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Ethics: What is the Brazilian Software Engineering Research Scenario?

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Abstract

Background: Ethics is the theory or science of the moral behavior of humans in society. Traditionally, we value "unethical" actions that go against determining morality in a specific context. One of the sub-domains of Ethics is Computational Ethics, which deals with ethical dilemmas that are strictly related to computational issues. Dilemmas in this area involve privacy, improper access, intellectual property, digital norms and laws, power, socio-technical aspects (such as gender discrimination), and robotics, among others. In this context, "Software Engineering" and "Software" are different objects. Engineering is an act, a practice, as also coding, programming, and software reuse. As with any act, moral and subsequent ethical considerations are appropriate. We characterize software as an object of concrete reality, as a sociotechnical system formed by a technical artifact, human aspect, and procedural aspect. This assumption will form the main base discussion of ethics and morals in Software Engineering in this paper. **Objective:** The goal of this paper is to unveil the Brazilian Software Engineering ethics panorama. **Method:** We follow the rigor of, and inspired by, a Systematic Literature Review (SLR) protocol to answer the question: *how does ethics explicitly permeate the Brazilian Software Engineering publications between the last thirteen years (2010 and 2022)?* **Results:** After analyzing 1529 papers through the research protocol, 175 (≈11%) presented some explicit occurrence of ethical aspects. The occurrence was relevant in only 7 papers (≈0.4%), exposing a shallow scenario on ethical or moral aspects. *Conclusions:* If Ethics is a topic considered important to deliberate, research or discuss, this did not occur significantly in the Brazilian Software Engineering research scenario since 2010. With this result in mind, we discussed parallel terms and concepts to enrich the contribution of the qualitative synthesis.

Keywords: *Ethics, Meta-Science, CBSoft, JSERD, Software Engineering, Systematic Review*

1 Introduction

In the landscape of Information and Communication Technology (ICT), software stands as a paramount element. This preeminence is evident not just academically but culturally, as most computing students in Brazil lean towards a professional future related to software. Moreover, the significance of software in Brazil's academic and practical context is historically underscored by events like SEMISH and other institutions focused on software and its intersections with hardware (Wazlawick and Silva Junior, 2021).

Yet, despite this pervasive influence, there appears to be a conspicuous void in the discourse surrounding ethical considerations in Brazilian Software Engineering (SE) publications. Such an oversight is even more stark given the intrinsically human-centric nature of software. After all, software and its engineering processes are designed with, by, and for humans, making the ethical dimensions of software inseparable from its technical aspects (Engle, 1989; Gotterbarn, 2002).

Recognizing this gap, this study sought to delve into the explicit permeation of ethics within Brazilian SE publications across esteemed platforms like CBSoft, SBQS, and JSERD over a span of thirteen years, from 2010 to 2022. Inspired by the rigor and consistency of the Systematic Literature Review (SLR) protocol outlined by Kitchenham (Kitchenham et al., 2015), we aim to discern how ethics explicitly intertwines with SE discussions within these publications.

The findings indicates an arid scenario regarding ethical or moral aspects in SE Brazilian research. Out of the 1529 papers analyzed, only 175 (≈11.5%) exhibited touch-points with ethical considerations. Upon deeper scrutiny, a mere 7 papers (≈0.5%) presented profound engagement with ethics, thereby revealing a significant gap in ethical discourse within the Brazilian SE landscape since 2010. Despite the negative scenario, a formative and constructive aspect of this gap indicates opportunities and paths to be explored.

Historically, the 1980s marked a period of demarcation, where SE sought its own identity distinct from Computer Science. Ethics was posited as a linchpin for SE during this phase (Engle, 1989; Gotterbarn, 2002). Hence, the current findings, especially from the past decade, summon a moment of reflection regarding the trajectory and priorities of the Brazilian software community. This introspection aligns with meta-science paradigms (Ioannidis et al., 2015; Enserink, 2018), further emphasizing the urgency for a more rooted and earnest dialogue between SE and Ethics.

Tying together the entire analysis of the Brazilian panorama, broad and in-depth, we present a discussion anchored on specific points found in the works analyzed and also perceived as effervescent topics by the contemporary state of the art of computational ethics and SE ethics (Barger,

2008; Manjikian, 2017). We conclude by summarizing the perceived critical scenario and presenting proposals to the community to foster an ethical climate for meta-scientific moral advancement in this direction.

This paper is structure as follows. Section 2 presents the theoretical foundations for our discussion about Ethics in SE; Section 3 presents related work; Section 4 details the research methodology and method; Section 5 contains the investigation results; Section 6 presents the discussion and; Section 7 concludes this paper.

2 Theoretical Foundations

As the Brazilian academic-scientific SE scenario may be unknown to many outsiders, unfamiliar with this context, we present a summary of the scenario to present the study environment. Next, we present concepts and definitions on topics essential to the development of this work.

2.1 The Brazilian scientific Software Engineering context

The SEMISH (In Portuguese: *Seminário Integrado de Software e Hardware* – Integrated Software and Hardware Seminar), is one of Brazil's oldest academic-scientific events in computing. Celebrating its 50th edition in 2023, it holds a significant place in the history of Brazilian computing. In fact, its importance is such that it played a pivotal role in the formation of the Brazilian Computing Society (SBC) (Wazlawick and Silva Junior, 2021). Software, as an academic and scientific subject, has consistently attracted the Brazilian community, a fact underscored by SEMISH's longevity [1].

In the realm of Brazilian computational academia, several enduring and pertinent platforms exist, primarily curated by the CEES (*In Portuguese: Comissão Especial de Engenharia de Software* – Software Engineering Special Committee). This entity focuses on promoting software engineering's role in Brazil, integrating members of the SBC dedicated to methods and techniques for software development [2]. Our study further explore these platforms, which the community has expressed through various events and a journal.

Software's growing significance has given rise to numerous events. Notably, Brazil introduced the SBES (In Portuguese: *Simpósio Brasileiro de Engenharia de Software* – Brazilian Symposium on Software Engineering) which marked its 37th edition in 2023. In 2010, the emergence of CBSoft (In Portuguese: *Congresso Brasileiro de Software: Teoria e Prática* – Brazilian Conference on Software: Theory and Practice) consolidated various symposia related to software engineering and programming languages. As of now, CBSoft's 14th edition encompasses four annual symposia:

- The 36th Brazilian Symposium on Software Engineering (SBES);
- The 27th SBLP (In Portuguese: *Simpósio Brasileiro de Linguagens de Programação* – Brazilian Symposium on Programming Languages);
- The 17th SBCARS (In Portuguese: *Simpósio Brasileiro de Componentes, Arquiteturas e Reutilização de Software* or Brazilian Symposium on Software Components, Architectures, and Reuse);
- The 8th SAST (In Portuguese: *Simpósio Brasileiro de Teste de Software Sistemático e Automatizado* – Brazilian Symposium on Systematic Automated Software Testing).

The SBMF (In Portuguese: *Simpósio Brasileiro de Métodos Formais* – Brazilian Symposium on Formal Methods) was incorporated within CBSoft between 2011 and 2015, but is not included in current references to CBSoft's symposia.

Also oriented to Software and parallel to CBSoft, the SBQS (In Portuguese: *Simpósio Brasileiro em Qualidade de Software* – Brazilian Symposium on Software Quality) takes place annually. In its 22nd edition in 2023, it is presented as follows:

> "The Brazilian Software Quality Symposium (SBQS) is the leading Brazilian forum dedicated exclusively to Software Quality. Over time, the scientific and practical communities have created methods, techniques, paradigms, development environments and tools, life cycle models, maturity models, best practices, among others, which have largely impacted the way Software Engineering is done. Software Quality manifests itself in two complementary and dependent aspects: Process Quality and Product Quality. With the current high dependence on software and aggregated services, research in Software Quality and its application in products and services is both a necessity and a differential to provide value to organizations and their businesses." [3]

Considered conferences, CBSoft (with its internal events) and SBQS are the main ones in the Brazilian scenario, presenting editions that date more than twenty years ago. There is an intersection of publications with similar elements, despite differences in epistemology, semantics or topics of interest. Both spaces deal with SE, this combination is expected and normal behavior. In addition to these, there is a journal, JSERD (Journal of Software Engineering Research and Development).

Even though JSERD is one of the many journals in the SE area, it presents the differential of being Brazilian and managing the highest level research on this topic in Brazil. Its first edition dates from ten years ago, 2013, and its introductory publication announces:

> "Research is shared with the world through the publication of scientific papers in conferences and journals. Between these two, journals are the traditional means for archival publication of research results across a broad range of disciplines. So it is in software engineering. Despite the important role that our conferences serve in furthering our field, journals still serve the role of disseminating and archiving more complete and mature results. Providing this avenue is crucial, given how software is present in human life more than ever. As a result, our community has the great responsibility to invent, develop, and deploy new techniques that assist developers everywhere in creating high-quality, safe, and secure software through productive and economically-feasible processes. Only

[1] `https://csbc.sbc.org.br/2023/semish/` [accessed 01-01-2024]

[2] `https://comissoes.sbc.org.br/ce-es/` [accessed 01-01-2024]

[3] `http://sbqs.sbc.org.br/2023/` [accessed 01-01-2024]

> by 'seeing the research through', that is, pushing it further so we understand the full ramifications of our inventions, can we guarantee that what we propose actually helps make the world a better place. As such, journal publications are as important as ever." (Gimenes et al., 2013)

Since the beginning of the 21st century, the SE community has grown, matured and established its academic-scientific spaces, promoting this domain in Brazil. With this complexity and growth, the meta-scientific structure brings new challenges, problems, opportunities and questions; including the ethical or moral ones.

2.2 Ethics, Computing and Software Engineering

Ethics is the theory or science of the moral behavior of men in society, in specific ways (Vázquez, 2018). The sector of human reality that we call moral, constituted by human facts or acts, are the objects with which Ethics is concerned (Ferraz, 2014). Our customs, habits, and traditions, and to a lesser extent our acts, are analyzed by Moral, which Ethics then analyzes.

Ethics involves the rational scrutiny of human beings' conscious and free actions (Vázquez, 2018). With a high degree of abstraction, it makes us question: "What should I do?", e.g., there is a deadline for delivering a project, and the task allocated to you involves the programming of a specific module is incomplete and delayed by excessive external obstacles. In an Internet forum, you find an "abandoned" and discarded proprietary code of an old Software. Do you reuse the code? Try to contact the owner of the code? Just take inspiration from code logic to build your own? Put that aside and make yours from scratch? Just do nothing and make up an excuse? A primary ethical misunderstanding is to look at one of these options and categorize it as unethical. As a value judgment, the valuation of action as bad, good, evil, benign, fair, better, or worse is subject to Morals (Ferraz, 2014). We take an ethical path, considering the rational, conscious and free reasoning, even if it is "bad" [4].

One of the sub-domains of Ethics is Computational Ethics (Johnson, 2008; Barger, 2008), which deals with ethical dilemmas that are strictly related to computational elements. Computing has reached a level of importance and relevance to generating ethical dilemmas related to its domain (Barger, 2008). Dilemmas in this area involve privacy, improper access, intellectual property, digital norms and laws, power, socio-technical aspects (such as gender discrimination), and robotics, among others (Carvalho et al., 2021a). We have Professional Ethics in Computing, Education/Instruction of Computational Ethics, and Ethics in Computational Research(s). Hall (2014) defines Computational Ethics as:

> "Computing ethics is the interdisciplinary and collaborative efforts of scholars and professionals to methodically study and practically affect the contributions and costs of computing artifacts in global society" (Hall, 2014)

Software, as well as its architecture, components, and reuse, involves the Professional aspect (excessively even) (Berenbach and Broy, 2009; Gotterbarn, 1995; Gotterbarn et al., 1997); Education/Instruction aspect (Narayanan and Vallor, 2014; Towell, 2003) and Research aspect (Badampudi, 2017; Singer and Vinson, 2002). We see the domain of Ethics above Applied Ethics in Computing and just below the SE Ethics.

Since the 1980s, the Computing community started a structured differentiation between Computing areas. Engle (1989) emphatically announces that SE **is not** Computer Science, and that Ethics is one of the fundamental precepts for Software Engineering/Engineers to be effectively considered engineering/engineers.

Don Gotterbarn, from the beginning of the 1990s, is one of the seminal authors in the intersection between Ethics and SE, debating the relationship between both areas in several works (Gotterbarn, 1991, 1995; Gotterbarn et al., 1997; Gotterbarn, 2002). Afterwards, the call for dialogue between SE and Ethics continues to grow.

Research in SE is also subject to ethical scrutiny, combined with aspects of Research Ethics (Badampudi, 2017). One can see that there were several academic attempts to "frame" Ethics wherever it fits in SE. In 1996, the discussion of ethical dilemmas in SE was already considered overdue (Brunnstein, 1996), as critically announced:

> "It seems that such immediate impact of new concepts, ideas, systems, products or methods in ICT not only produces specific incidents with less human ability to interfere but also shapes the consciousness of too many techno-minded people in the ICT community NOT to care for implication and effects of their work." (Brunnstein, 1996)

"Software Engineering" and "Software" are different objects. Engineering is an act, a practice, as also coding, programming, and software reuse. As with any act, moral and subsequent ethical considerations are appropriate. When we qualify software engineering as "bad", we consider a moral analysis of all the elements that make up the Software life cycle, from its ideation to its deactivation or abandonment. For example, the engineering process instance of a specific software skipped the testing step. Depending on the process model followed, we can judge the respective values of this "test skip". The same is not valid for software, architectures, or components.

Software, architectures and components are artifacts, not practices. Interaction with these elements, however, is a practice and may be subject to ethical scrutiny. When dealing with them, classical and traditional Ethics are not enough, so we must resort to other theories or reasoning, such as Information Ethics, proposed by Floridi (2015).

Another common conceptual misunderstanding involves the difference between moral values and practical-utilitary values. Technical aspects are wrapped in technical facts; although values influence them, they are primarily objective — for example, good code reuse for a software project. "Good", in this case, relates to the practical-utility value, not the moral one. Now, the practice of deliberating about

[4] For Ethics, the "bad" option is coercive, unconscious, and irrational action. Traditionally, we value "unethical" actions that go against the determining morality in a specific context. Suppose, among all possible options for moral action, the person consciously, rationally, and freely chooses the option aligned with immoral or destructive values. In that case, this person is acting morally and ethically, bad.

whether to best reuse a software or its components, rather than using one emotionally preferred by the head of the project, is amenable to ethical deliberation, i.e., moral judgement of values.

Another ethical factor is ignorance (Vázquez, 2018), which guides us to poorly considered decision making, both in terms of value and in fact. Several works by CBSoft criticize the poor quality of software engineering, with phenomena such as "technical debt" or "bad smells". Action out of ignorance is outside the ethical scope because it does not even meet the basic requirements for doing so. For example, many researchers are ignorant that research involving human subjects, whatever it may be, needs to be submitted, appreciated and approved by an EC. Suppose they conduct research with significant human participation and without EC involvement because they did not even know that ECs existed. In that case, the subject is wrong and period. There is no room for value or moral judgment. However, the origin or path that allowed this ignorance to remain intact is plausible for ethical consideration; e.g., why is EC absent in some scientific methodology curricula? Should the researcher autonomously discover the norms of Brazilian Research Ethics? The ethical precept determines that failure due to ignorance is plausible. However, failure due to ignorance having the *a priori* possibility and availability to avoid the error, or solve its ignorance, is reprehensible (Vázquez, 2018).

Law and ethics are not synonyms (Masiero, 2013; Barger, 2008; Vázquez, 2018). Following legal rules or any rules does not constitute ethical quality. When a person follows laws, he follows ethically deliberate, structured, formalized, and institutionally accepted and enforced moral determinations. One can ethically act outside the law, on the fringes of the law, religiously follow it, or interpret it in their own way, among others. It is also not ethical to transgress laws and regulations simply because blindly following them is unethical. Ethical deliberation considers laws, other regulations, and other elements of reality.

One of the recurring topics of SE Ethics is the "codes of conduct", such as the Association of Computing Machinery (ACM) (Gotterbarn et al., 1997), delegating your moral values uncritically to a normative code of conduct also does not constitute ethical quality. The way to "be morally better" or "be good" exceeds blind obedience to the morally dominant norm (Vázquez, 2018). Going further, Ethics is the domain of scientific-philosophical reflection to interact with laws and norms, abolish them, change them or criticize them. As a classic example, at a certain point in Brazilian history, the slavery of people was legally and morally permissible and well-established. That is, at that time in history, it was ethically permissible to have people as possessions and to treat them as objects. Enslavers, for the dominant morality instituted by the privileged and powerful strata, were morally virtuous and accepted. Currently, in Brazil in 2023, owning slaves or treating people as mere objects is both morally abhorrent and legally prohibited.

Another category of standards is technical, such as those proposed by the International Organization for Standardization (ISO). Technical standards primarily act in factual judgment and practical-utility value and seek to cover good (technically) objective practices. As human beings formulate norms, there is a part of subjectivity in their essence; however, their goal is to get as close as possible to technical objectivity. ISO/IEC/IEEE 42010:2011 is an example of a software architecture technical standard/norm [5].

We characterize software as an object of concrete reality, as a sociotechnical system formed by a technical artifact, human aspect, and procedural aspect. This assumption will form the main base discussion of ethics and morals in SE in the following sections.

In context, Software, as an artifact, has characteristics and technical specifications disconnected from value judgments or ethical scrutiny [6]; however, Software **Engineering** (and related topics, such as software reuse and testing) is an immanently human area. Software, and its engineering, are developed with, by, and for humans. Even Artificial Intelligence that develops code or other programs (Finnie-Ansley et al., 2022) was generated with, by, and for humans.

We go a step beyond. The Software and SE research is generated with, by, and for humans. It follows traditional scientific epistemology primary and trivial reasoning, considering the link between scientific research and a rational, structured, and formally perceived problem. In that case, this same problem involves part of the human aspect, so the idea of developing scientific research involving SE has as an audience final target, directly or indirectly, humans. For example, suppose a developer idealizes Software that emits music to calm dogs. In that case, the final target audience is not dogs (although they are the biggest beneficiaries of the final product of this research). It is people who interact and live with dogs. From a trivial phenomenological perspective, a dog never requested such an application and, independently, will never make organic and spontaneous use of such a solution.

In order to mature and think about the contributions and scientific communications of the Brazilian Software community, we align this research with the concept of meta-science, or meta-research (Ioannidis et al., 2015; Enserink, 2018). We dialogue with concepts and definitions of Computational Ethics (Johnson, 2008; Glover, 2017), combined with episteme and good practice in SE (Gotterbarn, 2002; Singer and Vinson, 2002). The dialogue with Ethics takes place on two levels: first, terms directly associated are the search objects, composing the search elements of this investigation; second, terms such as EC (In Portuguese: *Comitê de Ética* – Ethics Committee) and IC (In Portuguese: *Consentimento Livre e Esclarecido* – Free and Informed Consent).

[5] `https://www.iso.org/standard/50508.html` [accessed 01-01-2024]

[6] This idea of the possibility that characteristics and technical specifications of computational artifacts are disconnected from values or subject to a value judgment is not consensual. It is a reason for heated debates in the academic environment. For example, can we consider Software "bad"? Or racist? Or malicious? Or is it its use that determines? Or are the values inherited from whoever developed them? As these are philosophical-level debates, we refrain from them.

3 Related Work

As determined in the protocol followed in this research (Kitchenham et al., 2015), and detailed in Section 4, we searched for concurrent proposals and related cross-cutting works. We searched the *Portal de Periódicos CAPES* which indexes several relevant scientific repositories, and Google Scholar for "SOFTWARE ENGINEERING" + ETHICS + "LITERATURE REVIEW" [7]. This string search did not result in directly associated or competing papers. Therefore, we reduced the scope to "SOFTWARE ENGINEERING ETHICS", culminating in a profusion of results. In line with the terms and topics of this present proposal, Carvalho et al. (2021b) presents a research covering parallel related works.

Regarding the ignorance perspective presented in Section 2, Ghanbari et al. (2018) investigates the omission of quality practices in SE, resulting in technical debt. They reinforce that software development is a human-centric phenomenon, concluding that the scenario is complex and indicates the possibility of future works anchored in Ethics, which is absent in this respective paper. It is worth emphasizing that omission due to ignorance is, in fact, ethically a complex phenomenon, where accuracy or objectivity is difficult to achieve.

Dealing indirectly with Ethics, Rodríguez-Pérez et al. (2021) presents an SLR on perceived diversity in SE. They state that the diversity of a team is essential beyond ethical reasons. They promote and point out the Aydemir and Dalpiaz (2018) model for Ethics-aware SE, which we also reiterate as a solid and necessary work. Directly aligned with Canedo et al. (2021), Rodríguez-Pérez et al. (2021) concludes: "Previous studies demonstrate that women increase productivity, performance, and efficiency. But, unfortunately, some developers still have a strong bias against women in OSS and industry.".

As a difference from the related works mentioned previously, as well as in Carvalho et al. (2021b), we present a meta-scientific overview of the debate in the context of Brazilian science + computing. We go beyond presenting and structuring a scenario, a baseline of what is present; we bring critical and materialistic analyses. We take a step further in the analysis of the phenomenon as an abstraction.

4 Research Methodology and Method

The guidelines in Kitchenham et al. (2015) serve as basis to develop a comprehensive, reproducible, and accurate SLR from the SE domain. We use these well-established guidelines to identify and interpret the SE academic-scientific panorama of ethical aspects. With this, we collect, select and summarize relevant research elements in a disclosing process that enables their auditing and replicability. We followed a collaborative method using the Google Sheets online service, allowing remote operation and monitoring from a shared database. In a summarized and broadway, Figure 1 shows in detail the rigorous protocol followed by this research. In the remaining of this section, we present the present protocol.

Being a series of works that make up a larger research, the protocol of this same work was carried out previously for the SBQS, in Carvalho et al. (2021b), contemplating the years 2006 – 2020. In this present work extending this search to 2022 and we cover the entire scope of SE in Brazilian spaces, incomplete disregarding the SBQS. Therefore, in this present work we import the screenings and results in Carvalho et al. (2021b), attaching them to CBSoft and JSERD. Carvalho et al. (2021b) presents an SBQS in-depth approach, here we broadly extend and generalize it to SE.

We cut up the main question into sub-questions aiming for better comprehension. Table 1 summarize the sub-questions and their possible answers. Possible answers are: (i) Open answer, which means that answers depend on what comes up, if it does, in the content; (ii) Interpretative questions are based on quality criteria defined and consensually accepted by all the authors. For example, implying difficulties without presenting them as "difficulties"; (iii) The other questions have their answers closed, ranging from none, one, or several options. For example, research can be both quantitative and qualitative. If it was impossible to extract or infer information objectively, we indicate accordingly, e.g., the paper does not present the scientific approach (RQ5), and the inference of this data is compromised.

RQ6 refers to the Ethics domain, which is worth more detailing. As we deal with elements inherent to Ethics, we look for principles or terminologies in this field, e.g., in a software-related paper in a Computing communication, we expect details on the programming language involved, even if not profoundly. Just as expected as a paper deals explicitly with Ethics, even superficially, will dialogue with specific principles and terminology. For example, deontology, moral luck, consequentialism, contractualism, and virtuosity.

Systematic reviews, usually framed as SLRs (in which the L indicates "Literature"), are traditional studies that follow very delimited and structured epistemological essences (Kitchenham et al., 2015). Escaping or misrepresenting these values ends up generating SLRs with errors or serious flaws (Uttley et al., 2023), resulting in significant damage to academic-scientific values, due to their high scientific value (Creswell and Creswell, 2018; Marconi and Lakatos, 2017).

The motivation, interest and objective of this work classify it as a secondary study, without corresponding to all essential criteria of an SLR as epistemology (Kitchenham et al., 2015; Uttley et al., 2023). To guarantee epistemological rigor to the knowledge generated here, we sought a methodological framework, with a mature and well-structured method, which would lay the foundations of this investigation. In this way, we selected the Kitchenham et al. (2015) protocol, consistent in values and ideals.

In this sense, this proposal differs from the traditional nature of an SLR (Kitchenham et al., 2015; Petersen et al., 2015; Creswell and Creswell, 2018). The intention has a meta-scientific, materialist and critical bias; disconnected from what is originally sought from the result of an SLR, a "state of the art". Instead of investigating the academic-scientific phenomenon of computational ethics associated with SE primarily, we intend to analyze the

[7] We performed the exact search in Brazilian Portuguese, with fewer results and even less adherence to the central scope of this present research.

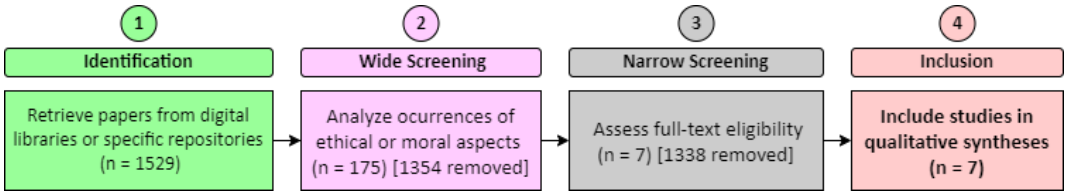

Figure 1. Diagram of the literature review process.

Table 1. Research sub-questions and answers

ID	Questions	Answers
RQ1	What technological domains are involved?	Open answer.
RQ2	Do the occurrences of ethics refer to ethics in the research epistemology, application, or both?	Meta-research, Application, Both
RQ3	Quantitative analysis of ethics committees and terms of consent	Interpretative. About EC and IC
RQ4	Which research institutes or universities in the country stood out in ethics-related research?	Research institutions or universities
RQ5	What is the methodological research approach?	Quantitative, Qualitative, Pragmatic, Interpretative, Literature Review or Others
RQ6	What ethical principles, foundations, terms or concepts are covered?	Open answer. Ethical principle, foundations, terms or concepts
RQ7	What are the main limitations and difficulties explicitly associated with the ethical aspect?	Interpretative. Cited limitations and difficulties related to ethics or moral aspects
RQ8	What is the research application environment?	Open answer. Where the research took place

contours of this phenomenon. How does this topic occur (if occurs)? Where? Associated with what? Who materializes this topic? With what quality does it occur? What can the result of this panorama suggest? The focus is to scientifically analyze the manifestation state of this topic in science.

4.1 Research method step-by-step

This section presents the methodology, rationale and epistemology of the method.

4.1.1 Identification stage

We analyze the CBSoft (SBES, SAST, SBCARS and SBLP) papers published between 2010 (the year of its first edition) and 2021, covering thirteen editions of the event. Additionally, we cover the CBSoft extended proceedings between 2019 – 2022, we selected this range to ensure completeness. Each year features different tracks, e.g., industry track, tools section or specific contests [8]. Table 3 structures the event year, publication numbers and repositories.

To balance the analysis and the panoramic results as a whole, we chose to cover only 2010 – 2022 here. SBCARS, SBES and SBQS present editions prior to 2010. JSERD's first volume is dated 2013, so we cover all of its content, in all volumes and issues, 2013 – 2022.

CBSoft's extended proceedings (not directly related to any specific symposium) between 2019 – 2022 are fully openly available in the SBC SOL digital library. We cover these years, focusing on the quality of completeness and safety of valid results. For simplicity and brevity, here we refer to CBSoft's extended proceedings as **CBSoftX**, as in "CBSoft eXtended".

Considering SBQS, we cover all the papers available in the respective repositories. In addition to technical works (nomenclature used in the SBQS for the main research track), we cover other sessions such as Thesis and Dissertation Contests, Experience Reports Track, Software Quality Education Track, among others and if available.

The search focus on retrieving studies explicitly related to ethical or moral aspects. We search for explicit elements associated with Ethics and configured the open terms to capture morphological variations. In English, we search for "ethic", e.g., ethics, ethical; in Brazilian Portuguese, "etic", e.g., *eticamente, ético, ética*. We search for the homonym considering moral, equal in English, e.g., morally; or Brazilian Portuguese, e.g., *moralmente*, including *morais* (plural). Table 2 displays the detailed search terms.

We also consider Informed Consent (IC) and Ethics Committee (EC) [9], as they are intrinsic elements of research ethics, although secondary (Brown et al., 2016; Badampudi, 2017). When exposed, they indicate a direct concern with meta-research ethical aspects. Considering EC, we include the results of the string search associated with ethics since the formal and official term is **ethics** committee.

IC is a specific case because several scientific communications use different terms to indicate that "human participants, as holders, consented to the terms set out for their practical participation or involvement in the research, and allowed the use of personal data". Whether in the practice of the research, internally or in its subsequent explicit, external communication. We only encompass consent, which is the official term (Brasil, 2012, 2016). The document can be classified as a term or form. We search for "consent" to encompass both English, e.g., consent, consent term, consent form; and Brazilian Portuguese, e.g., *consentido, consentiu, termo de consentimento, formulário de consentimento*. Table 2 presents the exact search string, exclusion and inclusion criterion.

[8] `https://sol.sbc.org.br/index.php/cbsoft_estendido/issue/archive` [accessed 01-01-2024]

[9] In Brazil, we perceive the Ethics Committees (EC), associated with the National Research Ethics Commission (CONEP); different from other countries, with the Institutional Review Board (IRB). IRBs do not evaluate Brazilian research, but ECs.

Table 2. Search string, exclusion and inclusion criterion

Search string	"ethic" OR "etic" OR "ética" OR "moral" OR "morais" OR "consent"
Wide screening exclusion criteria	- Does not mention ethical-based terms directly associated with the search string - Does not mention informed consent or ethics committee - Ethical-based terms occurs only in references, abstract, direct citations/quotes, title(s), or keywords - Presents only the term, or variations of, "morale"
Wide screening inclusion criteria	- Mention ethical-based terms directly associated with the search string - Mention informed consent or ethical committee - Ethical-based terms occurs in body-text
Narrow screening exclusion criteria	- Ethical-based terms are mentioned superficially - Ethical aspects do not adhere to the definitions considered in this paper
Narrow screening inclusion criteria	- Ethical-based terms are mentioned in-depth and broadly considered - Ethical aspects adhere to the definitions in this paper

Table 3. Covered publication numbers

Year	CBSoftX	SAST	SBCARS	SBLP	SBES	SBQS	JSERD	All
2010	*NA*	*NA*	16	*NA* [1]	19	37	*NA*	**72**
2011	*NA*	*NA*	13	*NA* [1]	34	34	*NA*	**81**
2012	*NA*	*NA*	15	10	24	38	*NA*	**87**
2013	*NA*	*NA*	14	10	17	34	4	**79**
2014	*NA*	*NA*	11	11	18	29	11	**80**
2015	*NA*	*NA*	14	10	21	30	12	**87**
2016	*NA*	15	16	12	16	32	8	**99**
2017	*NA*	11	12	11	42	29	10	**115**
2018	*NA*	10	11	12	38	39	16	**126**
2019	20	9	13	10	67	38	9	**166**
2020	32	12	16	9	104	45	10	**228**
2021	20	7	11	14	62	32	16	**162**
2022	20	8	10	9	53	35	12	**147**
Total	**92**	**72**	**172**	**118**	**515**	**452**	**108**	**1529**

[1]: Not available. Color metadata: gray, Not Available; blue, SBC SOL; green, ACM DL; yellow: IEEE/IEEE Xplore; red, Springer LNCS.

4.1.2 Wide Screening stage

The review followed two screenings, wide and narrow. In the wide screening, two independent researchers search for the search string in all papers and separate the papers with their occurrences. One of the researchers conduct the objective search, and the other review the result, ensuring impartiality and correctness. This initial screening exposes us to a broad view of the papers' quantitative situation of ethical aspects. This step resulted in 175 (≈11.5%) extracted papers.

The wide screening step involves a "search process" (Kitchenham et al., 2015), the search is objective and structured by previously defined criteria. As we are dealing with a complex construct with a varied application, we follow the reasoning of other authors who conducted SLR based on Ethics, such as Bock et al. (Bock et al., 2021). The terms indicate the presence of content on this topic, not necessarily objective and directly associated; then, we need additional screening. If we literally anchored the terms to the questions, (i) or we would have at best scenario one or two results in the wide screening; (ii) or a not plausible communication with the computing domain, i.e., it would be an Ethics aligned communication, instead of Computing. Related works on Computational Ethics have this "loose" aspect between Ethics and Computing.

4.1.3 Narrow Screening stage

Considering the papers extracted through the wide screening, we analyse the occurrences of ethical aspects. We evaluate whether or not they adhere to the definitions and concepts set out in Section 2. The quality of occurrences determines adherence, not quantity. The narrow screening stage selected the papers presenting relevant associations in their ethical aspects. In this case, we analyzed each of the 175 papers extracted by the wide screening and the ethical or moral aspects presented, aiming for a selection and quality consensus at the stage of qualitative synthesis. The researchers, authors of this present work, reached a consensus resulting in 7 (≈0.5%) papers (Silva et al., 2021; Canedo et al., 2021; Kon et al., 2011; Rosa and Valentim, 2020; Rocha et al., 2020; Vasconcellos et al., 2017; Cerqueira and Canedo, 2022). Respecting audit and open science criteria, we openly make the screening database available online [10].

It is important to note that, unlike the "search process", the "study selection" and "quality assessment" are subjective and vary according to the investigation, theme, and interpretation of the researchers involved (Kitchenham et al., 2015). For example, in Wessel et al. (2022) there is an explicit occurrence of the search term "ethic", limited to the sentence "Designers should envision bots as socio-technical rather than purely technical applications, considering human interaction, developers' collaboration, and ethical concerns". Despite being a very promising, contemporary and pertinent line of thought and an argument from an ethical or moral perspective, it is limited to this sentence. What ethical concerns? What would be an ethical concern in this case? If there are concerns at an ethical level, are these irrelevant as their deepening is left aside?

This exposition is far from making a value judgment about Wessel et al. (2022), it only serves to justify and illustrate that certain publications present the terms, have promising contexts and scenarios, point to ethical or moral aspects, even so the occurrence is superficial or brief. In other cases, we found erroneous occurrences of ethical or moral aspects, although in very low numbers, we prefer to refrain from exposing them, just indicating this problematic phenomenon. Furthermore, considering that the field of Ethics is alien to most of Computing, even if unacceptable, from the point of view of academic-scientific quality, these cases are plausible and understandable.

4.1.4 Inclusion stage

Considering the small number of results for qualitative synthesis (3), three researchers extracted information; and the same researchers, in a different combination, reviewed and validated it. Having reached a consensus, we followed the same approach in Carvalho et al. (2021b). Rather than basing the review on research questions, we base the review on the papers extracted in the final step. Therefore, each

[10] `https://4658.short.gy/JSERD2023` [accessed 01-01-2024]

paper will be analyzed in its subsection, thus answering each research sub-question.

In the qualitative synthesis, we follow good practices and quality recommendations oriented to the Software Engineering context (Wohlin, 2014), adapted to the specific needs of this present research.

5 Results

This Section answer the research question that guides this research. First, panoramic results of the wide screening are presented, followed by the in-depth results of the narrow screening.

5.1 Wide screening results

The wide screening results expose the quantitative panorama of the ethical or moral aspects explicitly present in the publications of the largest, most relevant and significant scientific spaces dedicated to SE in Brazil. That is, it exposes the panorama of ethical or moral aspects in the highest level formal research in SE in Brazil between 2010 – 2022. Table 4 presents the quantitative results of the wide screening. Summing 175 (≈11.5% of the 1529) papers extracted by the wide screening.

In absolute numbers, we can see a shy growth and constancy in 2020 – 2022; proportionately, this behavior is slightly inconstant, from 2014 the values remain above 8%, better compared to previous years; thereafter with little variance, in a behavior that indicates a timid growth, reaching 19% in 2022. Thinking about moral progress, this growth is positive, considering exclusively the occurrences and not their quality; and alarming due to the fact that out of the thirteen years this number did not reach even one fifth (20%) of the publications in any of the years.

When dealing with ethical or moral aspects in communications that prioritize or are dedicated to technical aspects, space is a limitation. For example, finding these elements in short papers is rare, and this rarity is an expected phenomenon. As we can see in Figure 2, considered a journal-level space and valuing the high level of discussions and contributions, with no space limit for communication, the number of occurrences was relatively miserable. What was initially expected to find most of the relevant, pertinent and in-depth occurrences in the JSERD, the result was null, far from the potential of the space and the initial expectation.

Figure 2 displays the results by scientific space, we can see that the SBES and SBQS are paired as the highest absolute number of occurrences of ethical or moral aspects per year. As of 2018, we noticed a significant increase in occurrences in both. Although we expected more from the JSERD, it remains proportionally matched with the SBQS and SBES, e.g., 2022 sums up 12 publications, with 4 (≈33%) presenting occurrences of ethical aspects, compared to 12 (≈22%) of 53 of the SBES; and 8 (≈23%) out of 35 from the SBQS. In this sense, the proportional comparison exposes a differential beyond the absolute.

SBCARS, SAST, SBLP and CBSoftX, even with lower absolute values, also present a significant deficiency in proportionals. Even so, one of the seven occurrences came from CBSoftX (Cerqueira and Canedo, 2022), relevant enough to be included in the qualitative synthesis and a positive differential.

Regarding the 175 (≈11.5%) papers extracted in the wide screening, the majority of occurrences, 120 (≈7.8%), dealt with IC; only seven (≈0.5%) papers dealt with EC; only one dealt with EC + IC.

5.1.1 Informed Consent, Ethics Committee and human participation

IC and EC are two items directly related to Research Ethics in general (Recker, 2021; ANPEd, 2019; London, 2022). In the epistemology of computing scientific research, it is common to find tests, simulations, emulations, workshops, experiments, and uses, among others involving the participation of human beings as a secondary research object. The computational artifact is the primary object, and the human participants are the secondary object, interacting with the primary object. In this case, we call them research **with** humnans; different from traditional ones in the health area, research **on (or in)** humans (ANPEd, 2019).

Regardless of the degree of human participation involvement, the Research Ethics resolution determined by the National Health Council (In Portuguese: *Conselho Nacional de Saúde* – CNS) is objective in determining that all research involving human participants must be appreciated and evaluated by an EC (Brasil, 2012, 1996). Outside our scope, but worth mentioning, this obligation is a source of criticism in the Computing scientific community (Amorim et al., 2019). It is enough to reiterate that this regulation also covers SE research. We will separate the analysis between IC and EC.

We want to reiterate that IC is the bare minimum, a basic tenet of Research/Science/Academic Ethics (Salganik, 2017; London, 2022). It is the expected minimum when the research involves participants external to the respective authors, who will be part of the procedure as "research objects". Consent must be free, where the participants can withdraw from the research whenever they want, depending on the content of the research. It also needs to be clarified that those responsible for the research should, in a simplified and understandable way, provide participants with all relevant information about their participation, e.g., benefits, risks, harm, security, and privacy, among others. The IC has many additional qualities and requirements outside this work's scope.

EC is a more complex element compared to IC. An EC is an institutionalized social organization that analyzes research and evaluates it against specific normative criteria. What institutionally and officially guarantees that research is following ethical criteria is the appreciation and approval by a valid EC. For example, determines IC as mandatory (Brasil, 2012, 1996).

Finally, only ≈7.8% indicates IC involvement in scientific communications. After a cursory search, we found several research cases involving humans with no explicit indication of IC/EC involvement. In this sense, this gap is more worrying if we compare it with the amount of EC or EC +

Table 4. Wide screening results, by event

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total	Total(%)
CBSoftX										20	32	20	20	92	**100%**
SAST							15	11	10	9	12	7	8	72	**100%**
SBCARS	16	13	15	14	11	14	16	12	11	13	16	11	10	172	**100%**
SBLP			10	10	11	10	12	11	12	10	9	14	9	118	**100%**
SBES	19	34	24	17	18	21	16	42	38	67	104	62	53	515	**100%**
SBQS	37	34	38	34	29	30	32	29	39	38	45	32	35	452	**100%**
JSERD				4	11	12	8	10	16	9	10	16	12	108	**100%**
All papers	**72**	**81**	**87**	**79**	**80**	**87**	**99**	**115**	**126**	**166**	**228**	**162**	**147**	**1529**	**100%**
Only IC	4	1	4	3	6	5	7	8	11	17	18	19	16	119	**7,78%**
Only EC	0	0	0	0	0	0	0	0	0	1	0	3	2	6	**0,39%**
IC + EC	0	0	0	0	0	0	0	0	0	0	1	1	0	2	**0,13%**
Adhere (no)	5	3	4	3	9	8	9	9	18	23	25	26	26	168	**10,99%**
Adhere (yes)	0	1	0	0	0	0	0	1	0	0	2	2	1	7	**0,46%**
Adhere (all)	5	4	4	3	9	8	9	10	18	23	27	28	27	175	**11,45%**
Adhere % (no)	6,9%	3,7%	4,6%	3,8%	11,3%	9,2%	9,1%	7,8%	14,3%	13,9%	11,0%	16,0%	17,7%		
Adhere % (yes)	0,0%	1,2%	0,0%	0,0%	0,0%	0,0%	0,0%	0,9%	0,0%	0,0%	0,9%	1,2%	1,4%		
Adhere % (all)	6,9%	4,9%	4,6%	3,8%	11,3%	9,2%	9,1%	8,7%	14,3%	13,9%	11,8%	17,3%	19,0%		

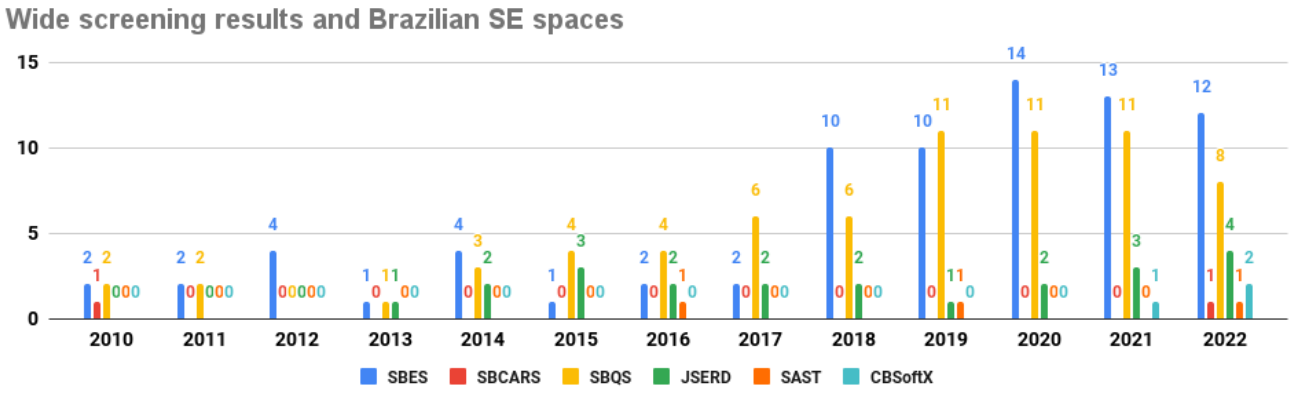

Figure 2. Bar graph represents the wide screening result, by event.

IC. There is an entire ethical bureaucracy involving EC Lima (2015), and without this occurring in the case of IC, omitting it or not involving it is a critical case of negligence or disrespect for Research Ethics involving humans.

There is still room for a disclaimer, the absence of IC/EC in scientific communication either (i) is not a necessary or sufficient indication to categorize the research as "immoral" or "bad"; (ii) means that the research did not specifically involve IC or EC, it just neglected these elements in scientific communication. In any of the cases, it is a mistake, as the research communication also involves the responsibility to communicate the procedure or protocol, which includes the involvement of IC/EC. The absence of IC/EC should be justified, if applicable. From an Open Science perspective, the IC term/form can be made available as complementary material and the EC code of research appreciation (CAAE).

"But what about the proportion or quantity of publications without human participants?". We analyze this ethical issue based on Table 4 and IC/EC, considering the 175 publications selected in the Wide Screening.

Many of the 1529 papers indicate human participants. However, none of these present the search terms listed in Table 2. They no longer have the appropriate terms for formal scientific communication (consent, assent, or ethics committee). Of the 175 papers, 163 (≈93%) feature human participants. The remaining 12 papers (≈7%) do not require IC/EC involvement.

We follow the IC/EC categorization analysis in Carvalho et al. (2022). Related to Research Ethics, the 12 publications without human participation and EC/IC involvement compose the ideal moral scenario, separated from the analysis by the absence of human involvement. Leaving 163 publications, subject to ethical and moral scrutiny of greater severity.

Of these 163 publications with human participation or involvement: (i) 2 (≈1%) are in the best possible case of compliance with Research Ethics, exposing involvement with EC and IC; (ii) 6 (≈4%) expose involvement with EC and not IC, even so by the normative regulatory determinations of CEs, for approval by EC it is necessary to present the involvement of IC, so here we can assume that IC is implied. Now cases morally irregular by institutional Research Ethics: (iii) 118 (≈72%) expose involvement with IC and not EC, indicating concern with this basic and primary element; (iv) in 37 (≈23%) both IC and EC are absent, configuring the worst possible case of total neglect of the moral precepts of Research Ethics.

The predominant human participation is of computer-related course students, whether undergraduate or graduate. Pragmatically, various evaluations, tests,

experiments, and the like are not student-oriented. It can lead to a perverse reductionism in the expected compliance because "in the wild" the results may differ compared to those obtained with students, offering other challenges and complexities of an ethical or moral nature.

5.2 Narrow screening results

In this section, we present the qualitative synthesis involving the papers selected by consensus by the narrow screening. As the amount was proportionally very low (≈0.4%), for better exposition of the results and detailed analysis we decided to detail each one in a subsection.

As highlighted in Section 4, we took inspiration from the SLR methodology in Kitchenham et al. (2015), with appropriate changes to suit the purpose of this work. Unlike an SLR, this in-depth exposition will not be generalized, but rather punctual and indicating meta-scientific crossings with ethics or morals, driven by the research questions and other materials supporting this topic. The primary phenomenon is ethical scrutiny. When considering seven adherent works, generalizing them by guiding this analysis by the research questions would result in a significant loss of details or specifically located knowledge.

5.2.1 P1. Silva et al. (2021) [SBES]

The ethical differential for the inclusion of this paper in the qualitative synthesis, which is rare to find in Computing scientific communications, is (i) the presence of an exclusive section for ethical considerations, which is necessary; (ii) the relevance of ethical responsibility between pedagogical practice combined with a scientific experiment. Responsibility is one of the essential elements of Ethics (Vázquez, 2018), demonstrating epistemic responsibility to benefit students, directly involved in the research, and themselves, as researchers.

Silva et al. (2021) present a quasi-experiment involving student participation, i.e., human participation. Reiterating Section 5.1.1, students are the secondary element, and Design Pattern is the primary research object.

There is no mention of EC (RQ3). The authors indicate obtaining consent (RQ3), without indicating the official means of doing so through a term or form. Despite mandatory assessment by an EC, this is a typical case where the research offers minimal risk to the participants, reducing their involvement in practical-utilitarian values.

Ethical involvement is about meta-research (RQ2) in a dedicated section called "Ethical considerations". The authors are concerned with the morality of student involvement, following guidelines to ensure both research and pedagogical values. Some measures are ensuring adequate integration of the study into the course topics, planning follow-up activities, and integrating the study timeline with the course schedule.

The institutions involved (RQ4) are UTFPR (In Portuguese: *Universidade Tecnológica Federal do Paraná*) and UEM (In Portuguese: *Universidade Estadual de Maringá*). The research methodology is quantitative, an experiment (RQ5). The research involves students in an SE class; as the application context (RQ8), the authors strive to justify carrying out the research experiment only with students. The limitation or difficulty (RQ7) is related to gender criteria, with a low representation of women in the experiment.

5.2.2 P2. Canedo et al. (2021) [SBES]

Leaving aside a strictly technical aspect, Canedo et al. (2021) directs its lens to Gender Studies and SE. This topic also appears in current academic international debates (Rodríguez-Pérez et al., 2021). The significant crossover with this topic led to inclusion in narrow screening.

A grave problem is an absence of IC or EC (RQ3). They announce and also answer the limitations and difficulties of the respective research (RQ7):

> "Because women are underrepresented in the fields of Science, Technology, Engineering, and Math (STEM) [...], it is difficult to find women working in the tech area. Among them, there are many who were not willing to participate in interviews or surveys.
>
> The difficulty for some women to talk about the problems they face in the workplace can also be related to the fear that they have to expose themselves and suffer shreds on the part of their colleagues, due to the gender prejudice that they suffer in their teams. As a way of mitigating this threat, we contacted the professionals we knew and asked for help in finding other women to participate in the interviews." (Canedo et al., 2021)

The revival of memories associated with gender discrimination or oppression can be traumatic, presenting a psychological risk to the research procedure. The authors' sensibility regarding the topic mitigated this problem. However, the omission of IC/EC is problematic.

Explicitly deal with the ethical association as an application (RQ2). Implicitly, we can also perceive an ethical concern of a meta-research nature (RQ2). The authors avoided pressure on the participants and kept them comfortable participating.

The institutions involved (RQ4) are UnB (In Portuguese: *Universidade de Brasília*) and UFPA (In Portuguese: *Universidade Federal do Pará*).

There is a dedicated section for "gender issues", where the categories of gender issues coded through the participants' interactions appear. All issues listed are ethical or moral. They cited morality in only one category (*Harassment*, regarding sexual or moral harassment). However, the entire foundation of the paper's backbone is ethical. Some of the testimonies indicate that men appropriate women's ideas; male team leaders delegate tasks considered "more difficult" to other men; when men are very polite, they seem flirting; men abruptly interrupt women's speech, among others. All these behaviors, consciously or unconsciously, are subject to moral or ethical scrutiny. They are all negative and harmful acts of gender discrimination.

The methodology is Grounded Theory, qualitative (RQ5). There is no specific application context (RQ8), involving participants from several different environments.

5.2.3 P3. Kon et al. (2011) [SBES]

Grodzinsky and Wolf (2008) present a rich discussion on the relationship between Ethics and FLOSS, enhancing the ethical relevance of Kon et al. (2011). In their research, the authors noticed (in 2011) an increase in the use of FLOSS in SE research, but the amount was still incipient. This result instigates curiosity if the choice to use FLOSS involves moral values and traditional practical-utilitarian values.

The theme is FLOSS (Free/Libre/Open Source Software), complementing RQ1. Being exclusively a Literature Review (LR) (RQ5), it does not require the involvement of EC or IC (RQ3) (Brasil, 2012, 2016). There are no limitations or difficulties related to Ethics (RQ7). LR is applied at SBES (RQ8), analyzing the manifestation of FLOSS in the symposium papers. The ethical association is an application (RQ2).

From an ethical point of view, the authors advocate that FLOSS brings benefits to the population at large:

> "From an ethical point of view, if a resource may be easily shared, preventing this should only be pursued under very specific circumstances and with very good motivation. The growth of the FLOSS model in the last decades undermines arguments in favor of such restrictions for software, as its sharing does not prevent other benefits to society." (Kon et al., 2011)

The institutions involved (RQ4) are USP (In Portuguese: *Universidade de São Paulo*) and UFBA (In Portuguese: *Universidade Federal da Bahia*).

5.2.4 P4. Vasconcellos et al. (2017) [SBQS]

What distinguished Vasconcellos et al. (2017) and passed the narrow screening phase was the critical appreciation, even if brief, of the rapport phenomenon, i.e., an ethical concern with the quality of their results. This is a meta-scientific concern that is rarely addressed in research with a similar methodological approach, despite being commonplace.

There is no specific technological domain (RQ1), the paper deals with the formal decision-making process in MPS strategic alignment. The occurrence of the ethical aspect is about application (RQ2), i.e., it indicates ethical referrals about the application of the research object, not about the research, and the research process. Indirectly, there is a similar occurrence, of indirect ethical nature, where the authors point out that their rapport with the research participants may have culminated in positive biases in the evaluation, this phenomenon called the Hawthorne effect.

Does not quote or present IC or EC (RQ3). Categorically it should involve IC and EC. The research involved a cooperation between three universities (RQ4), UFMS (*Universidade Federal de Mato Grosso do Sul*), UFPB (*Universidade Federal da Paraíb*a) and UFSCAR (*Universidade Federal de São Carlos*). The methodological approach is pragmatic (RQ5), the authors define it as design combined with theory.

There is no mention of any principle or terminology in the field of ethics (RQ6). As a difficulty (RQ7), we can mention the rapport itself indicated in the threats to validity; because in the method followed, the researchers could not interfere, help or provide assistance to the participants, on the other hand, there was the practice of rapport to build an affective and sympathetic bond with them. Rapport is a determining factor for effective qualitative research, as it encourages the legitimate and spontaneous participation of those involved in the research (Guest et al., 2013). There is a conflict between the subjectivation of the human bond and the role of the "distant and indifferent" researcher. The application context is organizations with potential MPS involvement in general (RQ8).

5.2.5 P5. Rocha et al. (2020) [SBQS]

Rocha and collaborators bring an experience report, a remote MPS assessment and the adaptations that were made on the appraisal process. A strength of this paper is that it presents a section (Section 3.5) dedicated to ethical deliberation about research and its environment. We highlight this excerpt:

> "Thus, the company included among its concerns and decisions to pay special attention to equity issues in the assessment, in order to: (i) identify if and how things have changed for the less favored employees; and (ii) determine what can be done to ensure that these issues are addressed in planning the assessment." Rocha et al. (2020)

This type of concern is constantly omitted from scientific research, despite bringing concrete and realistic considerations about the organization's power structure and empathy with/among employees. The discursive weight of this section is reinforced by the concern with the COVID-19 pandemic, which affected society as a whole, both companies and researchers and research institutions. This is also an aspect of ethical richness that raised the level of this work beyond the narrow screening phase, combined with the occurrence of a section dedicated to the own ethical aspects.

Following the research questions, there was no explicit technological domain (RQ1). The ethical occurrence took place as an application (RQ2). The authors do not debate ethical aspects of the research itself, but rather on its application and impact. A differential were the institutions involved in authoring the paper (RQ4), UFRJ (*Universidade Federal do Rio de Janeiro*), UFPA, UNIRIO (*Universidade Federal do Estado do Rio de Janeiro*), Implementum Consultoria, TechLead IT Solution; both universities and ICT companies. As an experience report, the event encourages scientific rigor, although it does not consider it mandatory [11]; there is no mention of a methodological approach or scientific method in the paper (RQ5).

There was no occurrence of an ethical principle or foundation (RQ6). However, there is a conceptual slip related to Ethics. At a certain point, it is determined that one of the requirements associated with standards and guidelines for evaluation must be "[...] ethical (not reflecting personal or sector interests) [...]". However, the content in parentheses has nothing to do with ethics, but with neutrality. For, if we consider the ethical essence, personal or sector interests must be considered, considering that the ethical evaluation does not nullify the personal/group interests and

[11] Pointed in the track page: "The use of scientific rigor for the experience narrative is desirable."

specificity Fieser (2020); Ferraz (2014). We add, ethical analysis and evaluation deals precisely with these interests and their rational and political deliberation, considering the range of aspects under discussion. This does not mean that an interest should prevail, which epistemologically and dialectically will happen anyway, but rather that ethics also deals with dispute and conflict of interest, in a rational and well-founded way.

As a limitation and difficulty (RQ7), the opposite was observed, a facilitation. Remote MPS evaluation proved to be cheaper without losing quality. For organizations with budget constraints this case indicated that the remote approach is possible, depending on the scenario for some or all steps of the assessment. Economic aspects are also relevant for a realistic ethical judgment, i.e., thinking of the practice of a cheaper MPS assessment as a viable ethical option.

The application context is an organization (RQ8), SOFTEX. An MPS model being the evaluation and maturity model involved (RQ9).

We leave the occurrence of IC and EC (RQ3) until the end, as there is an atypical situation here. We will split into two parts, evaluator participants and SOFTEX employee participants.

- Evaluator participant: Some of the evaluators of the dynamics exposed in the paper are also authors of the paper. The tension occurs with non-author evaluators such as Breno and Vivian. They are not necessarily "participants" in the research, however they do participate and are involved people. As the resolutions for research ethics involving human participants exempt the authors themselves from IC or EC judgment Brasil (2012, 2016), this is a gray area. Are evaluators participants (objects) of the research or just parts of process operationalization? If we consider the first, it is appropriate to apply IC and EC involvement; if we consider the second, no. This case is aggravated because the name of the non-author evaluators is openly exposed.
- SOFTEX employee participants: At this point, there is a distinction between research as a scientific report of a formalized and structured praxis and the operational report of an institutionally determined organizational practice. As participants are employees, and considering that duly agreed organizational practices are exempt from consent, this is also a gray area when it comes to IC and EC. At the same time, the participants are human persons involved in an experience report research, and even if anonymized they are still under the auspices of the norms associated with research ethics Brasil (2012, 2016). Logically reasoning, what the paper brings is solely a recorded report, documented and methodically published, the practice behind this would occur independently, with or without the consent of the employees.

5.2.6 P6. Rosa and Valentim (2020) [SBQS]

What brought Rosa and Valentim (2020) to this detailed analysis was the rich meta-scientific ethical dilemma between pursuing the protocol scientific method and sustaining the quality of the methodological process or preserving the well-being and safety of the human participants involved.

The technological domain involves mobile applications (RQ1). The involvement of ethics is meta-research, i.e., it deals with making-thinking research and its epistemology (RQ2), as this excerpt summarizes:

> "P3 [participant number three] was not asked to remove the glasses to carry out the study activities, as this could pose risks to the participant, further impairing their vision, and go against the research ethical issues." Rosa and Valentim (2020)

This is an ethical concern that places two elements in dispute, (i) the accuracy and fidelity of the scientific method and; (ii) human consideration for the condition of the person with a disability. The authors could value the methodological scientific rigor and demand the participant to attempt against their own physical integrity, removing the equipment and harming himself. Despite this, the researchers decided to preserve the visually impaired person, respecting him, and reporting this detail in their scientific communication, out of respect for their academic peers and for the discourse of their research protocol.

About IC and EC (RQ3), there should be both, but only IC is present. The participation of visually impaired persons worsen the results, as photos (blurred or not) of them are exposed in the paper.

The two authors are from the same university, UFPR (*Universidade Federal do Paraná*) (RQ4). The study is presented as exploratory, however there is no description of specific methodology or scientific method (RQ5). There is no stated ethical principle (RQ6). The application context is smartphones (RQ8), through their mobile applications. As an ethical difficulty (RQ7), the pandemic situation and its aspects (such as social isolation) may have negatively compromised the results, although it was not enough to make the research unfeasible.

5.2.7 P7. Cerqueira and Canedo (2022) [CBSoftX]

Its adherence is direct, primary and categorical, it is a research especially oriented to SE ethics, the title explicitly states: "Exploring Ethical Requirements Elicitation for Applications in the Context of AI".

Cerqueira and Canedo (2022) is an unusual occurrence in this set, not being a traditional research article or similar, it is a publication of the CBSoftX theses and dissertations contest. In this sense, this publication is an abridged version of the first author's dissertation [12]. As a disadvantage, this is a very short publication (2 pages), but its adherence is so effective, we decided to include it. Furthermore, interested parties can peer to delve into the related dissertation or investigate related work.

The technological domain is specifically AI (RQ1) associated with SE. The association is application (RQ2). There is no occurrence of IC or EC (RQ3). As a dissertation, it is limited to the associated university, UnB (RQ4). The

[12] `https://repositorio.unb.br/handle/10482/41966` [accessed 01-01-2024]

methodology is Design Science Research (DSR) (RQ5). They mention that 11 ethical principles are addressed, and they support the elaboration of the artifact proposed in the research (RQ6). There is no specific ethical difficulty cited (RQ7) and no specific application environment (RQ8).

In respect of the rigorous protocol of this present research, we were limited to extracting the data present in Cerqueira and Canedo (2022), from only 2 pages in CBSoftX. Complementary information can be found in the complete dissertation, outside our scope of extraction, although aligned with our thematic scope.

6 Discussion

We discuss here the procedure results and some specific topics present in certain papers and aligned with Ethics or Morals in SE will be discussed in this Section. As there were few adherent papers, the discussion of ethical aspects was average, despite overcoming the superficiality of those present in the wide screening without additional discussions.

6.1 Synthesized results about research questions and the narrow screening

In this Section we deal with the aggregate analysis of all results in Section 5, and if appropriate and fruitful, discussing them.

The predominant technological domain (RQ1), as expected, is software. Some deals with software outside a strict technical perspective or as an artifact, as in Kon et al. (2011). Only Rosa and Valentim (2020) presents an solely meta-scientific involvement with ethics (RQ2), while the others treat it only as an application.

The result of RQ3 is quite problematic, with no occurrence of EC, even in research involving human participation; and only two explicitly mentioning IC Silva et al. (2021); Rosa and Valentim (2020). No specific research institution or author stands out among the others (RQ4). Considering the scope and boundaries of this analysis, we were unable to list an entity that stands out in the Brazilian SE scenario, producing and publishing research with relevant importance on ethical or moral topics.

The methodologies or methodological approaches vary significantly, without any one standing out (RQ5), we find all the traditional options. There is no mention of elements of the epistemology of ethics or morals (RQ6) in any of the works analyzed, Cerqueira and Canedo (2022) refers to a master's thesis, in which there is an exposition of ethics or morals elements.

Regarding ethical limitations or difficulties (RQ7), only gender complications arose twice, which we will reinforce in Section 6.5. Only one work explicitly dealt with issues associated with the Covid-19 pandemic, a period that significantly influenced and marked the research of several Brazilian academic-scientists. Following the other loosely linked and related results, RQ8 presents several different application contexts.

We note, from the result of the narrow screening synthesized, that there is abundant space to strengthen the topics already started and presented here; open new fronts of ethical or moral analysis; tension the current scenario and lead changes in ethics in Brazilian computational research, especially when considering an area and a topic that is so relevant in the context of computing, SE.

In the remainder of this section we deepen and extend analyzes of themes noticed during both wide and narrow screening scans, which are aligned with current debates and discussions in both computational ethics and SE.

6.2 Values

Directly associated with Ethics are values. We make decisions based on cultural, social, and historical valuations. The decision-making, and related data, are related to Ethics. When faced with options A and B (or more), in a scenario of free and conscious choice, we choose the one that is most valuable to us (Vázquez, 2018). For this reason, Ethics deals with values, as valued choices guide the behavior trajectory. Furthermore, we can frame these values in categories such as kindness, justice, loyalty, and punctuality, among many others. In addition to the trajectory being subject to quantification (the one with the highest value), it is also subject to quality (related to the type of action). Axiology studies values and is indirectly related to Ethics.

Considering the tiny result of the wide screening, we looked for traditional ethical values to complement the essential intention of this research, such as "good", "bad", "evil", "wrong", "right", and "fair", among others. Results based on practical-utility values predominate, as explained in Section 2. Considering only the term good we have "good code", "good programming language", "good architecture", "good components", among others; disconnected from primary moral valuation. Additionally, some are used as a language vice and harm technical communication, as "good architecture" is objective and subjective, lacking requirements or technical aspects. Is the architecture well-founded? Is it well structured? Is it clear? Properly segmented? Are the variables well named? Are the functions well defined? Is it intuitive? There is no way of knowing when we categorize the object as just "good", the same symmetrically for "bad".

A recurring topic is "bad" in bad smells. Figuring as "bad smells", "bad test smells", and "bad code smells", among others, were found in papers from all four symposia. In this case, the bad association concerns the practical-utility value inherent to the artifact. The engineering of this artifact, as a practice, is subject to ethics-related questioning, e.g., "what led to the occurrence of the bad smell phenomenon?", "which elements in software process instances culminate in bad smells?" and "was it possible to avoid bad smells?".

Very few papers present indirectly plausible terms of appropriate value. As in Magalhães et al. (2017), the authors propose a computational solution "to replace the test architect activities completely. To accomplish this, we must attest that its selection is as good as human beings." (Magalhães et al., 2017). Automation as a cause of work function extinction is a hot topic in Computational Ethics (Masiero, 2013; Barger, 2008). A rich discussion of the impact the proposal causes through the test architects'

bias would be in order. There is a lack of well-founded deliberation on the consequences of pragmatic research.

6.3 The (in)famous "Soft Skills"

We delve deeper into this topic due to the specific occurrence in two papers that mention a search term in Figure 1 and deal with Soft Skills (SS). Here, the conceptual basis reference for SS is the SLR presented by Matturro et al. (2019). We searched for the term as part of the wide screening in approximately 50 papers.

Santos and Werner (2010) advocate the imbrication and inseparability between technical and non-technical in SE in higher education, through the sociotechnical perspective, forming something indivisible. Herbert and Nane (2016) separate "ethical and conduct competencies" from specialization in the discipline of software testing, reiterating this dichotomy.

The idea of "soft skill" is far from consensual throughout the literature and is also controversial. Initially, everything that escapes "the technique", Hard Skill (HS), is considered non-technical, SS. In addition to this initial dilemma of defining what is categorically technical or not, the set of supposed strange SS appears, such as "race and gender", "courage", " willingness to travel" or even "punctuality" (Matturro et al., 2019); and, among the most cited, Ethics. Even from a linguistic perspective, there is a pejorative valuation of the skill named "soft", compared to "hard".

The conceptual association of Ethics as a SS is also present (Matturro et al., 2019; Vale et al., 2010): "The ability to follow a set of rules and precepts of value, order, and morality". However, this is a far cry from what the Ethics literature considers "being ethical" (Ferraz, 2014; Vázquez, 2018). As put, it is obedience.

In the 2020 ACM Computer Curriculum Proposals (Force, 2020), occurrences of the terms SS or HS are absent, demonstrating its deprecated status. Instead, "competence" is used without distinguishing between technical and non-technical. Competence is the sum of Knowledge (know-what), Skills (know-how), and Disposition (know-why) in a specific context. Even abolishing soft or hard skills, they say that a conscious and proactive effort is needed for all Computing curricula to incorporate Ethics, including SE.

Ethics underpins both perspectives, whether "technical" or "non-technical"; separating them indicates that the set of "technical" things can exist without ethical scrutiny, which is false since Ethics is intrinsic to acts, even the "technical" ones. Ethical conscience is above technical or non-technical aspects, SS or HS. It makes sense to expect the entity under analysis to have human values in line with the state of social-historical morality appropriate to the sector in which it fits or seeks to fit.

6.4 The Open Source/Science Dilemma

It is relevant to extend one of the main themes associated with one of the extracted papers to qualitative synthesis, Open Source/Science (Kon et al., 2011); because both are intrinsically related to Computational Ethics. Kon et al. (2011) brings us the FLOSS (Free/Libre/Open Source Software) perspective, as indicated: "[...] offers SE researchers the opportunity of basing their research on abundant and publicly available data, freely accessible data analysis, and software development tools.".

In CBSoft, there is a profusion of occurrences of the term "OPEN SOURCE" and similar, surpassing a quarter of all publications. Even so, only Kon et al. (2011) dealt significantly with ethical aspects.

In short, the decision to follow "openness" ideals and values in both Software and Science is directly ethical, e.g., making source files and data generated by research available; opting for the use of available tools/systems in the engineering of software or the elaboration of research in SE; make scientific communication (paper) available free of charge in an open and easily accessible way. There is a social and political moral clash in everyday computing culture between using "open" systems, such as Linux, or "closed" ones, such as Windows. This clash is a current, visible, and routine theme for Computing. Open Source/Science is a topic related to Ethics of such relevance that the intersection between these two and the Brazilian SE scenario, mainly CBSoft, deserves future work.

This relevance culminated in the holding, in the 2021 edition of CBSoft, of the First Workshop on Open Science Practices for SE. Given the theme's intersection's relevance, we also analyzed these sub-events' communications. Unfortunately, and despite its potential, the results were similarly meager.

We analyze two relevant ethical Workshop papers. Mendonça et al. (2021), and Mendonça (2021) both deal with solid ethical issues about how open or closed the SBES community is to new independent researchers and on the oxymoron between SBES opening and internationalization. Both themes had a strong potential for explicit ethical deliberation, which was not taken advantage of.

Mendonça et al. (2021) noticed that the SBES is an event of difficult access to new researchers. In the conclusions, the authors indicate that they "believe that the entry of new members, through the publication of independent works and without a direct link with current members, it is a *sine qua non* to maintain healthy and diverse research communities" [our translation] (Mendonça et al., 2021). Why? Why do new members and independent work keep the community healthy and diverse? Is it currently not healthy and diverse? Does that mean it is unhealthy when conclude that SBES is a closed community?

Mendonça (2021) presents the dilemma between internationalization and openness as a political problem. For whom does SBES produce, or to whom does it intend to communicate? These are intentional and conscious collective choices of a scientific community, the collegiate that makes up the organization of SBES. Under the auspices of publication of proceedings by ACM DL, in a closed and paid repository; and exposing the preference for communications in English in its call for papers, a

language in which few Brazilians are literate [13], an ethical stance is taken. The English and ACM DL preferences prioritize greater reach, visibility, and impact values. The dilemma we perceive is, should SBES prioritize scientific communication for Brazil and Brazilians in general? Or prioritizing reach, visibility, and impact under the scientific principle that scientific contribution should aim at these ends? Because, globally, the number of people literate in English is greater than in Brazilian Portuguese, as is the scope of ACM DL's search networks. As the author concludes, it is worth reflecting: is the scientific production of SBES, or should it be, oriented to Brazilian society?

In conclusion, the rational, conscious and free adherence to open source/science is a moral act resulting from an ethical deliberation, anchored in one of the contemporary dilemmas of Computational Ethics (Grodzinsky and Wolf, 2008). As well as its complement, non-adherence, it is also a moral position, e.g., if the database is protected by confidentiality requirements or its exposure has a high risk of harming others, there is a plausible ethical perspective to avoid an open approach.

6.5 The Social Diversity Dilemma

One of the topics of significant relevance in CBSoft, specifically in SBES, is social diversity in SE. It has received increasing attention and dedication in publications, SBES 2022 presents an entirely session dedicated to it [14]. We can see it in Ortu et al. (2017); Canedo et al. (2022); Kohl and Prikladnicki (2022); Canedo and Santos (2019). Considering the Brazilian SE scenario, we can see that Edna Canedo is a reference in the topic of gender diversity, which in turn predominates in the theme of social diversity.

The scope ranges from the Brazilian one, as we can see in (Canedo et al., 2021), to the international (Rodríguez-Pérez et al., 2021), exposing a wide range phenomenon. Analyzing the publications that present this theme during Narrow Screening, we perceive some aspects that are appropriate for discussion from an ethical perspective.

Without defending a forced or majority omnipresence of ethical or moral aspects, we note an absence of ethical or moral discussion in publications crossed by this theme, which presents ethical justification essentially through the dialectical and social path (Vázquez, 2018). An agenda of greater social diversity is directly related to the dialectical intention of moral and social advancement of a secondary category in the SE area, i.e., greater social diversity indirectly and secondarily leads to better perspectives and innovations in SE (Ribeiro et al., 2020). And deliberation about social diversity, whether in terms of combating exclusion or encouraging greater inclusion, is categorically (although not exclusively) ethical. Diversity is not a natural phenomenon that naturally manifests itself spontaneously or through processes disconnected from human intervention; social, cultural and dialectical, i.e., ethical, agency is necessary.

Critically, a discourse objectively emerges in Kohl and Prikladnicki (2022) and in Rodríguez-Pérez et al. (2021), the statement that "diversity is good beyond ethical reasons". This idea configures an epistemological conflict with the ethical essence itself, it is the ethical reasons that formulate objective morality, which in turn form the idea of good and evil. It is impossible for something to "be good" together with "beyond ethical reasons", because there is a derived dependency relationship between them. On the contrary, ethical justifications (Vázquez, 2018) support diversity.

As presented in the works cited throughout this section, the evidence and data indicate that social diversity, even considering only gender, brings several advantages, benefits and opportunities in SE. Therefore, and due to the idea of values, anchored to ethics, the organizational choice to promote, sustain and manage social diversity is a positive path in the universe of possible practices or institutional actions. Choosing to promote, sustain or manage social diversity is an ethical path, among the many possible ones (e.g., social exclusion). It promotes social, cultural and historical moral advancement, and presents rational support, based on evidence and data. In fact, it is an agenda that is not restricted to ethics, at the same time it is inseparable from it, without being "beyond good".

6.6 Limitations and Threats to Validity

Traditional to secondary studies, we present the threats to validity (Petersen et al., 2015). We cover theoretical validity by bringing definitions as a basis for screening, allocating diverse and independent researchers to selections, extractions, and reviews at each stage. We use an extraction form based on previously defined, deliberate and eligible research questions and answers defined by the authors in consensus. The findings, results, and conclusions were drawn and discussed to avoid researcher bias. To preserve repetition, we aim to present the protocol with maximum completeness and documentation. To preserve auditability, we make the data available online for review and analysis. Approximately six SBLP papers from 2010 and 2011 were unavailable online without causing significant threat due to the inexpressive amount, less than 0.01% (from 1529).

7 Conclusion

How are ethical aspects spread across publications in Brazilian SE publications? This paper presents an investigarion on the broad scope of Brazilian SE scientific publications between 2010 and 2022, regarding SBQS, SBES, SBCARS, SAST, SBLP, JSERD, and CBSoftX; presenting a panorama, both wide and quantitative, as well as narrow and qualitative, in-depth.

A meta-scientific view of the Brazilian SE scientific panorama and its publications is structured. We followed Kitchenham et al. (2015) protocol for structuring and formalizing the research objectives. We analyzed 1529 papers; 175 presented some ethical aspects, and seven stood out and included qualitative and detailed synthesis.

[13] Just as we, the authors of this present work, are ethically aware and chose to write this scientific communication in English.

[14] `https://dl.acm.org/doi/proceedings/10.1145/3555228` [accessed 01-01-2024]

The quantitative data behavior was inconsistent. The ethical aspects varied weakly between the thirteen years. In 2022, the year with the highest occurrence, ≈19% of publications presented some ethical aspect; ≈4.6% in 2012, the year with the lowest occurrence. Of the 175 papers analyzed in the wide screening, more minor than 5% had any ethical consideration in addition to IC/EC, and even the amount of papers presenting only IC/EC is, alarmingly, much lower than the amount of SE research published and involving human participation.

Including the seven narrow screening papers, all ethical deliberations analyzed were shallow, with no room for further consideration. Therefore, concerning ethical aspects, the Brazilian SE scenario is deficient, but also a potential terrain to be explored. To enrich the SE-related ethical or moral aspects, we have forwarded discussions of marginal and transversal topics based on the information extracted from the qualitative synthesis and relevant terms.

From the synthesized and evaluated information, we extracted knowledge for proposals and practical referrals in order to advance the ethical aspects in the CBSoft, practically the same as we noticed in research involving other Computing events, also SE-related (Carvalho et al., 2021b): (i) Establish a mandatory explicit statement related to IC/EC in the respective scientific communication, justifying in case of non-occurrence; (ii) During the review stage, create a criterion associated with ethics for reviewers to analyze how ethical research issues are being addressed; Establish a standard terminology and structure for an IC, although this document is research dependent, some information or questions are standardized, varying only with the research data *per se*; (iii) Foster a culture of consideration for ethical aspects in CBSoft published research, recommending that authors dedicate a section or subsection of their articles for its ethical analysis; (iv) Offer short courses and workshops on Computational Ethics and Research Ethics.

It is necessary for the Brazilian SE community, in a systemic and structural way, to foster an ethical climate and seek moral advancement. Whenever possible, supported by academic-scientific criteria, as in studies of the moral behavior of humans or Ethics (Vázquez, 2018). In this sense, above extending recommendations, we reinforce the promotion of ethical or moral aspects and that ethical recommendations or moral standards emerge from these. Then, in this sense, we made ourselves available to the community, within the scope of practice and of a transformative nature, to move towards this north.

In this work, we analyze the occurrence of ethical aspects explicitly communicated. It is beyond our scope to analyze whether, *de facto*, the published research is ethical/moral or not. For this purpose, we need more profound and complex research, analyzing different criteria and parameters. For example, research associated with analyzed publications may have dealt with EC/IC, but the authors omitted this information from the paper. While the absence of communicated ethical aspects is not a necessary or sufficient condition to categorize research as "unethical"/"immoral", the explicit and correct presence in scientific communication positively points toward an objective direction indicating ethical/moral research.

In future work, the search can be expanded to other SE-related spaces, e.g., others conferences or journals. Here we present brief recommendations to advance the ethical and moral aspects to the Brazilian SE community and scenario. Analyze in detail and specifically each SE community, its sub-areas and topics, and analyze how ethical or moral aspects are addressed. There is potential for future work that, in a formal and structured way, proposes ethical or moral advance in the Brazilian context of SE. Considering our own ethical responsibility, this path must be built in a collaborative and participatory community way, and this present work is a step towards that.

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