to 2018, 2021 no publications on the subject. It is noteworthy that in a study published in 2023 those responsible for research integrity intend to be facilitative, preventive, and corrective in their work which is encouraging to create a positive climate for responsible research (Deniau, 2023).

Regarding the category (IR Policies), studies by (Labib et al., 2021, 2022) presented ideas on how research institutions should address and implement IR education and training policies so that researchers can conduct research free of ethical irregularities. For their part (Davies & Lindvig, 2021; Roje et al., 2021) identified different actors (researchers, agents of research institutions and systems) as responsible for preventing FFP and QRP and developing and preserving the culture of research integrity.

Table 8: Topics addressed by category and year

Year	RI Representations	RI Education	RI Environment	RI Policies
2023	Research integrity attitudes and behaviors. (Hofmann et al., 2023)	-	Role of those responsible for integrity. (Deniau, 2023)	-
2022	Conceptions of scientific integrity and ethics. (Stigger et al., 2022)	Ways of educating RI; support and encourage; virtues of ethics and integrity training; training leaders in ethics and integrity; method for responding to integrity issues. (Chua et al., 2022; Evans et al., 2022; Felt & Frantz, 2022; Tammeleht et al., 2022; Tomić et al., 2022)	Climate of integrity; Supervision, mentoring; competence and funding in researcher ethics. (Armond & Kakuk, 2022; Pizzolato & Dierickx, 2022; Vie, 2022)	Institutional education and training policies. (Labib et al., 2022)
2021	Perspectivas sobre Integridad y compromiso de la investigación; éxito en la ciencia y responsabilidades para la integridad de la investigación. (Aubert Bonn & Pinxten, 2021a, 2021b; Telha, 2021)	Perspectives on Research Integrity and Commitment; success in science and responsibilities for research integrity. (Abdi, Fieuids, et al., 2021; Pizzolato & Dierickx, 2021; Sarauw, 2021)	-	Topics to foster scientific integrity; Implementation of guidance documents on research integrity; Research integrity as a policy object; Strengthening research integrity. (Davies & Lindvig, 2021; Labib et al., 2021; Roje et al., 2021; Sørensen et al., 2021)

Year	RI Representations	RI Education	RI Environment	RI Policies
2020	Attitudes and misconduct; misconduct in research; knowledge and factors that influence misconduct; principles of scientific integrity in doing science; value of responsibilities and integrity enablers. (Ababneh et al., 2020; da Silva et al., 2020; Hofmann et al., 2020; Huybers et al., 2020; Kalichman, 2020)	Training in research integrity. (Knysh et al., 2020)	Perceptions of a responsible research climate. (Haven et al., 2020)	-
2019	Opinions and beliefs about whistleblower cases and investigative integrity; perceptions about misconduct. (Olesen et al., 2019; Yi et al., 2019b)	Responsible conduct training; learning and developing integrity ideas; research integrity training. (Sarauw et al., 2019; Satalkar & Shaw, 2019; Simon et al., 2019)	The environment in the IR infraction; perceptions of ethical climate; perceptions of integrity climate; leadership for positive environments. (Antes et al., 2019; Haven et al., 2019; Hofmann & Holm, 2019; Malički et al., 2019)	-
2018	Reflections on reporting misconduct; Interpretations on the integrity of the investigation. (Satalkar & Shaw, 2018; Shaw & Satalkar, 2018)	-	-	-
2017	Assessments of RI Infractions. (Carnero et al., 2017)	Conceptions of teaching research ethics and integrity. (Hyytinen & Löfström, 2017)	-	-
2016	Classification of RI violations. (Bouter et al., 2016)	-	-	-

4. Discussion

The empirical research related to research integrity in the university context, after no publications between 2014 and 2015, as of 2019 leans toward a growing interest in publishing original articles with quantitative, qualitative and mixed approaches on IR, despite the proportion of publications remaining low compared to other types of papers found in the initial search (Figure1), which resembles the study of (Aubert Bonn & Pinxten, 2019), considering that the mentioned authors included combined search terms almost different from our search strategy.

Regarding the geographical distribution of the authors, European countries were the ones that published the most on IR compared to Oceania, Asia, and America. This is not surprising, because in the European context, consortia have been created (for example, PRINTEGER, INTEGRITY, ROSiE, among others) that were funded with significant amounts of money by the European Commission Horizon 2020 to carry out research on IR.

Regarding the journals, database, and quartiles of the publications, it should be noted that most of the articles are located in specialized journals on the subject, which were indexed in Scopus/Wos and are in Q₁ and Q₂. This explains that the articles that are part of the analysis of the present study had and have a higher probability of being cited and seen by other researchers along the same thematic line. In that line, the most cited and viewed articles were (Haven et al., 2019; Sarauw, 2021) published in Journal of Academic Ethics and Plos One indexed Scopus/Wos and placed in Q₁. This tells us that the articles of the mentioned authors had higher potential visibility and impact in the

same field and in the scientific community.

As far as the methodology is concerned, most qualitative articles use semi-structured interviews with the population studied, or focus groups/semi-structured interviews. As far as interviews are concerned, this is similar to what was discovered by Aubert Bonn and Pinxten in 2019 and Roje et al. in 2022, although in our research we found that there was an important proportion of articles using focus groups/interviews or participant observation/interviews. In quantitative studies, surveys/questionnaires are used, which resemble studies (Roje et al., 2022).

In the analysis of the articles included in the study, four categories representing the various themes were identified. Most of the publications are related to the category representations on IR, although in reality the focus of attention and thematic exploration of the authors were the perceptions, opinions, beliefs, attitudes towards integrity violations or misconduct in research and to some extent on integrity itself. From this it can be inferred that the largest proportion of the articles approached from a normative perspective focusing more on the sanctioning of the misconduct of the violator, although we also found publications presented from the perspective of principles, moral and epistemic values (Godecharle et al., 2014; Helgesson & Bülow, 2021; Horbach & Halffman, 2017).

In the category (Education for IR), which refers to training programs planned to teach integrity-related topics to foster responsible practice in research, a significant proportion of the studies highlight the importance of developing training programs mediated by interactive didactic resources such as workshops, case analysis, playingrole-playing and reflective practice to promote learning about integrity-related topics in research. A significant proportion of the studies highlight the importance of developing training programs mediated by interactive didactic resources such as workshops, case analysis, role-playing and reflective practice to promote learning about research integrity issues; this finding adds to the findings regarding the effectiveness of training based on experiential learning to promote judgment in ethical and research integrity issues (Katsarov et al., 2022)

The category (IR Environment) refers to the institutional climate in which the practice of responsible research can be fostered or lead to a negative environment. The study found more environments with barriers that are not conducive to responsible research, which affects researchers, research quality, institutions, and the trust of the scientific community. The referred results are supported by the study that identified similar environments (Roje et al., 2022)

The category (IR policy) refers to a set of guidelines and standards developed by institutions to promote responsible research and prevent FFP and QRP. The study found that there were studies that proposed various ideas for institutions to promote and implement their research, training and education policies to conduct responsible research, and identified various actors to ensure the quality of research and the integrity culture, explaining that research is not only the responsibility of individual researchers or groups, but also that of other actors (such as sponsors, mentors, supervisors, institutions and research-related systems) provide the conditions for ensuring the quality of scientific production (Cao et al., 2023; Helgesson & Bülow, 2021; Meriste et al., 2016; Roje et al., 2022).

Like other research, this study has some limitations, one of which is that it focused on the Scopus and Web of Science databases and another is that it considered articles only in the English language. Consequently, the findings are not definitive. Therefore, it is suggested that future research expands the search in other databases and languages to ensure the inclusion of more articles that might not have been selected for analysis.

The present study contributed to a systematic map of the situation of empirical studies of IR, and serves as a reference to other researchers wish to study with mixed methods or integrate approaches ethical approaches in order to better understand and develop new ways of promoting and educating academics, researchers and stakeholders in the university environment worldwide in relation to ethics and research integrity.

5. Conclusion

There is a growing trend towards the production of original empirical studies, although it is still low

compared to other types of document found in the initial phase of this study. In the IR representations category, there are more publications, and the focus of exploration is on perceptions, opinions, and attitudes towards integrity violations and, to some extent, on integrity itself. Most studies value IR training, although for some the effects are modest and insufficient. In the research environment, there are more barriers than facilities. In recent years, IR policies are aimed at strengthening the different actors responsible for preserving the culture of integrity.

References

- Ababneh, R. A., Alzoubi, K. H., & Ababneh, M. A. (2020). Evaluation of pharmacy students' knowledge and perception of scientific integrity. *Education Sciences*, 10(2). <https://doi.org/10.3390/educsci10020041>
- Abdi, S., Fieuws, S., Nemery, B., & Dierickx, K. (2021). Do we achieve anything by teaching research integrity to starting Ph.D students? *Humanities and Social Sciences Communications*, 8(1), 1-7. <https://doi.org/10.1057/s41599-021-00908-5>
- Abdi, S., Pizzolato, D., Nemery, B., & Dierickx, K. (2021). Educating PhD Students in Research Integrity in Europe. *Science and Engineering Ethics*, 27(1). <https://doi.org/10.1007/s11948-021-00290-0>
- ALLEA. (2017). The European code of conduct for research integrity (revised edition). *Promoting Research Integrity in a Global Environment*. <https://www.allea.org/wp-content/uploads/2017/05/ALLEA-European-Code-of-Conduct-for-Research-Integrity-2017.pdf>
- Anohina-Naumeca, A., Birzniece, I., & Odiņeca, T. (2020). Students' awareness of the academic integrity policy at a Latvian university. *International Journal for Educational Integrity*, 16(1). <https://doi.org/10.1007/s40979-020-00064-4>
- Antes, A. L., Kuykendall, A., & DuBois, J. M. (2019). Leading for research excellence and integrity: A qualitative investigation of the relationship-building practices of exemplary principal investigators. *Accountability in Research*, 26(3), 198-226. <https://doi.org/10.1080/08989621.2019.161429>
- Armond, A. C. V., Gordijn, B., Lewis, J., Hosseini, M., Bodnár, J. K., Holm, S., & Kakuk, P. (2021). A scoping review of the literature featuring research ethics and research integrity cases. *BMC Medical Ethics*, 22(1). <https://doi.org/10.1186/s12910-021-00620-8>
- Armond, A. C. V., & Kakuk, P. (2022). Perceptions of Research Integrity Climate in Hungarian Universities: Results from A Survey among Academic Researchers. *Science and Engineering Ethics*, 28(4). <https://doi.org/10.1007/s11948-022-00382-5>
- Aubert Bonn, N., & Pinxten, W. (2019). A Decade of Empirical Research on Research Integrity: What Have We (Not) Looked At? *Journal of Empirical Research on Human Research Ethics*, 14(4), 338-352. <https://doi.org/10.1177/1556264619858534>
- Aubert Bonn, N., & Pinxten, W. (2021a). Rethinking success, integrity, and culture in research (part 1)—A multi-actor qualitative study on success in science. *Research Integrity and Peer Review*, 6(1), 1-18. <https://doi.org/10.1186/s41073-020-00104-0>
- Aubert Bonn, N., & Pinxten, W. (2021b). Rethinking success, integrity, and culture in research (part 2)—A multi-actor qualitative study on problems of science. *Research Integrity and Peer Review*, 6(1). <https://doi.org/10.1186/s41073-020-00105-z>
- Bouter, L. M., Tijdink, J., Axelsen, N., Martinson, B. C., & ter Riet, G. (2016). Ranking major and minor research misbehaviors: Results from a survey among participants of four World Conferences on Research Integrity. *Research Integrity and Peer Review*, 1(1). <https://doi.org/10.1186/s41073-016-0024-5>
- Cao, Y., Jiang, Y., & Zhao, Y. (2023). A study on the content of integrity policies and research integrity management in Chinese universities. *Frontiers in Research Metrics and Analytics*, 8. <https://www.frontiersin.org/articles/10.3389/frma.2023.943228>
- Carnero, A. M., Mayta-Tristan, P., Konda, K. A., Mezones-Holguin, E., Bernabe-Ortiz, A., Alvarado, G. F., Canelo-Aybar, C., Maguiña, J. L., Segura, E. R., Quispe, A. M., Bayer, A. M., & Lescano, A. G. (2017). Plagiarism, Cheating and Research Integrity: Case Studies from a Masters Program in Peru. *Science and Engineering Ethics*, 23(4), 1183-1197. <https://doi.org/10.1007/s11948-016-9820-z>
- Chua, J. Y. L., Lee, C. S. L., Yeo, K. P., Ali, Y., & Lim, C. L. (2022). Perception and reaction of Nanyang Technological University (NTU) researchers to different forms of research integrity education modality. *BMC Medical Ethics*, 23(1). <https://doi.org/10.1186/s12910-022-00824-6>
- da Silva, N. R. A., Pádua, G. C. C., Novaes, M. R. C. G., & Guilhem, D. B. (2020). Scientific integrity among nursing students participating in the scientific initiation program: An exploratory study. *Revista da Escola de Enfermagem*, 54, 1-7. <https://doi.org/10.1590/S1980-220X2018047703548>

- Davies, S. R., & Lindvig, K. (2021). Assembling research integrity: Negotiating a policy object in scientific governance. *Critical Policy Studies*, 15(4), 444-461. <https://doi.org/10.1080/19460171.2021.1879660>
- Deniau, N. (2023). Perceptions on the role of research integrity officers in French medical schools. *Accountability in Research*, 00(00), 1-21. <https://doi.org/10.1080/08989621.2023.2173070>
- El Bairi, K., El Kadmiri, N., & Maryam, F. (2022). Exploring scientific misconduct in Morocco based on an analysis of plagiarism perception in a cohort of 1,220 researchers and students. *Accountability in Research*. <https://doi.org/10.1080/08989621.2022.2110866>
- Elliott, S. L., Fischer, B. A., Zigmond, M. J., Grinnell, F., & Zigmond, M. J. (2015). Perspectives on Research Integrity. En *Perspectives on Research Integrity*. ASMPRESS. <https://doi.org/10.1128/9781555819491>
- Evans, N., Buljan, I., Valenti, E., Bouter, L., Marušić, A., de Vries, R., & Widdershoven, G. (2022). Stakeholders' Experiences of Research Integrity Support in Universities: A Qualitative Study in Three European Countries. *Science and Engineering Ethics*, 28(5). <https://doi.org/10.1007/s11948-022-00390-5>
- Fanelli, D., Schleicher, M., Fang, F. C., Casadevall, A., & Bik, E. M. (2022). Do individual and institutional predictors of misconduct vary by country? Results of a matched-control analysis of problematic image duplications. *PLoS ONE*, 17(3 March). <https://doi.org/10.1371/journal.pone.0255334>
- Felt, U., & Frantz, F. (2022). Response ability A Card-Based Engagement Method to Support Researchers' Ability to Respond to Integrity Issues. *Science and Engineering Ethics*, 28(2). <https://doi.org/10.1007/s11948-022-00365-6>
- Godecharle, S., Nemery, B., & Dierickx, K. (2014). Heterogeneity in european research integrity guidance: Relying on values or norms. *Journal of Empirical Research on Human Research Ethics*, 9(3), 79-90. <https://doi.org/10.1177/1556264614540594>
- Grey, A., Bolland, M., Gamble, G., & Avenell, A. (2019). Quality of reports of investigations of research integrity by academic institutions. *Research Integrity and Peer Review*, 4(1). <https://doi.org/10.1186/s41073-019-0062-x>
- Hastings, R. C., Labib, K., Lechner, I., Bouter, L., Widdershoven, G., & Evans, N. (2022). Guidance on research integrity provided by European discipline-specific learned societies: A scoping review. *MetaArXiv Preprints*, 00(00), 1-18.
- Haven, T., Pasman, H. R., Widdershoven, G., Bouter, L., & Tjldink, J. (2020). Researchers' Perceptions of a Responsible Research Climate: A Multi Focus Group Study. *Science and Engineering Ethics*, 26(6). <https://doi.org/10.1007/s11948-020-00256-8>
- Haven, T., Tjldink, J. K., Martinson, B. C., & Bouter, L. M. (2019). Perceptions of research integrity climate differ between academic ranks and disciplinary fields: Results from a survey among academic researchers in Amsterdam. *PLoS ONE*, 14(1). <https://doi.org/10.1371/journal.pone.0210599>
- Helgesson, G., & Bülow, W. (2021). Research Integrity and Hidden Value Conflicts. *Journal of Academic Ethics*. <https://doi.org/10.1007/s10805-021-09442-0>
- Hofmann, B., Bredahl Jensen, L., Eriksen, M. B., Helgesson, G., Juth, N., & Holm, S. (2020). Research Integrity Among Ph.D Students at the Faculty of Medicine: A Comparison of Three Scandinavian Universities. *Journal of Empirical Research on Human Research Ethics*, 15(4). <https://doi.org/10.1177/1556264620929230>
- Hofmann, B., & Holm, S. (2019). Research integrity: Environment, experience, or ethos? *Research Ethics*, 15(3-4), 1-13. <https://doi.org/10.1177/1747016119880844>
- Hofmann, B., Thoresen, M., & Holm, S. (2023). Research Integrity Attitudes and Behaviors are Difficult to alter: Results from a ten Year Follow-up Study in Norway. *Journal of Empirical Research on Human Research Ethics*, 18(1-2), 50-57. <https://doi.org/10.1177/15562646221150032>
- Horbach, S. P. J. M., & Halfman, W. (2017). Promoting Virtue or Punishing Fraud: Mapping Contrasts in the Language of 'Scientific Integrity'. *Science and Engineering Ethics*, 23(6), 1461-1485. <https://doi.org/10.1007/s11948-016-9858-y>
- Huybers, T., Greene, B., & Rohr, D. H. (2020). Academic research integrity: Exploring researchers' perceptions of responsibilities and enablers. *Accountability in Research*, 27(3). <https://doi.org/10.1080/08989621.2020.1732824>
- Hyytinen, H., & Löfström, E. (2017). Reactively, Proactively, Implicitly, Explicitly? Academics' Pedagogical Conceptions of how to Promote Research Ethics and Integrity. *Journal of Academic Ethics*, 15(1), 23-41. <https://doi.org/10.1007/s10805-016-9271-9>
- John, L. K., Loewenstein, G., & Prelec, D. (2012). Measuring the Prevalence of Questionable Research Practices With Incentives for Truth Telling. *Psychological Science*, 23(5). <https://doi.org/10.1177/0956797611430953>
- Kalichman, M. (2020). Survey study of research integrity officers' perceptions of research practices associated with instances of research misconduct. *Research Integrity and Peer Review*, 5(1). <https://doi.org/10.1186/s41073-020-00103-1>

- Katsarov, J., Andorno, R., Krom, A., & van den Hoven, M. (2022). Effective Strategies for Research Integrity Training—A Meta-analysis. *Educational Psychology Review*, 34(2), 935-955. <https://doi.org/10.1007/s10648-021-09630-9>
- Kennedy, M. R., Deans, Z., Ampollini, I., Breit, E., Bucchi, M., Seppel, K., Vie, K. J., & Meulen, R. ter. (2023). "It is Very Difficult for us to Separate Ourselves from this System": Views of European Researchers, Research Managers, Administrators and Governance Advisors on Structural and Institutional Influences on Research Integrity. *Journal of Academic Ethics*, 1-25. <https://doi.org/10.1007/s10805-022-09469-x>
- Klimsza, L. (2021). Sven Ove Hansson: The Ethics of Risk. Ethical Analysis in an Uncertain World. Basingstoke: Palgrave Macmillan, 2013, 172 pp. *Ecumeny and Law*, 9(1). <https://doi.org/10.31261/eal.2021.09.1.08>
- Knysh, O., Liaska, O., Bielinska, I., Levandovska, I., & Vasylieva, O. (2020). Strategies in planning research integrity training (evidence of Ukraine). *Independent Journal of Management & Production*, 11(8). <https://doi.org/10.14807/ijmp.v11i8.1204>
- Kretser, A., Murphy, D., Bertuzzi, S., Abraham, T., Allison, D. B., Boor, K. J., Dwyer, J., Grantham, A., Harris, L. J., Hollander, R., Jacobs-Young, C., Rovito, S., Vafiadis, D., Woteki, C., Wyndham, J., & Yada, R. (2019). Scientific Integrity Principles and Best Practices: Recommendations from a Scientific Integrity Consortium. *Science and Engineering Ethics*, 25, 327-355. <https://doi.org/10.1007/s11948-019-00094-3>
- Labib, K., Evans, N., Roje, R., Kavouras, P., Reyes Elizondo, A., Kaltenbrunner, W., Buljan, I., Ravn, T., Widdershoven, G., Bouter, L., Sørensen, M. P., & Tijdink, J. (2022). Education and training policies for research integrity: Insights from a focus group study. *Science and Public Policy*, 49(2), 246-266. <https://doi.org/10.1093/scipol/scabo77>
- Labib, K., Roje, R., Bouter, L., Widdershoven, G., Evans, N., Marušić, A., Mokkink, L., & Tijdink, J. (2021). Important Topics for Fostering Research Integrity by Research Performing and Research Funding Organizations: A Delphi Consensus Study. *Science and Engineering Ethics*, 27(4). <https://doi.org/10.1007/s11948-021-00322-9>
- Maličić, M., Katavić, V., Marković, D., Marušić, M., & Marušić, A. (2019). Perceptions of Ethical Climate and Research Pressures in Different Faculties of a University: Cross-Sectional Study at the University of Split, Croatia. *Science and Engineering Ethics*, 25(1), 231-245. <https://doi.org/10.1007/s11948-017-9987-y>
- Meriste, H., Parder, M.-L., Lõuk, K., Simm, K., Lilles-Heinsar, L., Veski, L., Soone, M., Juurik, M., & Sutrop, M. (2016). Normative analysis of research integrity and misconduct. *Promoting Integrity as an Integral Dimension of Excellence in Research*, 665926, 1-50.
- Muthanna, A., & Alduais, A. (2021). A Thematic Review on Research Integrity and Research Supervision: Relationships, Crises and Critical Messages. *Journal of Academic Ethics*, 19(1). <https://doi.org/10.1007/s10805-020-09368-z>
- Nek, R., & Eisenstadt, A. R. (2016). *Review of Federal Agency Policies on Scientific Integrity*.
- Olesen, A. P., Amin, L., Mahadi, Z., & Ibrahim, M. (2019). Whistle blowing and research integrity: Potential remedy for research misconduct in Malaysian institutions of higher education. *Accountability in Research*, 26(1). <https://doi.org/10.1080/08989621.2018.1554444>
- Petersen, K., Feldt, R., Mujtaba, S., & Mattsson, M. (2008). Systematic mapping studies in software engineering. *12th International Conference on Evaluation and Assessment in Software Engineering, EASE 2008*. <https://doi.org/10.14236/ewic/ease2008.8>
- Petersen, K., Vakkalanka, S., & Kuzniarz, L. (2015). Guidelines for conducting systematic mapping studies in software engineering: An update. *Information and Software Technology*, 64. <https://doi.org/10.1016/j.infsof.2015.03.007>
- Pizzolato, D., Abdi, S., & Dierickx, K. (2020). Collecting and characterizing existing and freely accessible research integrity educational resources. *Accountability in Research*, 27(4), 195-211. <https://doi.org/10.1080/08989621.2020.1736571>
- Pizzolato, D., & Dierickx, K. (2021). Stakeholders' perspectives on research integrity training practices: A qualitative study. *BMC Medical Ethics*, 22(1). <https://doi.org/10.1186/s12910-021-00637-z>
- Pizzolato, D., & Dierickx, K. (2022). Research Integrity Supervision Practices and Institutional Support: A Qualitative Study. *Journal of Academic Ethics*. <https://doi.org/10.1007/s10805-022-09468-y>
- Pruschak, G., & Hopp, C. (2022). And the credit goes to. . . - Ghost and honorary authorship among social scientists. *PLoS ONE*, 17(5 May). <https://doi.org/10.1371/journal.pone.0267312>
- Resnik, D. B., & Shamoo, A. E. (2011). The Singapore Statement on Research Integrity. *Account Res.*, 18(2), 71-75. <https://doi.org/10.1080/08989621.2011.557296>

- Roje, R., Reyes Elizondo, A., Kaltenbrunner, W., Buljan, I., & Marušić, A. (2022). Factors influencing the promotion and implementation of research integrity in research performing and research funding organizations: A scoping review. *Accountability in Research*, 00(00), 1-39. <https://doi.org/10.1080/08989621.2022.2073819>
- Roje, R., Tomić, V., Buljan, I., & Marušić, A. (2021). Development and implementation of research integrity guidance documents: Explorative interviews with research integrity experts. *Accountability in Research*, 00(00), 1-38. <https://doi.org/10.1080/08989621.2021.1989676>
- Sarauw, L. L. (2021). The Reversed Causalities of Doctoral Training on Research Integrity: A Case Study from a Medical Faculty in Denmark. *Journal of Academic Ethics*, 19(1), 71-93. <https://doi.org/10.1007/s10805-020-09388-9>
- Sarauw, L. L., Degn, L., & Ørberg, J. W. (2019). Researcher development through doctoral training in research integrity. *International Journal for Academic Development*, 24(2), 178-191. <https://doi.org/10.1080/1360144X.2019.1595626>
- Satalkar, P., & Shaw, D. (2018). Is failure to raise concerns about misconduct a breach of integrity? Researchers' reflections on reporting misconduct. *Accountability in Research*, 25(6), 311-339. <https://doi.org/10.1080/08989621.2018.1493577>
- Satalkar, P., & Shaw, D. (2019). How do researchers acquire and develop notions of research integrity? A qualitative study among biomedical researchers in Switzerland. *BMC Medical Ethics*, 20(1). <https://doi.org/10.1186/s12910-019-0410-x>
- Shaw, D., & Satalkar, P. (2018). Researchers' interpretations of research integrity: A qualitative study. *Accountability in Research*, 25(2). <https://doi.org/10.1080/08989621.2017.1413940>
- Simon, C., Beerman, R. W., Ariansen, J. L., Kessler, D., Sanchez, A. M., King, K., Sarzotti-Kelsoe, M., Samsa, G., Bradley, A., Torres, L., Califf, R., & Swamy, G. K. (2019). Implementation of a responsible conduct of research education program at Duke University School of Medicine. *Accountability in Research*, 26(5), 288-310. <https://doi.org/10.1080/08989621.2019.1621755>
- Sørensen, M. P., Ravn, T., Marušić, A., Elizondo, A. R., Kavouras, P., Tijdink, J. K., & Bendtsen, A.-K. (2021). Strengthening research integrity: Which topic areas should organisations focus on? *Humanities and Social Sciences Communications*, 8(1). <https://doi.org/10.1057/s41599-021-00874-y>
- Stigger, D. A. da S., Barlem, J. G. T., Stigger, K. N., Cogo, S. B., Piexak, D. R., & Rocha, L. P. (2022). Postgraduate nursing students' conceptions on scientific integrity and research ethics. *Revista brasileira de enfermagem*, 75(3), e20210060. <https://doi.org/10.1590/0034-7167-2021-0060>
- Tammeleht, A., Löfström, E., & Rodríguez-Triana, J. M. J. (2022). Facilitating development of research ethics and integrity leadership competencies. *International Journal for Educational Integrity*, 18(1), 1-23. <https://doi.org/10.1007/s40979-022-00102-3>
- Telha, M. (2021). A Thematic Study on Scientific Research Integrity and Commitment to Committee on Publication Ethics (COPE): Reality and Prospects for Northern Border University (NBU) Post Graduate Students. *International Journal of Educational Sciences*, 33(1-3). <https://doi.org/10.31901/24566322.2021/33-1-3.1180>
- Tomić, V., Buljan, I., & Marušić, A. (2022). Development of consensus on essential virtues for ethics and research integrity training using a modified Delphi approach. *Accountability in Research*. <https://doi.org/10.1080/08989621.2022.2128340>
- Vie, K. J. (2022). Can research integrity prevail in the market? Lessons from commissioned research organizations. *Accountability in Research*, 29(7). <https://doi.org/10.1080/08989621.2021.1937603>
- WCRI. (2010). *Singapore Statement on Research Integrity*. WCRI - The World Conferences on Research Integrity Foundation. <https://www.wcrif.org/statement>
- Wigboldus, D. H. J., & Dotsch, R. (2016). Encourage Playing with Data and Discourage Questionable Reporting Practices. *Psychometrika*, 81(1). <https://doi.org/10.1007/s11336-015-9445-1>
- Xie, Y., Wang, K., & Kong, Y. (2021). Prevalence of Research Misconduct and Questionable Research Practices: A Systematic Review and Meta-Analysis. *Science and engineering ethics*, 27(4), 41. <https://doi.org/10.1007/s11948-021-00314-9>
- Yi, N., Nemery, B., & Dierickx, K. (2019a). How do chinese universities address research integrity and misconduct? A review of university documents. *Developing World Bioethics*, 19(2), 64-75. <https://doi.org/10.1111/dewb.12231>
- Yi, N., Nemery, B., & Dierickx, K. (2019b). Perceptions of research integrity and the Chinese situation: In-depth interviews with Chinese biomedical researchers in Europe. *Accountability in Research*, 26(7), 405-426. <https://doi.org/10.1080/08989621.2019.1652096>