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A meta-scientific broad panorama of ethical aspects in the Brazilian IHC

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Abstract

Ethics is a field of study that analyses practices, their principles, customs, and habits. The Grand Research Challenges in Human-Computer Interaction in Brazil (GranDIHC-BR) between 2012 and 2022 highlighted the relevance of the topic Ethics in the context of Human Values. Aligned with that, we claim that computational techniques are not neutral and, therefore, ethical analysis is essential to the design of applications as well as theoretical or conceptual research. The goal of this work is to provide an understanding on how researchers have addressed the ethical aspects by analyzing the publications of the IHC-BR: the Brazilian Symposium on Human Factors in Computing Systems, the leading conference dedicated to HCI in Brazil. Thus, we conducted a Systematic Literature Review guided by the main research question: how does ethics permeate research published between 2006 and 2021? As a result, although less than 5% of the papers discussed ethical content, we observed a significant growth in ethical aspects over the years, both associated with the meta-research and its application.

Keywords: *Ethics, Computational Ethics, HCI, GranDIHC-BR, Systematic Literature Review*

1 Introduction

When elaborating on the Grand Research Challenges in Human-Computer Interaction (HCI) in Brazil (GranDIHC-BR) (Baranauskas et al., 2014), for the period between 2012 and 2022, the theme of applied ethics in HCI was categorical and explicitly wide open. Both in the Challenge #4, Human Values, and the respective appendix eleven, the guideline and context are straightforward: Computing has achieved pervasiveness in the societal and human relationships such that it is imperative to think about this topic by its application, impact, or influence, considering ethical precepts. Primary, from computing to computing, and secondary, from computing and beyond. As Piccolo et al. (Baranauskas et al., 2014) point out in appendix eleven: "*The designer's intentionality in directing certain actions or behaviors is not always explicit or desired by the stakeholders affected by the use of technology*". While GranDIHC-BR proposes five challenges, Stephanidis (Stephanidis et al., 2019) proposes seven grand challenges, and ethics is also of primary interest.

The GrandIHC-BR document indicates its intent and purpose, announcing what it explicitly is and intends to be:

> "The Grand Challenges which resulted from the GranDIHC-BR represent a reflection of the Brazilian HCI community on the area and an opportunity to inspire and guide the direction of HCI research in the country for the coming years. We hope that these Grand Challenges act as a guiding principal for the development of projects that lead to significant scientific advances with social and technological applications. We also hope that this initiative and its results reach out to other disciplines and inspire other developing countries and/or countries with challenges of a similar nature." Baranauskas et al. (2014)

Ethics and Aesthetics are siblings embraced by Value Theory. Ethics analyses practices, principles, customs, and habits; Aesthetics analyses the qualities and kinds (Schroeder, 2021). Interactive computing systems permeate human life, impacting how we live in every aspect. Computational practices are not neutral (Kira and Merkle, 2016; Christians, 2007), ethical analysis and evaluation are necessary for designing computational solutions and research.

The Human Values challenge #4 presents aspects of Ethics alongside Privacy and Post-death Digital Legacy (Baranauskas et al., 2014; Leitão et al., 2017). Silva et al. (Silva et al., 2018) present a Systematic Literature Review (SLR) on Privacy in the research scenario of the Brazilian Symposium on Human Factors in Computing Systems (IHC-BR), the main conference dedicated to HCI in Brazil, without focus on Ethics. Eight years have passed since the deliberation and elaboration of the GranDIHC-BR (Baranauskas et al., 2014), which brought ethical issues to the attention. The main question guiding our work is: **how is ethics addressed in the IHC-BR research papers published between 2006 and 2021?** In Section 4 we address related questions.

The concern with ethical aspects goes beyond the Brazilian context and is directly present in the HCI domain worldwide (Frauenberger et al., 2017; Fiesler et al., 2018; Munteanu et al., 2019). There are several challenges to ethical research, like Ethics Committees (EC - *Comitê de Ética*), Informed Consent (IC), and the relationship between researchers and research participants, among others (Brown et al., 2016); external to the scientific domain, legislation, scientific dissemination, search for research participants, structures of power and privilege, research impact and influence, among others. For example, the Brazilian General Data Protection Law (*Lei Geral de Proteção de Dados Pessoais* - LGPD) and scientific procedures (Carvalho et al., 2021a); the costs of hiring interpreters for research that so require, e.g., when involving deaf participants (Sheneman, 2016); or reflecting on the possible positive and negative research impacts, and for whom they will be so (Resnik and Elliott,

2015). Some ethical dilemmas in research today were previously invisible or ignored in the past, e.g., black people and blackness used as research objects by white scholars (Cardoso, 2020).

In this paper, we present the current panorama of Ethics related to research published in the IHC-BR through the SLR method proposed by Kitchenham (2004), mainly showing positive results and a few challenges and shortcomings. We identified a significant growth in ethical aspects over the years, both associated with the meta-research and its application, in the involvement of EC and IC, and the depth of theme coverage.

This paper is structured as follows: Section 2 briefly presents conceptual foundation used to conduct this research; Section 3 points out related works and Section 4 presents the detailed method used in our SLR; Section 5 presents results and qualitative synthesis with related discussions, and Section 6 closes with conclusions.

2 Theoretical Foundations on Ethics

Although widely disseminated as a definition, the primary interest in ethics is not "good" or "evil", "right" or "wrong". Ethics rationally analyses actions, with Morality as the subject (Fieser, 2020; Ferraz, 2014). While morality fits a subjective perception, considering that each one of us is a subject endowed with morals, Ethics is traditionally taken as objective (Singer, 2011). It involves balancing subjectivity and objectivity, disregarding the extremes of particularization and relativization, combining individual interest and the other elements of rationality, a dialogue between personal interest and moral interest (Ferraz, 2014). The self-immanence is respected, avoiding self-annulment or going against oneself. Ethics and Morals are not synonymous, considered the theoretical basis in this paper.

Ethics studies and raises ethical dilemmas (Fieser, 2020). We reinforce this statement since certain practices, located in the current time and in the Brazilian scenario, are no longer suitable for ethical scrutiny. For example, at some point in time in the twentieth century, any research could be designed and carried out with human participants without acquiring their free and informed consent.

In 2022, consent is no longer an ethical dilemma and is a preliminary minimum requirement in conducting research involving human participants (CNS, 2012, 2016). As Salganik (2017) points out, IC is both a foundational idea and an obsession in the current research ethics paradigm: "The simple version of research ethics says: 'informed consent for everything.' This simple rule, however, is not consistent with existing ethical principles, ethical regulation, or research practice. Instead, researchers should, can, and do follow a more complex rule: 'some form of consent for most research."' (Salganik, 2017).

Although research involving human participants demands IC, its involvement is inappropriate in specific research with particular specificity. Salganik (2017) exemplifies research related to the analysis of social discrimination, i.e., it is incompatible for the researcher to request consent while analyzing discriminatory practices from the people involved in the research. After a rational, structured, and formal analysis, IC adoption is considered a rule and its absence as an exception.

Moral or immoral practices, depending on the context, considered and valued through rational scrutiny are considered ethical (Vázquez, 2018; Ferraz, 2014). For example, Brazil's institutional regulations on research ethics determine mandatory quality requirements regarding IC (CNS, 2012). Being aware of the fundamental quality requirements for an IC and presenting it without complying with them through negligence is an unethical and immoral practice. That is, knowing that the quality requirements objectively exist and choosing to ignore them completely. It is an ethical and immoral practice if it occurs due to disagreement or rebellion against the rules. That is, knowing that quality requirements objectively exist and choosing to disregard them for one's own rational and well-founded motivations. The mere IC presentation is not necessary and sufficient to categorize research as "ethical".

Actions deliberately, consciously, and notoriously perceived as immoral taken by legitimate interest are considered unethical (Vázquez, 2018; Fieser, 2020). Even after reasoning about a course of action and analyzing from all angles that it is categorically immoral, following it is unethical. For example, as detailed in Section 5, in 2006 and 2008, very few papers cited EC or IC from participants, but this data alone does not categorize research or the researchers involved as unethical.

In the context of meta-science, when morality goes beyond the limits of the individual or group, it accesses the political sphere. In this sense, we perceive politics as morality on a collective, structured and organized scale (Ferraz, 2014). Political ethics, in this sense, deals with reflection on collective morals or morality; while ethics focuses on individual or group practices. For example, as ethics we have the choice of an author or research group to submit their research to the EC; as political ethics, an entire research laboratory choose to ignore the mandatory review of its research by ECs, or the IHC-BR stipulating the obligation that all research submitted to it justify the reason for both involving or not the review of an EC.

Research ethics is a well-established and debated topic in the scientific community, presenting prolific comprehensive literature (Reijers et al., 2018) and specialized HCI literature (Bruckman, 2014; Frauenberger et al., 2017; Fiesler et al., 2018; Munteanu et al., 2019). Detailing concepts and definitions of this theme is beyond our scope, however some general lines need to be drawn. Unlike Privacy or Post-death Digital Legacy (Baranauskas et al., 2014), Ethics encompasses a diversity of aspects transverse to research, due to its own philosophical nature. In this SLR, we address two specific research ethics criteria (Reijers et al., 2018), (i) as a meta-research, does the research path, as an end, present ethical analysis about itself? For example, are the research development procedure and meta-procedure ethical? (ii) as an application, does the research result, as external effectiveness, present ethical analysis about itself? For example, is there an ethical reflection on the impacts or influences of the artifact proposed?

Ethics and its analysis vary in time and scenario. Pereira

and Maciel (2013), in 2013, published a research paper with human participation without an IC form because "*According to French rules, there was no need to sign consent forms to participate in this research*" (Pereira and Maciel, 2013). French research morals were accepted and corroborated, while in Brazil the informed consent from participants would be necessary. In addition, there was an ethical meta-research concern, as the authors reasoned about the moral intermediary between the Brazilian and French scenarios. A pertinent ethical dilemma could be: should research published in Brazil follow Brazilian moral norms or should they respect the moral norms where the research was conducted? Regarding time, in 2013 this moral conduct in research was accepted, but would it be the same in 2021? Or should it be accepted in the future?

There is also Computational Ethics, a field of studies in Applied Ethics (Fieser, 2020) under the domain of Computing. Since the seminal article by Moor (1985), there is an open debate that divides the opinion of ethicists (Barger, 2008; Johnson, 2008): (i) the practices associated with Computing are so significant or specific as to consider Computational Ethics; or (ii) are computational ethical dilemmas a generic type of ethics? Countered by the ideals proposed in the GranDIHC-BR (Baranauskas et al., 2014), we reinforce option (i): Ethical dilemmas involving the complexity of interaction between humans, researchers included, and computers have their own specific ethical or moral considerations.

Computational Ethics is different from Normative Ethics or Law Studies (Barger, 2008). Normative ethics involves arriving at moral standards that regulate right and wrong conduct (Fieser, 2020). Law Studies is the formal and structured analysis of legislation, commonly carried out by law researchers. Following laws or norms indicates being adequate and in compliance with legal or normative morals, however it does not constitute ethics or ethical conduct. For example, an HCI computational system in compliance with the LGPD means that it is LGPD compliant, and is not a necessary or sufficient condition to be considered ethical.

As a concrete example, in HCI research involving underage participants, consent from guardians is mandatory. Several papers at IHC-BR present research involving underage as participants, with the consent of their guardians/parents through an IC. That is, ethical criteria were analyzed, evaluated and followed. However, what about the underage autonomy and free will? In Silva et al. (2019); Santos et al. (2019); Muriana et al. (2019), the underage participants were asked to sign terms of assent (not consent), adjusted to their level of literacy, and the guardians/parents were invited to participate. This practice demonstrates ethical concern both with the EC rules and the human values of the participants, guardians/parents or children.

In this section we present different concepts and definitions, also through examples. We do not intend to categorize research as ethical or not, or to propose a categorization framework for this purpose.

2.1 Ethics Committee and National Research Ethics Committee

In Brazil, the National Health Council (*Conselho Nacional de Saúde* – CNS) is the institutional regulatory body for the norms associated with research ethics, directly associated with Health, as the name implies. The National Research Ethics Committee (*Comissão Nacional de Ética em Pesquisa* – CONEP) and EC are linked.

The CNS institutional website has a clear and comprehensive explanatory text about EC and CONEP [1] in the absence of an English version, we offer a translation:

> "The National Research Ethics Commission (Conep) is directly linked to the National Health Council (CNS). The multi and transdisciplinary composition brings together representatives from different areas of knowledge to fulfill its primary task, which is the evaluation of the ethical aspects of research involving human beings in Brazil. In fulfillment of its mission, the Commission prepares and updates guidelines and norms to protect research participants and coordinates the EC/Conep System.
>
> The EC/Conep System is formed by Conep (the highest instance of ethical evaluation in research protocols involving human beings) and the EC (Research Ethics Committees), regional bodies located throughout the Brazilian territory. The System also involves researchers, research assistants, professors, university students in scientific initiation, teaching institutions, research centers, research sponsors, and research participants.
>
> Conep has autonomy for the ethical analysis of highly complex research protocols (and special thematic areas, such as human genetics, human reproduction, indigenous populations, and international cooperation research) and in research projects proposed by the Ministry of Health. At the same time, the EC is responsible for low and medium-complexity research protocols and is the gateway to all research projects involving human beings. In this way, the analyzes that are the responsibility of Conep first pass through the EC and are automatically forwarded to Conep for analysis." (our translation)

In addition to the researcher's particular or personal ethics perspective, there is an institutional structure behind it that determines and controls the "collective" ethical deliberation, representative of the moral values governing ethics in Brazilian research ethics. Only the EC/CONEP system can determine that a research "is ethical" from the governmental, institutional perspective, i.e., it conforms to the institutionalized moral norm.

CONEP must appreciate research with specific characteristics. The researchers submit their research involving human participants through the online system *Plataforma Brasil*, which an EC will appreciate. The non-appreciation by EC/CONEP is not a necessary or sufficient condition to categorize research as immoral or "unethical". However, due to the formal institutional bias, only official appreciation and approval by EC/CONEP can label it as "ethical". After submission, the research receives a Certificate of Presentation of Ethical Assessment (*Certificado de Apresentação de Apreciação Ética* - CAAE).

The CNS considers research ethical if it follows some criteria:

[1] http://conselho.saude.gov.br/comissoes-cns/conep/ [accessed 08-08-2022]

> "Respect the research participant in their dignity and autonomy, recognizing their vulnerability, ensuring their willingness to contribute and remain, or not, in the research, through objective, free and informed manifestation; Weigh between risks and benefits, both known and potential, individual or collective, committing to maximum benefits and minimum harm and risks; Ensuring that predictable damage is avoided; and have social relevance, which guarantees equal consideration of the involved interests, not losing the meaning of its socio-humanitarian destination." (our translation)

The CNS, and the EC/CONEP system, operate through normative acts. Such as resolutions, motions, bylaws, and recommendations. Among these, two represented turning points due to their significance and impact on the ethical aspects of Brazilian research, Resolution 466/2012 (CNS, 2012) and Resolution 510/2016 (CNS, 2016). Both bring many impositions to Brazilian institutional research involving human participants, also determining criteria for research that do not need to be registered or evaluated by the EC/CONEP system (CNS, 2016).

Consider the previous example of ethics and morality mentioned regarding IC. The EC/CONEP system officially determines the institutional moral norm of research ethics (i.e., what is right or wrong, good or bad, cruelty or kindness, justice or injustice, among others). For example, in a country without a high-level institutional standard-setting body, morality is stipulated in other ways. Even so, ethical dilemmas related to IC persist.

We conclude this section with the idea of "ethical bureaucratization" related to ECs (Tomanik, 2008; Bietti, 2020), from which some tension arises:

> "Acting as supervisors of norms, the committees eliminate the fundamental dialogic character of ethical reflections and subvert the very essence of ethical decision-making: ethical becomes what the committee, unilaterally, has classified as such. The researcher, the research proponent, is no longer treated as a significant other in the discussions and decisions involving their decisions, procedures, knowledge, and even convictions and values.
>
> Likewise, according to its essential proposition, committees exist to protect the integrity of research subjects; however, based on the adoption of linear interpretations of the "requirements" contained in the Resolution, these subjects are treated generically, without their specificity being or may be considered." (our translation) (Tomanik, 2008)

There is a tension between personal ethics and institutionalized ethics, which resembles mere bureaucracy. The target of recurrent criticism from researchers, leaving the impression that EC exempts itself from ethical deliberation on ethical aspects related to the analyzed research, just trying to confirm that the respective research is following regulations (regulations, offices, ordinances, among others). As already mentioned in this section, this culminates in an unethical phenomenon, alienated from properly ethical deliberation. Thus, it configures a scenario of ethics bashing (Bietti, 2020), where the practice of moral deliberation takes place through preconceived formalism and determination, without plurality or exceptions.

Some examples (Tomanik, 2008), mandating that **each and every** research needs to have IC; disregard **any and all** research in progress; **any and all** minors must present a term of assent and consent of those responsible; among others.

However, the criticisms we expose in these sections should not be used as motivation or justification to exempt research involving human beings from submission and appreciation by an EC. It is essential that the researcher, together with their peers in the joint scientific production case, support their ethical deliberation; without disregarding or neglecting institutionalized ethics, which in the Brazilian case involves the perspective of CNS, CONEP, and EC.

3 Related Works

We conducted a search for SLRs related to this present proposal, associating Ethics and HCI in two sources, *Portal de Periódicos CAPES* [2] – which covers essential databases such as the ACM DL – and Google Scholar [3]. We found no SLR results focusing on Ethics and HCI direct association, limited to research or not.

Considering non-systematic literature reviews, Shilton (2018) presents a discussion associating Ethics, HCI, Research, and Values-Oriented Design. The analysis is broad and covers both positive and negative aspects regarding Values-Oriented Design and its application, addressing challenges and opportunities. Thirty years of publications on the subject are covered in this literature mapping, summarizing reflections and findings.

Concerning the GranDIHC-BR and the IHC-BR, Silva et al. (2018) presents an SLR focused on privacy, one of the primary topics of the fourth challenge. The title of our paper mimics theirs. To maintain consistency and continuity, conducting an SLR dedicated to the Post-death Digital Legacy is future work in this sequence. They conduct a SLR exposing the Privacy scenario at the IHC-BR, identifying that, since the GranDIHC-BR, the occurrence and relevance of this topic have grown.

Outside the scope of the GranDIHC-BR, Coelho et al. (2017) presents an SLR on Accessibility related to the Grand Challenges of the Brazilian Computer Society between 2006 and 2016. They extracted papers from other spaces of scientific communication than the IHC-BR. It was possible to observe a greater diversity, even in small proportions, in the contributions and the unique needs addressed.

Based on the publications keywords between 2013 and 2015, Bueno et al. (2016) explore a relationship between the GranDIHC-BR and the research trends at the IHC-BR. The fourth challenge include Law Studies and Ethics as "Legal aspects and ethical aspects of HCI research and practice". Intertwining legislation and ethics is a frequent misconception, and they ground these two aspects nowhere in GranDIHC-BR. In a Tag Cloud generated from the papers' keywords to represent the fourth challenge, no occurrence of Ethics or similar terms, such as moral, was registered.

Barbosa et al. (2017) presents a detailed and in-depth meta-scientific bibliometric study of the IHC-BR between 1998 and 2015. This work helps researchers to understand the evolution of the HCI field in Brazil and may reach an understanding of how research communities are developing throughout

[2] https://www-periodicos-capes-gov-br.ezl.periodicos.capes.gov.br/. [accessed 08-08-2022]

[3] https://scholar.google.com/. [accessed 08-08-2022]

the world. However, the GranDIHC-BR (Baranauskas et al., 2014) is absent from this work, without any coverage whatsoever. Additionally, there is no occurrence of ethics or similar terms. On the one hand, these absences suggest that ethical aspects were not central to the community's scientific debate until 2015, as they were not present in the most important metadata (e.g., title, conference topic, keywords, and abstract). On the other hand, aspects related to ethics and the GranDIHC-BR may not have caught the authors' attention during data analysis and synthesis. Probably ignored considering the extracted keywords grouping under similar topics.

It is worth pointing out other literature reviews aligned with the immanence of HCI, Ethics, and ethical aspects. Pater et al. (2021) analyses compensation strategies to encourage recruitment in user studies. Some of the approaches may culminate in ethically questionable practices such as coercion. Van Mechelen et al. (2020) deals with the Child-Computer Interaction (CCI) area. Even mentioning ethics, the quality of its occurrences is deficient.

Finally, we must deliberate on the value judgment and ethical analysis in this present research. The absence of related works primarily aimed at ethics does not indicate that scientific communities are immoral or unethical or that they "are not concerned with ethics". It means that this aspect is not structurally and formally reported, either primary or secondary and this is an aspect of potential, but implicit, relevance. Contrary to this perception, we could say "ethics is uninteresting or useless to the HCI scientific community", but this would be a fallacy refuted in the GranDIHC-BR. However, there is a need for a more direct, specific, and proper approach to the ethical aspect. Moreover, this present work tries to formally disclose this reality through a Metascience perspective.

4 Research Method

SLR provides a methodology to identify and interpret state of the art regarding a topic of interest (Kitchenham and Charters, 2007). To perform this SLR, we used well-known guidelines to collect, select, and summarize relevant research, in a way to ensure the replicability of the process. For this purpose, we followed the guidelines from Kitchenham (2004); Kitchenham and Charters (2007). We used *Google Sheets* as an online support system to collaboratively perform this review, which allowed us to work remotely within a virtual shared database. In the remaining of this section, we present the SLR protocol.

4.1 Objective and research questions

The primary objective of this research is to present a panorama of ethical aspects through scientific communications categorized as full or short papers published in the IHC-BR event between 2006 (first edition available in the ACM DL) and 2021. Our analysis covered thirteen editions. In 2007 and 2009, there was no edition as the IHC-BR took place biannually.

For a panoramic perception aligned with the objective, we divided the main question (*how does ethics permeate research published between 2006 and 2021?*) into sub-related ones presented in Table 1.

Presented the main question, the objective, and the subquestions that guide this research, we present three exceptional complements. First, we avoid associating the quantitative results with the GranDIHC-BR (Baranauskas et al., 2014) because we consider this a spurious correlation, i.e., it is not because the work explicitly addressed ethical aspects that it was motivated by the GranDIHC-BR. Affirming that the variance of publications presenting ethical aspects was a direct consequence of GranDIHC-BR is a fallacy, so we validate this relationship only if the publication explicitly announces a relationship with GranDIHC-BR, as we verified in RQ10.

Secondly, we focus on the explicit occurrence of terms associated with ethical aspects, i.e., publications that deal with ethical aspects implicitly, indirectly, or through isolated values, fall outside our scope. For example, if a publication deals with **virtuously** "good" or "bad" design practices without explicitly citing ethics or morals, it is outside the scope of this research.

4.2 Search strategy and data extraction

We conducted a string search using key terms to encompass all possible related morphological constructions. The search focused on retrieving studies explicitly related to ethical aspects. For ethics, we searched for "ethic", such as ethics or ethical; for Brazilian Portuguese "etic", as *eticamente, ética, ético*. For morals, we look for "moral", namesake in English or Brazilian Portuguese, like *moralmente* or morally; and "morais", for plural.

As for associated and **not** covered terms, due to semantic complexity, we excluded the indirect ones associated with morals or ethics, such as "good", "bad", "fair", "evil", among others. In English and Brazilian Portuguese, we found that terms that refer to ethics or morals for other communicational purposes are not limited to value judgments. The time and effort to extract, analyze, review and discuss each case of these occurrences is disproportionate to the potential outcome.

Two other elements directly associated with the research and ethics epistemology are IC and EC (Brown et al., 2016). They are explicitly exposed and indicate a direct concern with ethical aspects, even if by secondary association. In the case of EC, the search for terms associated with ethics is sufficient since the formal and official term is **ethics** committee. Whether by consent term or not, we search for "consent" to include consent, consent term, consent form, or similar; and in Brazilian Portuguese, all the many variations, such as *consentiu, consentiram, termo de consentimento, formulário de consentimento*, among others.

We considered all publications categorized as full or short papers, in English or Brazilian Portuguese, and available at the *ACM Digital Library* [4] where IHC papers are indexed and stored.

This present work is an extended version of an article that appears in the search domain, unconsidered in the extraction.

[4] https://dl.acm.org/ [accessed 08-08-2022]

Table 1. Research sub-questions and possible answers

ID	Questions	Possible answers
RQ1	Did the production of works based on ethics show quantitative variance, absolutely or proportionally?	Ethical terms detailed in Section 4.2 and quantitative analysis
RQ2	What technological domains are involved in ethically-based work in previous and subsequent editions of GranDIHC-BR?	Open answer. Technological domains are research dependent
RQ3	Do the occurrences of ethics refer to meta-research, application, or both?	Meta-research, Application, Both
RQ4.1	Quantitative analysis of ethics committees and terms of consent?	Ethics committee, Consent term
RQ4.2	If they involve an ethics committee or informed consent, what is the specificity of involvement of the respective research?	Open answer
RQ5.1	Which research institutes or universities in the country stood out in ethics-related research?	Research institutions/universities
RQ5.2	Which authors stood out in ethics-related research?	Paper author(s)
RQ6.1	What is the methodological research approach of the works?	Quantitative, Qualitative, Pragmatic, or Literature Review
RQ6.2	Is the research fundamentally pragmatic, and does it propose an artifact?	Yes, No
RQ7	Cover ethical principles or foundations?	Open answer. Ethical principle or foundations
RQ8	What are the main limitations and difficulties explicitly associated with the ethical aspect?	Interpretative. Cited limitations and difficulties
RQ9	What is the language of publication?	Paper language
RQ10	What is the relationship with the GranDIHC-BR?	Yes, No (is or is not related to the GranDIHC-BR)
RQ11	Was the research publicly funded?	Yes, No
RQ12	In which scenario does the research occur, or is it intended to take place?	Open answer.

We preserve the final number of publications containing the summarized version of this article.

The year of the event and the number of publications analyzed were considered, respectively, 2021: 56; 2020: 60; 2019: 72; 2018: 54; 2017: 66; 2016: 57; 2015: 60; 2014: 53; 2013: 39; 2012: 39; 2011: 46; 2010: 28; 2008: 39; 2006: 32. Between 2006 and 2021 we covered 701 published papers. Considering the development and structuring of GranDIHC-BR in 2012, 417 date after (2013-2021) and 184 before (2006-2012). Required explanations about additional terms in Table 1 are presented through Section 5.

We extracted relevant information and data from selected studies through the data extraction process (Kitchenham and Charters, 2007), and present the items used in the data extraction process in Table 1. An open question means that answers depend on what comes up, if it does, in the content. Interpretative questions consider quality criteria defined and accepted by all the authors in consensus. If it was impossible to extract or infer information objectively, we indicate accordingly, e.g., the paper does not present the scientific approach (RQ7), and the inference of this data is compromised.

4.3 Review conduction process

The review took place in two stages, a wide and a narrow screening. In the first stage, two independent researchers conducted the initial extraction by searching for terms, one performed the extraction, and the other reviewed the results. The papers were qualified for their ethical aspects relevance and adherence. We choose those considered adherents for the second step. Adherent papers involving ethical aspects delve into the ethical or moral analysis, regardless of related terms, e.g., we exclude some papers with three or more occurrences of ethics from this second phase. In contrast, we include others with one or two. It is not about quantity but the quality of its occurrence and its relationship with the SLR objective.

Figure 1 illustrate the selection process and results. A total of 701 papers were initially retrieved, out of which we included 249 papers, as detailed in Section 4.2. After evaluation, 25 were read in full and included in the qualitative synthesis.

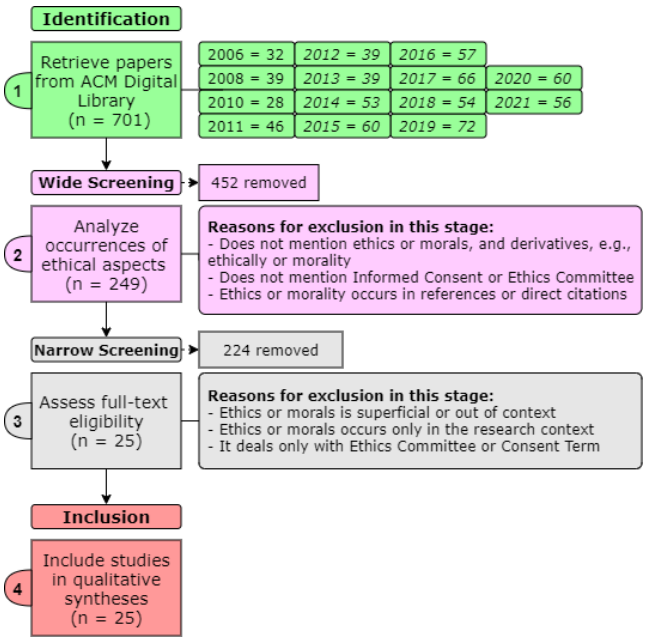

Figure 1. Diagram of the literature review process.

In the narrow screening stage, papers classified as adherent were separated. In this step, we conduct a deep and detailed extraction of information. The researchers involved, the authors, appreciated this list and reached a consensus, agreed by all. These publications address ethical aspects with relevance and significance.

For data extraction, selected papers were distributed in equal amounts or with a maximum difference of two between the four researchers. In order to minimize subjectivity and extraction errors, a second researcher analyzes and reviews the extraction for each selected paper, ensuring each researcher reviews data extracted by the other three. In the end, researchers resolved the disagreements and reached a consensus in a synchronous meeting. We achieved a consensus regarding the extraction results after consolidation.

5 Results and Discussion

There are two perspectives of analysis: (i) involving all the 249 papers from the wide screening, related to generalized perceptions; and (ii) involving the 25 papers of the narrow screening, related to specific perceptions about adherent papers dealing with ethical aspects. Section 5.1 deals specifically with the classification of papers by ethical aspects.

5.1 Q1. Publication categories and numbers

We present a comprehensive quantitative overview of publications involving explicit ethical aspects. Of the 701 papers initially collected, screened 249 for synthesis eligibility. These papers involve the term ethics or morals and the IC/EC. We categorized the papers as follows. **Not adherent** when the only ethical aspect identified was mentioning IC/EC or when "ethics" or "moral" terms appeared in the text but only superficially or without context. **Adherent** mentions the terms and contextualizes them in the research, or the terms are directly related to the focus of the study and discussed explicitly and broadly. This categorization reached consensual and interpretive acceptance by the authors, considering this is a qualitative criterion.

We exemplify with two examples of papers classified as not adherent. Santos and Prates (2018), the only occurrence is "*These decisions were motivated by ethical concerns*", there is no detail or explanation of what ethical concerns are or what they specifically refer to. (ii) Pinheiro et al. (2021a), "*However, in addition to the high cost of this alternative, there are also ethical challenges in recruiting users with disabilities, even more so in the case of color blindness, which has different types and gradations*" (our translation), although plausible, what are the challenges? Why are they "ethical challenges"? Is there an ethical difference between recruiting users with or without disabilities? The ethical issue is left loose and lacking in detail. As computational equivalence, it would be like saying "we use a programming language" without saying which or any specificity. There is a concern with an ethical aspect at a high, abstract level. However, it does not allow us to conduct a qualitative synthesis.

In the following sub-questions, we divide the analysis in two levels. Wide screening is the first level, involving the 249 not adherent papers, as illustrated in Figure 2, presenting a horizontal and broad panorama of ethical aspects. Narrow screening involves the 25 papers selected in the narrow screening, as illustrated in Figure 2, presenting a qualitative, in-depth synthesis.

The top chart in Figure 2 shows the absolute values of the publication number. The bottom chart shows proportional values, i.e., the number of publications involving ethical aspects divided by the number of publications in the respective year.

Figure 2 presents the quantitative results from the wide screening. We noticed a significant increase concerning ethical aspects from 2015 onward. Concerning the proportional analysis, in 2006, ethical aspects occurred in 6.3%, against 60% in 2020. In 2015 the proportion pointed to 21.7%, presenting expressive growth soon after. While absolute growth is uninterrupted, proportional growth has decreased in 2019,

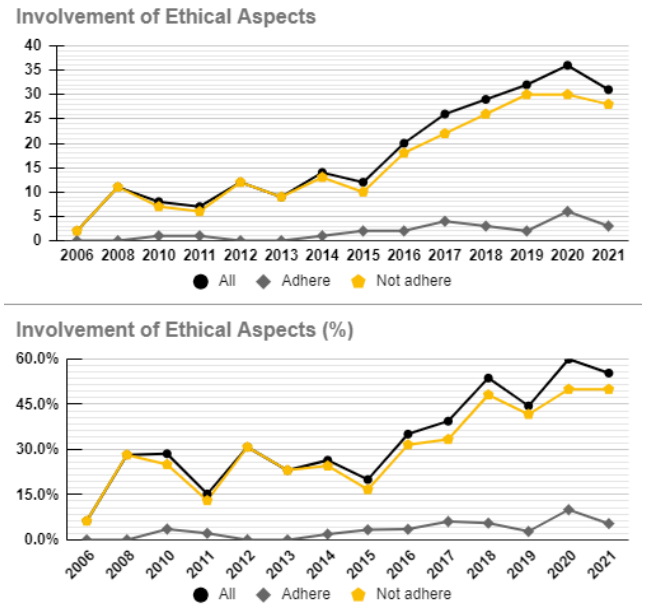

Figure 2. Involvement of ethical aspects.

rose in 2020, and slightly decreased in 2021. Positively, the number of vague approaches has decreased, and the adherence numbers increased in 2019 and 2020, i.e., improved ethical aspects reported in research.

Excluding IC/EC from the analysis, the most significant amount of papers occurs in 2018 (27.8%), i.e., 78.2% of the publications do not explicitly present ethical or moral reflections, even superficially. Best-case scenarios present an entire ethics section dedicated to its scientific thinking-doing, e.g., some of the adherent papers have entire sections oriented to ethical aspects (Muriana and Hornung, 2017; Marczal and Junior, 2016; Cunha and Aguiar, 2020).

The categorization of each type of work, by ethical aspect focus, is available in the online database [5] presenting all papers extracted during the screening phase, as illustrated in Figure 1. The qualitative syntheses are developed from 25 adherent papers (Santos et al., 2020; Espinoza and Baranauskas, 2020; Canal and Pereira, 2020; Sacramento et al., 2020; Gonçales et al., 2020; Lima et al., 2019; Silva et al., 2018; Strey et al., 2018; Paim et al., 2018; Martinez, 2017; Muriana and Hornung, 2017; Bueno and Anacleto, 2017; Pereira and Baranauskas, 2017; Marczal and Junior, 2016; Klock et al., 2016; Pereira et al., 2015; Souza et al., 2015; Braz et al., 2014; Maciel, 2011; Pereira et al., 2010; Amorim et al., 2019; Cunha and Aguiar, 2020; da Silva et al., 2021; Pinheiro et al., 2021b; Galvão et al., 2021). Qualitatively appreciated, Amorim et al. (2019); Cunha and Aguiar (2020) stand out for their great analysis involving ethical aspects.

No article has dealt with ethics as a primary topic, associated with a technological domain or not. Amorim et al. (2019) come closer, addressing Brazil's HCI ethics and research committees. Pereira et al. (2010, 2015) discusses ethics associated to human values and cultural aspects. Likewise, in the GranDIHC-BR, ethics is immediately below human values. Formally, it should be noted that the idea of "human values" comes from Ethics, and not vice versa (Vázquez, 2018).

[5] https://cutt.ly/XnaFsY3 [accessed 08-08-2022]

5.2 Q2. Technological characteristics

We analyze here the adherent papers. The technological domain through the papers is diverse, without one standing out over the others, suggesting the IHC-BR has published papers in a pretty diverse range of technological domains.

Considering the most frequent ones, 10 (≈40%) deal with the super-type of software applications, with varied subtypes, such as persuasive systems, digital games, or collaborative systems. 6 (≈24%) are alien to the technological domain, dealing specifically with design, e.g., design for the elderly, inclusive design for LGBTQIA+, digital legacy systems, or voice assistants. 3 (≈12%) deal with Online Social Networks. 5 (≈20%) has no specific or objective technological domain. 1 (da Silva et al., 2021) (≈4%) deals with wearable device, i.e., hardware.

5.3 Q3. Research ethical association

We analyze here the adherent papers. As explained in Section 2, this analysis has three options: meta-research, application, or both. As *meta-research*, when the authors discuss ethical aspects in the development of scientific thinking-doing. As an *application*, when the authors indicate ethical aspects associated with their main proposal or analysis. As *both*, when ethical aspects intertwine meta-research and application.

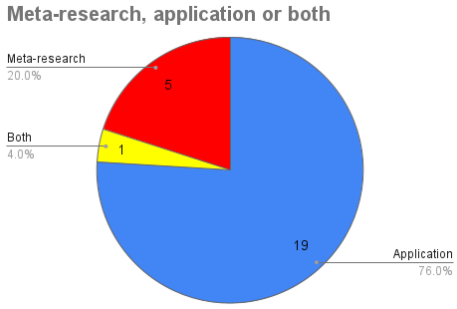

Figure 3. Focus of the research ethical association.

Figure 3 represents the information extracted by category. Two papers fit both. Gonçales et al. (2020) analyzes the effectiveness of using machine learning techniques to classify the understanding of software developer programs based on electroencephalogram (EEG) data. There is a subsection dedicated to ethical aspects, considering the use of EEG in the respective research (meta-research) and the use of EEG for unscrupulous purposes (application):

> "[...] some companies could use this information to try to qualify the performance of the developers. It would be an unethical implication to link scores, performance factors, or assign problems in the code directly to a physiological factor of employees" (Gonçales et al., 2020)

Only a minority deals with meta-research (Silva et al., 2018; Muriana and Hornung, 2017; Bueno and Anacleto, 2017; Souza et al., 2015). For example, Muriana and Hornung (2017) carried out a study involving older people and details the respect for the participants' autonomy. Some did not like to participate in certain activities. Some older people required training to carry out the research. They respect their health condition without coercing them to participate in the activities.

In Souza et al. (2015), the authors consider the relations of privilege and power in the educational environment between students and teachers:

> "As they were attending an introduction to HCI class, in order to take care of the ethical considerations of the study, their professor was not involved in the data collection and did not know who participated or not in the study until the end of the semester, after the grades had been assigned. During the semester, the professor only had access to anonymized data." (Souza et al., 2015)

Very close to both meta-research and application, Pinheiro et al. (2021b) dedicates its focus predominantly to meta-research, considering that its target audience is visually impaired people. During the COVID-19 pandemic, there is concern about the research evaluation experiment:

> "In the first stage, users were research instructed and signed the Free and Informed Consent Term, informing about the risks of the assessment, such as bumping into objects that were used to simulate the scenarios. In addition, due to the COVID-19 pandemic, all measures were taken on issues of distancing, masks and alcohol usage, and device hygiene measures.
>
> To carry out the experiments, there were at least two people: one writing down important information and the other responsible for always being close to the user, so that he could carry out an intervention in the event of an accident." (our translation) (Pinheiro et al., 2021b)

However, it boils down to meta-research, as there is ethical appreciation concerning the various risks of research. Although promising, the application analysis was absent, with possible questions and analyses regarding the application of the proposed artifact under ethics or morals in its implementation, use, and application. For example, what are the potential harms of using it? Besides the visually impaired people, who would benefit or profit from this proposal? How affordable or accessible is the artifact?

We perceive a lack of ethical meta-analysis on research in the respective scientific communications. The analysis of the meta-research advances the ethical analysis coverage. Ethically, it is an advance that the authors consider the applications of the research thinking-doing.

5.4 Q4.1. Ethics committee and informed consent

In this Section, we analyze the IC/EC relationship and involvement. As we have already pointed out, it is not our intention to analyze the quality of scientific communication published in the IHC-BR. We have not analyzed whether any of the 452 studies excluded in the selection process, Figure 1, "should" have an association with IC/EC but did not present it. It is beyond our goal to answer the quality of the respective IC/EC or examine what research should or should not involve IC/EC and whether they involved it. These analyses are possible inputs for future work.

Amorim et al. (2019) present a broad study on IC and HCI research in the Brazilian context, in which they detail this specific topic. While their study involves human participants, they justify the absence of submission for an EC appreciation.

Initially, we will conduct a comprehensive analysis through the not adherent papers.

One of the questions raised by Amorim et al. (2019) is precisely about the quality of the research and its relationship with EC: "HCI research that was conducted with the involvement of humans and was not submitted or approved by an EC, does it have a lower merit than the research submitted and approved?" (Amorim et al., 2019).

A criticism to Amorim et al. (2019) is the moralizing and normative discourse. The paper presents a pro-EC discourse, assuming that submission to the EC is imperative and questioning "how to get more researchers to submit to the EC?". They raise this question without presenting an answer to the title question: to submit or not to submit to the ethics committee. For clarification, we do not say that they should not be; but this reasoning does not build an ethical analysis because the only proper way is to respect moral norms.

Figure 4 exposes the occurrence of IC, EC, or a combination of both between 2006 and 2021. We present four types of extraction of explicit occurrences from the search terms. Scientific communication is involved with: (i) only IC (there is no mention of EC); (ii) EC only (no mention of IC); (iii) both IC and EC; (iv) has EC, with or without IC (sum of (ii) and (iii)). We mention "scientific communication" and not "research" because there is a difference between factual research and communication. For example, the research may have involved EC, IC, or both; however, these elements are absent from scientific communication. This mismatch between the research facts and the respective scientific communication is inadequate, however possible.

We do not analyze by proportion as it would indicate comparing research that requires IC/EC with research that does not need within the entire sample universe. We can see a growing concern in this topic, demonstrating an increasing concern with ethical aspects for conducting scientific research involving humans published in the IHC-BR. Regarding the combination of EC + IC, a concern about researchers' perception is: if EC approval is informed, does it include IC, or should it be informed explicitly?

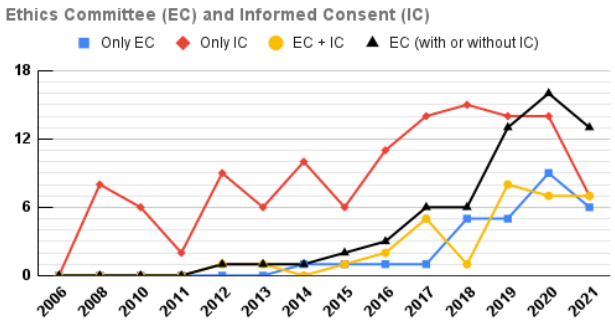

Figure 4. Research covering Ethical Committee and Informed Consent.

Regarding the analysis from the adherent papers, some have human participants, and there is no occurrence of IC/EC. In Espinoza and Baranauskas (2020), there is wide participation of humans by various methods of data collection involving them. This example reveals a situation in which an EC approved a research project. Although citing the funding project, we could identify an approval by an EC, and there is no mention of IC in the paper. However, the paper did not mention it – and this can be the case for other papers excluded in our selection process because they did not mention any term related to ethical aspects. Therefore, although the concern with ethical aspects is growing in the IHC-BR, there is still a need for rigor and standard to inform ethical issues.

In Marczal and Junior (2016); Bueno and Anacleto (2017), there is a classic dilemma of asynchronous and indirect data collection: "personal data extracted from social networks or pre-built databases need the consent of the personal data owners?". Carvalho et al. (2021a) associate this issue and the LGPD. Consent is not the only legal basis for processing personal data. Moreover, even based on legitimate interest or the LGPD, ethical requirements in research (e.g., as stipulated by EC) must be considered. In short, as long as there is good faith, anonymity effort, and respect for the law principles, the researcher is supported by the legitimate interest of his core activity, research.

In Bueno and Anacleto (2017), in addition to the debate on Online Social Network personal data collection, researchers deliberately intervened in a virtual community of a Municipality on Facebook to observe the reaction of its members. Specific questions arise: did the group members know that their actions would be used and recorded in the research? Did participants know they were reacting to an intervention purposely made to observe their behavior? Does accessing the group mean that members freely and clearly consent to participate in any research? Knowing that their actions would be inputs for some research, would they have acted spontaneously in the same way? Even if members configure their publications as "public" and researchers move away from legitimate intentional bad faith while preserving members' anonymity, the least expected is a formal, explicit, free and informed consent from "individuals observed". For example, notify them when accessing the group or keeping a publication fixed in a prominent position. The EC appreciation is morally ideal for the precepts of ethics in research. Neither occurred.

Pinheiro et al. (2021b) justifies the absence of EC submission and appreciation, reiterating obedience to official resolutions:

> "For the experiments to take place, ethical concerns were considered, according to the resolution 466/2012 ethical aspects. Due to time and research restrictions, the testing protocol was not submitted to the ethics committee." (our translation) (Pinheiro et al., 2021b)

Yet, research procedure in Pinheiro et al. (2021b) involves significant physical risks, such as accidents. Resolution 466/2012 already determines that the CEP/CONEP system appreciates research involving human beings:

> "VII.1 - Research involving human beings must be submitted to the CEP/CONEP System, which, when analyzing and deciding, becomes co-responsible for guaranteeing the protection of the participants." (our translation) (CNS, 2012)

Specific ethical concerns determined by the resolution were neglected; on the other hand, there was a pointer towards official normative and justification concerning the EC, an advance. In Section 6.1, we will revisit similar cases, as well as the phenomenon behind them.

Several studies, among those in the wide screening, indicated following ethical standards or good practices. Very few referred to or cited the resolutions of the National Health Council (*Conselho Nacional de Saúde* - CNS), which governs the conduct and rules on Brazilian research ethics.

In the absence of ethical recommendations conveyed by the CNS, we realize that there is a lack of practical and normative referrals that help develop Brazilian ethical research in computing. We notice this by the absence of citation or reference when the authors claim to conduct research or propose artifacts with "ethical" quality. What were sources used to functionally and actively confer this quality?

We perceive strange epistemological occurrences concerning IC/EC, as in Paiva et al. (2021) extracted from the wide screening. "The objective of this demographic analysis, in addition to knowing the profile of the participants, was to ensure that none of them would be underage, which would require another type of consent for the research ." (our translation) (Paiva et al., 2021). Is the consent acquisition's problem to express the risk the research poses or the bureaucratic burden involved in obtaining consent? Should the involvement of possible minors in the research be foreseen in the research protocol?

5.5 Q4.2 IC/EC involvement specificity

We divide the EC phenomenon in four categories, from the most to the least adherent to the Brazilian normative research ethics. We will rank from 1 to 4, from the least to the most adherent:

1. The paper does not mention EC. Of the two: (i) either the researchers neglected the evaluation by the EC due to ignorance or free and conscious choice; (ii) or the researchers considered the EC and omitted this information from the scientific communication about the respective research. If human beings are involved in the research, this is the worst possible scenario.
2. The paper covers the submission (or non-submission) to an EC. Research ethical deliberation **is not** mere subservience and coercive submission to an EC or EC rules; the researcher must be aware of the reasoning behind this action. When we consider that all research involving human beings must be submitted and appreciated by an ethics committee, we fall back on morals and leave ethical scrutiny aside. Both the submission to the ethics committee and the justification for carrying out the research **without** an EC appreciation are ethical trajectories. When human beings are involved, only the option of submitting is morally acceptable by the CNS, which determines the parameters of institutionalized morality associated with Brazilian research.
   In this sense, rather than simply omitting EC information about research involving human beings, the next best option is to justify why the research was not submitted and appreciated by an EC. For example, lack of time for submission, problems with EC demands, and EC delay, among others. At this second level, the best case is to notify the submission.
   The problem at this informational level is that the assessment result is unknown so the research may be (or even have been, depending on the interval between submission and publication) disapproved by the EC.
3. The paper mentions the research submitted and approved by an EC without a respective identifier code. This case occurs recurrently with the scientific communications of the *Dados Além da Vida* (DAVI) research group from the UFMT university. In both wide and narrow screening, there is an indication of approval by the respective EC of the university without an approval/appreciation code.
   The problem at this level lies in the difficulty of traceability, i.e., finding the record of the respective research in the registry base.
4. Is the highest possible level of EC-related maturity in Brazilian research. Considering the results of both wide and narrow screening, studies authors from the UNICAMP University showed a significantly higher occurrence, with the participation of Professor Maria Cecília Baranauskas. The research was submitted, approved, and explicitly presented its respective identifier code.

Figure 5 exposes the submission types extracted from the wide screening that explicitly announced involvement with EC. Only two submitted the research proposal to the EC. Two announced a whatsoever evaluation [6]. 26 announced that they had been approved by the respective EC, without presenting a certificate. 32 indicated the CAAE.

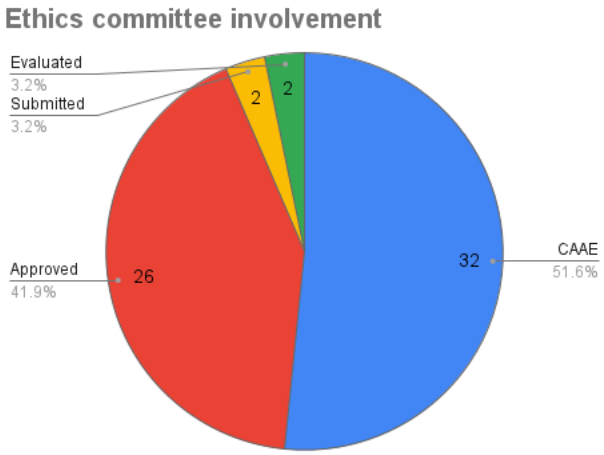

Figure 5. Ethics committee submission information

Regarding IC, the situation presents even more variances when compared to EC. Developing an extraction ranking on IC proved confusing and complex, so we avoided it. The problem in this category is terminology; no consistent nomenclature is used in the selected papers to describe the procedure for obtaining informed consent from the research participants. The language variation aggravates this problem. For example, consent terms, consent form, free consent term, informed consent, free and clarified consent term, and informed consent form. Few papers indicated obtaining consent without terms or forms, only tacitly. Amorim et al.

[6] There is no English accurate translation, in Brazilian Portuguese, they use the term *parecer*, indicating that the proposal was appreciated and received something like a "visa", which is not a CAAE.

(2019) was an example of a paper not included in the IC category, as it says "the participant was informed that [...], when answering the questionnaire, he would be agreeing to participate in the research.", without involving the word consent or similar. The reasoning of "participants automatically agreeing to participate and consent in this research when answering this questionnaire" is equally erroneous, as it excludes the explicitly given consent value essential to free and informed consent, also not LGPD compliant in these cases (Carvalho et al., 2021a).

Less than 1% disclosed their IC form or term regarding open data and research. Therefore, there is no way to analyze or evaluate the quality of the ICs, mainly to propose improvements or study this category of documents, which is essential to research involving human beings Salganik (2017). We reinforce the need for a clear, direct, and objective presentation of the justification for the involvement or, mainly, non-involvement of the IC/EC in scientific communications involving humans.

5.6 Q5.1. Research institutions/Universities

To answer Q5, we analyzed authors' research institutions or universities from the adherent papers. Figure 6 shows the research institutions involved in the WordCloud style.

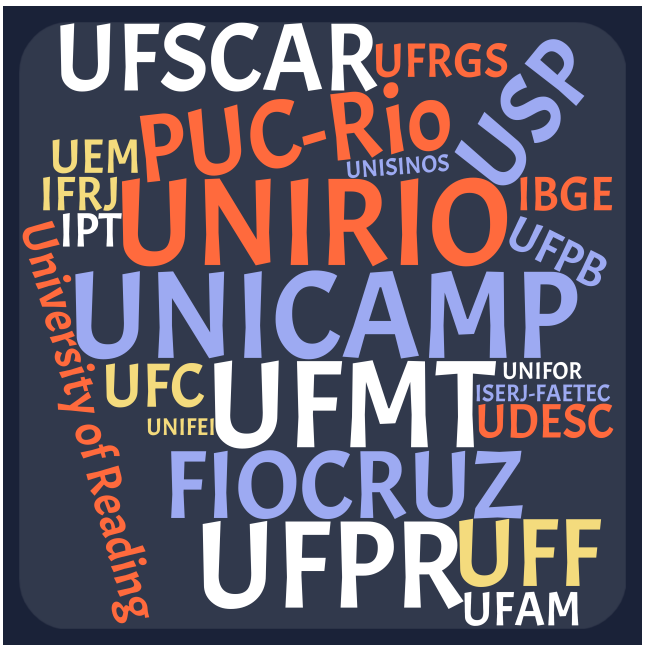

Figure 6. Institutions involved in the selected papers.

Figure 7 exposes the research institutions involved in the works extracted by narrow screening. UNICAMP and UFMT are institutions of most significant production at IHC-BR, as well as those that address ethical aspects with depth and relevance. UFMT stands out in research on Post-death digital legacy and its ethical aspects. The other institutions present a wide range of topics and interests with in-depth ethical analyses.

5.7 Q5.2. Research authors

Considering the absence of works primarily directed and positioned in ethics, the depth of ethical scrutiny in research is a choice of the authors involved. In this Section, we present the authors of significant engagement through narrow screening, who also led the work of the most profound ethical contextualization at the IHC-BR between 2006 and 2021.

Figure 8 depicts the authors from two or more different works extracted by narrow screening. We highlight authors of work(s) primarily dedicated to ethics, state of the art, and conceptualization, design, or research in HCI. As there was no occurrence in this sense, the authors were secondarily concerned with ethics in a significant and relevant way. Moreover, although these authors are actively engaged in a cross-cutting way with ethical analysis, it is worth noting that this does not make them experts in ethics, computational ethics, or HCI ethics.

Going deeper into Figure 8, Roberto Pereira, who has consistently discussed the importance of ethics since 2010 (Pereira et al., 2010), with his contributions on value-oriented vision in social software, until 2021, co-author dealing with ethical dilemmas in Post-death digital legacy (Galvão et al., 2021). Cristiano Maciel, extensively covering the ethical aspects of Post-death digital legacy. Maria Cecília Baranauskas, co-author of works that significantly discuss ethical aspects in different topics.

5.8 Q6.1. Research approaches

In this Section, we analyze the adherent papers and methodological approaches, i.e., qualitative, quantitative, pragmatic, or exploratory research (Recker, 2021). The detailing of these categories is outside our scope. Figure 9 exposes the approaches involved in the 25 papers.

The problem of information without clarity or terminological inconsistency, as in Section 5.4, was identified here. While the issues related to IC are related to research ethics, those perceived here are scientifically fundamental and basic. Some papers do not clearly state their methodological approaches. For example, in (Martinez, 2017) no research method or methodology is explicitly announced. The lack of this information makes room for erroneous inferences and doubts about the reported research's conditions and characteristics. They quote Design Thinking only superficially and *en passant*. We infer the research as "qualitative", being nebulous if it proposes a new artifact or discusses something already built.

Some papers present secondary research, including literature reviews (LR) (Silva et al., 2018; Strey et al., 2018; Pereira and Baranauskas, 2017; Pereira et al., 2010). The ethical aspect consists of forwarding recommendations for applying ethical precepts already covered in the primary or secondary literature. Indirectly, we also perceive a maturation of the community and the production of IHC-BR, finding critical research about themselves and related to their productions.

There is an apparent discrepancy between papers with qualitative (≈72%) and quantitative (≈28%) approaches. The total exceeds 100% as there is research with a mixed

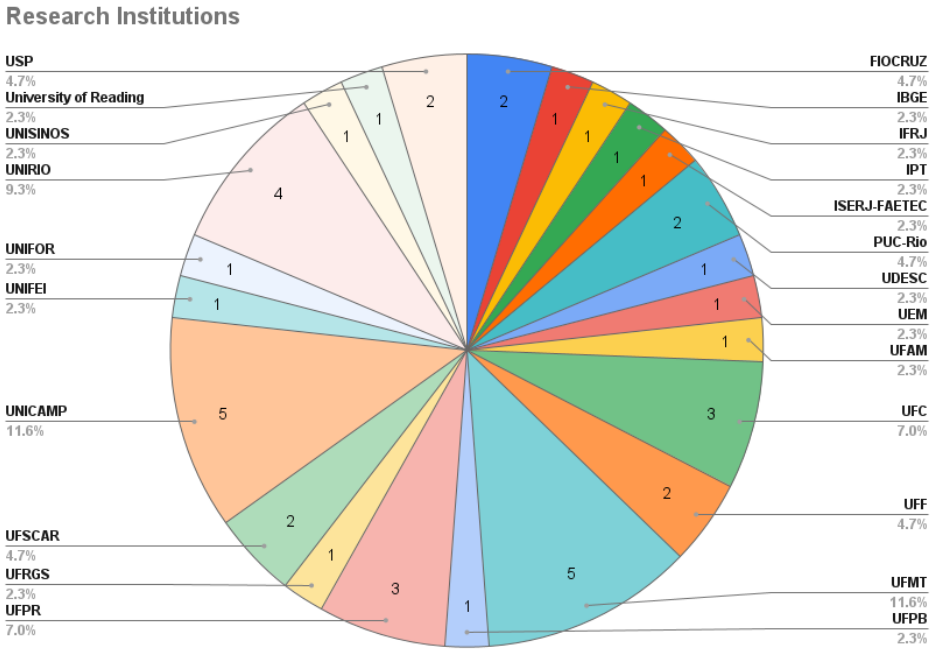

Figure 7. Institutions with at least two occurences.

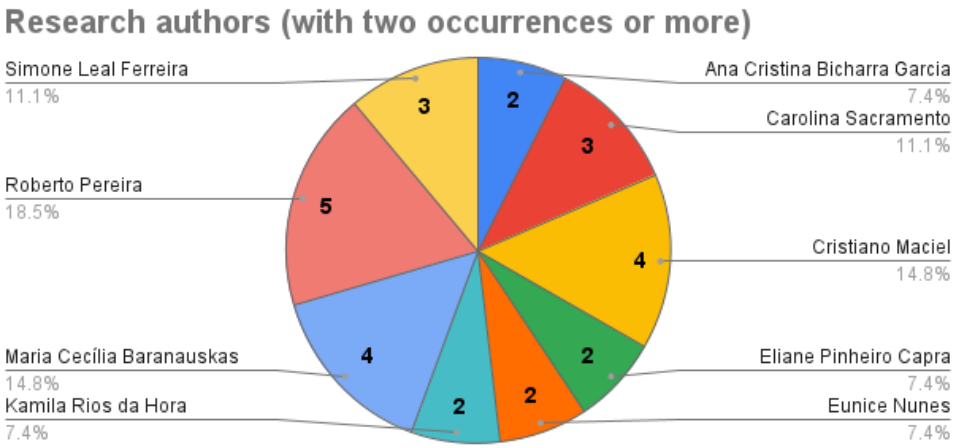

Figure 8. Research authors (with two or more occurrences.

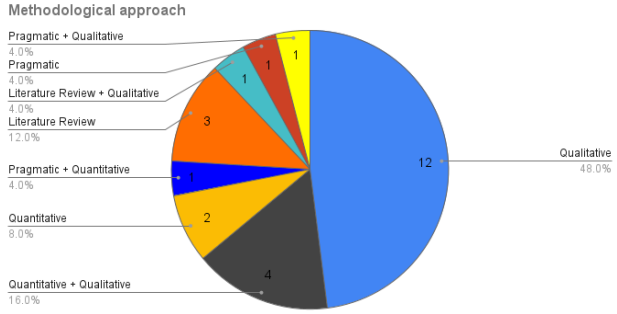

Figure 9. Methodological approach of the selected papers.

approach. We believe that this phenomenon occurs due to the epistemological immanence of qualitative research, involving aspects of context, identity, or subjectivity. While (Gonçales et al., 2020) extracts data directly from participants' brain impulses, analyzing them quantitatively, (Pereira and Baranauskas, 2017) involves LGBTQIA+ identities, (Muriana and Hornung, 2017) involves older people, and (Sacramento et al., 2020) involves visually impaired people, analyzing data qualitatively.

Pragmatic research occurs quite frequently in the field of Computing, including HCI. Of the 701 papers analyzed, a tiny amount of artifacts or pragmatic solutions deepens ethical aspects, i.e., research that addresses solutions proposing reality interventions (Wieringa, 2014). To these, applied ethical aspects objectively described demonstrating responsibility and awareness related to the effectiveness of the proposed artifact, i.e., its impact or influence.

For example, (Espinoza and Baranauskas, 2020) proposes a persuasive system that uses nudging techniques, which in turn are criticized and analyzed by (Cunha and Aguiar, 2020). What are the ethical implications of applying the proposal? Emphasizing, as detailed in Section 2, that the ethical debate

involves dilemmas and open questions, not just "what is good or bad" on an idealistic or concrete level.

5.9 Q6.2. Artifact proposal

Among the different paradigms of applied research, we have the traditional one, which includes reality analysis research, and the pragmatic, which includes research that proposes artifacts, whether material or immaterial, that alter reality (Recker, 2021; Wieringa, 2014). Here we analyze the primary product of the research and if it proposes a change in reality via technological and pragmatic artifacts, which technologies are these.

Artifacts can be material or immaterial. In Computing, immaterial is the majority and varies in abstraction, e.g., from frameworks at the contextual or conceptual level to executable code at the physical level. Research that proposes artifacts immanently directs and calls for a change in reality through their use, even if the research omits or ignores this fact. Traditional research can lead to functional changes in reality. For example, "we analyzed this scenario and proposed these points for improvement"; while pragmatic research, since its beginning, already guides change by its nature. We stress this aspect considering that this clamor for a change in reality fostered by an artifact proposed in research is a practice and articulates ethical and moral implications. Despite the validity of a possible debate on the "neutrality" of technologies/artifacts, the idea of "neutrality" of the researcher's practice when proposing a technology/artifact is absurd. Antecedent to research or engineering is the premise of conscience, rationality, freedom, responsibility, and cognition of the respective researcher (Vázquez, 2018).

Of the 25 works extracted by narrow screening, eight (32%) propose different artifacts. Framework is the most common artifact type, 3 out of 8 (Klock et al., 2016; Paim et al., 2018; Espinoza and Baranauskas, 2020). In certain cases, the artifacts themselves are unclear, as in Bueno and Anacleto (2017) which proposes a "new approach to managing virtual communities".

In all the analyzed works, we noticed difficulty aligning objectively pragmatic research that proposes artifacts to appropriate methodologies. Even demonstrating difficulty in this direction, the researchers successfully present reflections, contributions, and interactions with the existing body of knowledge. For example, Design Science Research (DSR) (Wieringa, 2014) is a well-accepted option in the pragmatic Computing scientific epistemology.

5.10 Q7. Ethical principles or foundations

In this Section, we analyze the adherent papers. There are several ethical principles and foundations for applied ethical analysis, e.g., Utilitarianism, Ethics of Care, Virtue Ethics, Kantian categorical imperatives, Duty Ethics, and Contractualism. At the same time, the association of these same principles and fundamentals to problems located explicitly in the field of Computing persists inconclusively (Barger, 2008; Johnson, 2008). Despite this, a well-founded ethical analysis must follow theoretical precepts of Ethics. When positioning a scientific communication from a community external to Computing in Computing, we expect computational precepts. Even without going deeper into intricacies.

In advance, we expected that there would be few occurrences, as the focus of HCI is primarily and emphatically on Computing. However, we did not expect to find any. Only two papers (Pereira et al., 2010, 2015) implicitly cited native ethical elements from Virtue Ethics (Ferraz, 2014; Vázquez, 2018). What leads us to question: how to produce scientific research involving ethics and rigor expected by the fourth challenge without any ethical formalism or content? Or is the direction essentially axiological and normative?

The concern with ethical aspects grew over the years at IHC-BR without explicit maturity associated with Ethics, which indicates a potential next step to be explored by the community.

5.11 Q8. Limitations or difficulties

In this Section, we analyze the adherent papers and paraphrase the challenges presented in the papers. We obtained few results regarding challenges and difficulties. Most of the papers point out their own, almost none associated with ethics.

A recurring item involves the extraction of personal data from users available over the Internet, whether in Online Social Networks or not. The topic is resolved, conclusively or not, instead of an ethical dilemma. For example, at Marczal and Junior (2016), user interaction data is analyzed in a taxi request application available on the *Google Play* app store and used by real users. Is this analysis suitable for appraisal by the Ethics Committee? Can sensitive or compromising data appear in personal data naively scraped automatically? Does the legitimate interest of the end research activity (Carvalho et al., 2021a) contemplate any and all cases of personal data extracted from the Internet?

Some papers indicated indirect challenges to Ethics. For example, Lima et al. (2019) discusses the need for voice assistants to contemplate the speeches of users with different demographic levels to avoid bias towards accents. As the authors point out, voice assistants can reinforce unintentional technological determinism and linguistic discrimination or oppression.

da Silva et al. (2021) was unable to recruit the research target audience, visually impaired participants. In this way, they carry out the research experiment with blindfolded people without visual impairments. The pandemic has disrupted the research plans.

5.12 Q9. Language

Previously, Barbosa et al. (2017) dealt with linguistic characteristics in IHC-BR publications. The two dominant languages are Brazilian Portuguese and English. Here, we also analyze this characteristic through a twofold ethical-critical bias. The choice of language for publication offers pros and cons to scientific communication.

Choosing Brazilian Portuguese indicates scope dedicated to the Brazilian public; collusion with the official language; less complexity of textual construction and interpretation by

Brazilian researchers; and facilitating scientific dissemination for the local audience. As a con, restrict these publications to a literate audience in Brazilian Portuguese, which in a globalized ecosystem drastically reduces its reach.

Choosing the English language indicates a widespread coverage of the English-literate audience, globally higher than Brazilian Portuguese; communicates scientific production to a larger target audience; improves indexing, search, and consultation by stakeholders external to the Brazilian scenario. As a con, it stimulates linguistic imperialism through the English language, considers a minimum number of Brazilians, and undermines scientific dissemination for the local audience. Symbolically, it weakens the "Brazilian" immanence of **Brazilian** IHC-BR.

Also, we must consider the author's literacy levels in language choice, specifically in English. Whereas academic researchers can usually write a paper in English, that is not always the case with graduate students. Not being fluent in English may be a barrier to some students learning to write scientific communications if they must write them in English. In practice, a paper evaluation also covers textual quality. The perception of this factor can affect either distance the student from scientific writing due to insecurity or make him opt primarily for the security of his language with a higher degree of literacy, mainly the mother tongue.

As Brazilians and scientists, we respect and understand the initiative of our peers in the production of scientific communications in languages other than Brazilian Portuguese – in the same way that we write this present work in English. Both are valid options. Even so, it is necessary to reflect on the concrete realism of this linguistic choice.

We cover the broad scenario from the adherent and not adherent papers. The top chart in Figure 10 shows the quantitative progression of papers presenting ethical aspects and the language of the main content. There is a higher growth rate in publications written in English.

The bottom chart in Figure 10 shows the proportion of papers containing ethical aspects concerning the absolute number of papers of the respective year and their language. For example, 2020 presents 60 papers; of these 60 papers, 36 consider ethical aspects; of these 36, 25% (15) are written in English and 35% (21) in Brazilian Portuguese. In 2006 no paper considering ethical aspects was written in English.

A future work involves studying the direct or indirect impact of language choice, e.g., how does language influence the research impact? Considering the audience, does the phenomenon of accesses and readings vary based on language?

5.13 Q10. Relationship with GrandIHC-BR

The fact that ethics is present in the Grand Research Challenges raised by the Brazilian HCI community shows awareness of ethical aspects. However, intuitively, we expected papers with prominent ethical aspects to indicate the GranDIHC-BR as an intentional motivation directly. Nevertheless, this did not happen, i.e., the GranDIHC-BR did not necessarily explicitly motivate further research in this direction. Furthermore, if motivated, they did not indicate. Of the adherent papers (25), 20 are post-2012; of these 20, only 4 (20%) (Pereira et al., 2015; Amorim et al., 2019; Cunha and Aguiar, 2020; Silva et al., 2018) cite the GranDIHC-BR (Baranauskas et al., 2014). Given the growing number of papers since 2012, the GranDIHC-BR played its role in bringing and keeping the topic of ethics on the table.

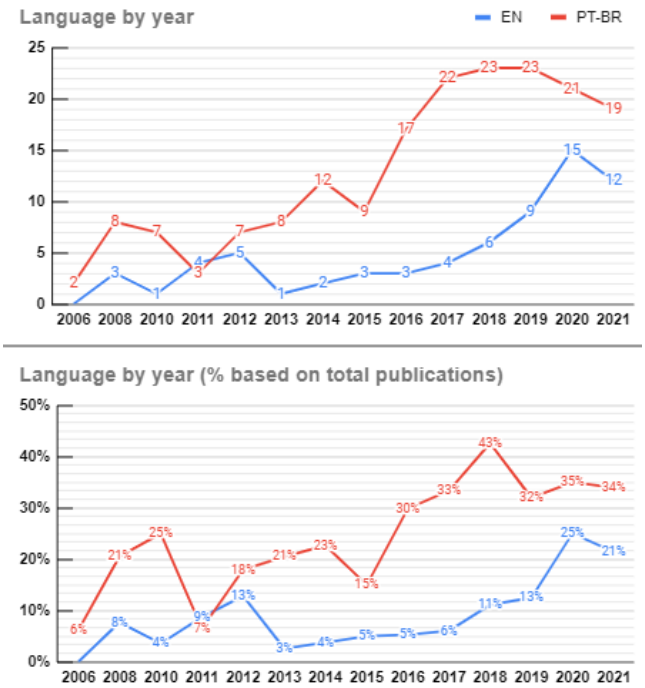

Figure 10. Language of papers containing ethical aspects.

GranDIHC-BR dedicated tracks occurred in 2014 and 2017, publishing position papers. These papers abundantly mentioned ethical aspects. On the other hand, the same proportion does not reflect in the main research track.

Thinking critically about this data behavior, it indicates an inorganic or artificial relevance of ethical aspects. In terms of ethics, while GranDIHC-BR is expected to reflect in the main research of the event, it proportionally ends up impacting more in papers dealing with the same GranDIHC-BR. There is circular, deliberate importance. If ethical aspects make up the great challenges of the Brazilian community, IHC-BR should reflect or occur as much as in the main research track as in tracks dedicated to them.

As a positive criticism, this indicates that the community is maturing, discussing, and curating its own scientific culture. Moreover, this involve dialogue between researches, and conducting research that will disseminate future results.

5.14 Q11. Research funding

When dealing with meta-science and scientific production, one of the recurring debates on ethics in research is the open access to scientific knowledge by society. Despite controversies, currently established morality indicates that research funded by public institutions, i.e., with public money, should be fully open to society (Phelps et al., 2012). There are both excellent, favorable, unfavorable, and adverse points about Open Science and universal and open access to scientific knowledge (Fernández Pinto, 2020).

One of the largest public funding bodies for Brazilian research, the São Paulo Research Foundation (*Fundo de Amparo a Pesquisa do Estado de São Paulo* – FAPESP) presents

initiatives and regulations to promote Open Science [7]:

> "[...] all journal papers that result from FAPESP-funded research must be made publicly available via their publication in institutional open access repositories, as long as this does not violate the copyright rules of the journal in which the papers appear. Researchers are free to decide the publication venue, as long as they comply with this Policy."

Ten adherent papers (40%) indicated funding in their acknowledgments sections. Of these ten, 3 (≈33%) are FAPESP related. An issue to be considered is the existence of funding by an author (or co-author) and its omission in scientific communication. Some funding agencies mandate the announcement of funding in the formal scientific communications of those involved in projects they fund. The study on funding and transparency of information about it is a potential future work, i.e., are scientific communications showing their funding, whether this practice is mandatory or not?

On this date, 08/08/2022, the proceedings of the IHC-BR between 2006 - 2021 in the ACM repository are open. In 2020 they were closed and restricted, with access through payment or institutional credentials.

6 Discussion

After synthesizing, summarizing, and extracting knowledge in this exploratory research, we noticed some gaps and potential for improvement related to ethical aspects. Although originating from the knowledge extracted through the main objective of this research, i.e., analysis of the IHC-BR, the contributions of the subsequent subsections can be generalized to other events or communities, respecting specific transferability. We discuss points relevant to the objective of this present research, forwarding possible practical proposals and referrals for community consideration and appreciation.

6.1 EC, thoughts on "submit or not?"

Although similar, this Section seeks to complement the debate contributed by Amorim et al. (2019).

The premise for the reasoning is clear, the moral standard in ethics in institutionalized and formal research determines the appreciation of **all** research involving the participation of human beings by an EC. One-off exceptions are available (CNS, 2012).

As already encouraged by Amorim et al. (2019), there is a pressing need for computing communities to bring ethics to the table in their professional and academic day-to-day. However, contrary to the authors' conclusion, we disagree "mainly with regard to the assessment of research to local ethics committees" (our translation) (Amorim et al., 2019). The community should submit research to the EC, speculatively or normatively. Positively or negatively, the ethical debate must be broad regarding EC deliberation.

We reiterate the proposal of "the possibility of the CEP/CONEP System offering a specific area for submissions of human-technological research" (our translation) (Amorim et al., 2019), due to the specificity of computational research and "Human participation". For example, research on a large scale of personal data from social networks is still an open problem without an objective ruling (Carvalho et al., 2020). On the other hand, we defend that the committee's composition remains plural and diverse without having an exclusive committee of specialists in computing, which brings oxygenation of multiple perspectives.

As defended by Bietti (2020), the primary intention is to avoid phenomena such as ethics washing or ethics bashing. There is a middle ground between submitting **any** research involving human participants to an EC and leaving all ethical deliberation related to the research to the researchers involved. We can see examples in some of the adherent papers analyzed, da Silva et al. (2021) refrained from considering an EC. Even if there are substantial risks in the research protocol and the scientific communication itself, they clarify the measures adopted to mitigate or resolve the risks. The question is, did the researchers cover all the risks? Would the EC appreciation bring improvements in this aspect? Are visually impaired people safe participating in a research experiment that bypassed the EC appreciation requirement? Echoing the dilemma in Amorim et al. (2019), is there any demerit in the quality of da Silva et al. (2021)'s research for evading the appreciation of an EC?

The debate extends to the researcher's ethical capacity to deliberate ethically about their research, especially with minimal risk. For example, in research in which human participation is to answer a questionnaire, the identity of the participants will be anonymous in scientific communications, and there are no invasive or sensitive questions. Is there a need to go through the procedure of an EC?

We noticed an ignorance concerning normative decisions on ethics in Brazilian research, as observed in Amorim et al. (2019); as well as a lack of structured and well-established communication interactions on the topic of research ethics. The risk is twofold, the researcher being ethically alienated, despite complying with the dictates for an EC, which constitutes ethics bashing; or simply reinforcing an ethical idea in the imaginary sphere while neglecting it in the material or concrete sphere, which constitutes ethics washing.

Furthermore, as this present work follows the precepts of ethics without value judgement, we propose that all researchers and researches have ethical deliberations about themselves, especially those involving human beings. If the community effectively considers the current moral norms as categorical imperatives, then establish a mandatory explicit statement related to IC/EC in the respective scientific communication, justifying in case of non-occurrence. During the review stage, create a criterion associated with ethics for reviewers to analyze ethical research issues.

6.2 The HCI ethical burden

This work is part of more extensive research in progress, and this Section brings a tension associated with the other works that compose it. The Brazilian Computing community delegates the burden of ethics, explicitly or implicitly, to a specific sub-community?

Here we analyze the scientific communications of the largest Brazilian event dedicated to the sub-area of HCI, the

[7] https://www.fapesp.br/open science/en. [accessed 08-08-2022]

IHC-BR. Works with a similar objective, despite covering other areas, show worrying data regarding ethical aspects. The highest occurrence of ethical aspects in the IHC-BR occurred in 2020, 60%. To date, a similar analysis has been carried out at events dedicated to Games and Digital Entertainment (*Simpósio Brasileiro de Jogos de Computador e Entretenimento Digital* – SBGames) (Carvalho et al., 2021e); Software Quality (*Simpósio Brasileiro de Qualidade de Software* – SBQS) (Carvalho et al., 2021b); Computing in Education (*Simpósio Brasileiro de Informática na Educação* – SBIE) (Carvalho et al., 2021c); Information Systems (*Simpósio Brasileiro de Sistemas de Informação* – SBSI) (Carvalho et al., 2021d); and Collaborative Systems (*Simpósio Brasileiro de Sistemas Colaborativos* – SBSC) (Carvalho et al., 2022). In none of these events did the occurrence come close to the IHC-BR.

Through the years, the event, analysis interval, the year with the highest occurrence of ethical aspects and their proportion follows: SBGames, 2011 – 2020, 2020 (25.6%); SBQS, 2006 – 2020, 2019 (28.9%); SBIE, 2011 – 2020, 2019 (16.7%); SBSI, 2011 – 2020, 2020 (23.4%); SBSC, 2008 – 2021, 2017 (23.1%). These values are restricted to the results of the wide screening. On the adherent papers, the IHC-BR presented 3%, SBGames, 2.42%; SBQS, SBIE, and SBSI less than 1%; and the SBQS, none.

Ethics concerns practices beyond HCI in computing. Being a human and social construction, all areas of Science, including computing, deal with human factors. However, implicitly, academic/scientific analyzes on the margins of computing with "greater human influence" are delegated to HCI, as if, for example, human values "was an HCI thing". Which, epistemologically, is absurd.

Moreover, even with the absence of primarily and essentially ethics-oriented papers at the IHC-BR, the event maintains the best values of occurrences of ethical aspects among those analyzed so far. What brings us to the issue of ethics "localization" among computing communities, i.e., absent a congregational event dedicated to computational ethics in Brazil, the IHC-BR seems to be the ideal place to share research on this topic. The ideal would be for each community to have its front associated with ethics, whether trails or workshops or if this front is the IHC-BR, or whether communities should foster a united front dedicated to ethics.

The fact that the IHC-BR has more than twice as many occurrences of ethical aspects compared to other events in suitable areas for relevant ethical scrutiny is quite problematic. For example, Spiekermann et al. (2022) discusses ethics and values in Information Systems and mentions HCI as an area that has brought advances toward the development of well-being-oriented computing solutions. If we analyze critically, we will ask ourselves why HCI is heading this proposal, as there is an ethical option that considers a computational solution that disregards the well-being of society? Again, why do we see that HCI is driving an ethical path that everyone should rationalize?

6.3 Nurturing and maintaining an ethical culture

Every individual, including a researcher, will classify himself as "ethical". However, this does not mean that their ethical practices are ethically grounded, while morals make up their subjectivity (Vázquez, 2018). Proportionally, the same applies for their respective community(ies). It is out of our practical scope to point out "how ethical the IHC-BR community is", so, based on the inputs of this SLR and works related to ethics and computational ethics, we forward directions for the IHC-BR to increase and improve its ethical aspects. Therefore, the intention is to nurture and maintain a culture of ethics, promoting a moral advance.

Two of the major elements for ethical research are IC and EC. These two elements must be exposed as necessary from the call for papers. If papers, which should need these elements, are accepted, this indicates that IC/EC are optional. Accepting particular research with or without these elements culminates in an ethical relativism (Johnson, 2008; Ferraz, 2014), i.e., it is right for some and wrong for others.

Looking at the papers superficially analyzed by wide screening, there is relativism about the rigor related to IC/EC. Some papers present research involving human beings as participants without IC/EC, which leads us to perceive, taking a meta-scientific step back, the division inside the HCI community. This division may be accidental, as reviewers are unaware of the research ethics regulations determined by the CNS, or purposeful, where reviewers deliberately neglect the importance of IC/EC. Therefore, there is a moral luck factor (Nelkin, 2021). If scientific communication exposes partial peers to review the involvement of human participation and (i) in favor of IC/EC, there is a high probability of rejection; (ii) is reviewed by partial peers against the IC/EC (or ignorant of these elements), IC/EC will be an indifferent variable with no negative influence on the research evaluation. We believe this happens because of the absence of an obligation of these elements, i.e., negligent partiality on ethical aspects. This is not exclusive to ethical aspects, as we can see in analyzed papers without an exposed paradigm, research methodology; or presenting technical problems.

Suppose one of the central ideas is to promote changes in the current scenario (such as creating a specific submission for computing research). In that case, the instruction is necessary to modify it. In this case, it is essential that the community, mainly during official events related to HCI, reinforce the importance of IC/EC. This reinforcement should move away from coercion or threat, which is closer to ethics bashing, and towards education about the research benefits of these elements. From this instructional interaction and at these official moments, the community will also discuss critically. For example, how will individuals who overlook the importance of IC/EC and label them as simple "bureaucracy" participate in a constructive debate on this topic?

Notwithstanding, the entirety of research ethics is beyond IC and EC and should not be reduced to them. Several other elements make up the ethical aspects of a research, such as risks, benefits, consequences, responsibility and accountability, moral conscience, researchers subjective choices, among others.

Establish a standard terminology and structure for an IC, although this document is research dependent, some information are standardized, varying only with the research data *per se*. Researchers have difficulty designing and writing IC (Amorim et al., 2019), and a standard document facilitates the usage adherence, even if it only serves as a template.

Both regulations 466/2012 (CNS, 2012) and 510/2016 (CNS, 2016) stipulate mandatory IC qualities, e.g., "provide information in clear and accessible language, using the most appropriate strategies for the culture, age group, socioeconomic condition and autonomy of those invited to participate of the search;". Understanding technical information is a construct of complex operation regarding subjective variables, a target of specialized research (Carvalho and Cappelli, 2019; Cappelli et al., 2021).

Linguistics and understanding of information are very distant topics and are minimal in institutional and traditional Brazilian computing instruction. That is, recommending using an IC template without being obligated, already considering good practices, and implementing a clear, straightforward, and plain language (Carvalho and Cappelli, 2019) facilitates the required communication qualities compliance. It exempts the researcher from the need to learn about "how to elaborate an clear and accessible IC document through good linguistic practices", saving effort in research practice.

Promote an ethical instruction. Offer short courses and workshops on Computational Ethics, HCI Ethics, and research ethics. An example is an informal text on the quality of reviews of papers and academic projects [8], also available as a webinar/lecture/chat [9]. There is an ethical concern with peer-review in the academic-scientific context so that there are no evil, unfair, or harmful reviews; proposing an moral advance in the scientific culture.

While trivial, this recommendation is complex regarding peer privilege and power. When dealing with stakeholders who are both indifferent and positively partial to ethical aspects, we expect cooperation and collaboration. The complexity increases when dealing with stakeholders resistant to ideology [10] of the importance of the ethical aspects. This aspect is sensitive, as senior stakeholders, in positions of power and privilege, mentor students and morally influence their peers, mainly through moral example (Zagzebski, 2017).

Encourage explicit ethical deliberation in research. Foster a culture of consideration for ethical aspects in IHC-BR published research, recommending that authors dedicate a section or subsection of their articles for ethical analysis or aspects, whether its meta-research or application.

This section or subsection also serves as a dedicated space for the disclosure of IC/EC, ethical concerns of experiments, ethical reflections on the respective research, or even ethical self-reflection of the researcher positioning himself as an agent of (his/her) science. For example, there is a significant phenomenological and political difference when a visually impaired researcher undertakes research aimed at improving life (including his [11]) from other visually impaired people. In a complementary way, this does not preclude similar proposals submitted by people without visual impairments. Traditional scientific epistemology escapes the identity appeal but allows the researcher to position himself as someone endowed with specificity and subjectivity, moral or political.

6.4 Encourage multi-lingual communications

Continue accepting submissions in English and Portuguese, and discuss further possibilities, such as accepting two versions (one in each language) and accepting bilingual articles.

This recommendation becomes more relevant for research funded by Brazilian public agencies. Let us consider the political position that (i) research financed mainly by public money should be shared and made available to the Brazilian people and (ii) the only institutionally official language of Brazil is Portuguese [12]. There is a political inconsistency in this system, where research funded by Brazilians is available in unofficial languages (or official for other countries), which Brazilians are exempt from learning when we consider that they are not institutionally official languages in the national territory.

We could engage in the debate between locally and nationally brokered science, and academic-scientific culture, which we outlined above. The last one is about expanding science into what is known as the "official language of science", English [13]. So scientific communication must be guided by the dominant language, which would enable the greater reach of this scientific contribution and globalized engagement. Subsequently, it enables scientific advancement that transcends localized language barriers.

We are absent from this discussion in this work, which, although valid, is outside our main scope. The linguistic choice of scientific communication is a political and cultural choice at a secondary level. Therefore, it is also a moral choice.

6.5 Encourage disclosure and transparency

As a final item of discussion and recommendation, promote greater transparency and openness of information, and informational objects, associated with ethical aspects. As in scientific productions, considering artifacts (e.g., the code) or data; and ethics-related objects, such as IC and CAAE, in the case of EC. Promoting ICs accessibility, which can serve as an example for peers and facilitate a more in-depth ethical analysis, can be achieved by making these informational objects available in online repositories.

Funding data must be available similarly, at least from the funding parties. The ideal for completeness is to expose

[8] https://horizontes.sbc.org.br/index.php/2021/10/cinco-principios-para-uma-revisao-responsavel/ [accessed 08-08-2022] (in Portuguese)

[9] https://www.youtube.com/watch?v=hZjGxx6Rlok [accessed 08-08-2022] (in Portuguese)

[10] It Is categorically essential to reinforce that morals, morality, or collective morals are ideologies (Vázquez, 2018). Morals, *per se*, is a human social construction; morals and applied morals, too.

[11] Self-preservation and the pursuit of one's well-being are morally valid and ethically plausible perspectives (Ferraz, 2014). In this example, it would be scientifically insignificant for this researcher to propose research that would benefit himself, bringing self-preservation and well-being only to himself, ethically framed as selfishness. As a collective approach and considered criteria of scientific validity, this is a viable and valid goal.

[12] http://www.planalto.gov.br/ccivil_03/_Ato2007-2010/2008/Decree/D6583.htm [accessed 08-08-2022]

[13] This is a historically constructed idea. By historical materialism and dialectics, this too can be modified or overthrown.

data completely, including identifying the respective funding processes. For an strictly ethical appraisal, these identifying codes are insignificant, while the nature of the interested parties is categorically significant. Exposing funding data can, for example, reveal cases of conflict of interest as a threat to the external validity of research; or explain whether this funding leads to specific political determinations, as in the relation between FAPESP and Open Science.

6.6 Enhance technical quality of publications

This aspect arises from specific difficulties experienced during this present research procedures. We present details in Section 7. Although this point strays from the pure ethical aspect, it reflects an objective moral concern related to metascience.

Several papers presented syntactic problems related to poorly coded characters, which substantially hampered the preliminary search for accented terms, such as "*ética*" in Brazilian Portuguese. This error can harm other searches and, more than that, harm the impact of searches where the documentation files have encoding problems. As this research is an SLR, we consider that this same problem may also affect future literature reviews, whether systematic or not.

In several papers from 2021, already published and available in the repository, we noticed the absence of a final verification/review by those responsible (whether they are parts of the IHC-BR or the ACM), which resulted in several occurrences of expressions such as "this data was omitted for blind review". For example, this phenomenon occurs in Neto et al. (2021). Regarding ethics, there was an omission of data related to ethical aspects to prevent traceability of the research and identification of authors. Even absent from the ethical or metascience aspect, this is an unacceptable slip when considering that the authors paid to publish their scientific communication. Suppose there is a burden of an error on the part of the authors. Then, in that case, the responsibility for the quality of publications and scientific communications goes beyond them, especially when considering payment for publication and publishing.

One of the central elements of ethics is responsibility and accountability (Vázquez, 2018) so that the papers did not publish themselves, as they are objects and non-acting elements. In this case, the idea is that some mechanisms and practices prevent these future problems because they harm scientific communication, harm future literature reviews, and discredit the event and its respective proceedings.

7 Final remarks

We present a Systematic Literature Review on the scope of ethical aspects in research published in the main research track of the IHC-BR between the years 2006 and 2021. In 2012, the Brazilian HCI scientific community deliberated and made the GranDIHC-BR, which exposed a concern with ethics in HCI research related to human values. Eight years later, how are ethical aspects spread across publications in the IHC? Considering previous editions of GranDIHC-BR, quantitatively and qualitatively, was there any change?

Following the Kitchenham (2004) protocol, we selected and analyzed 701 full papers: 249 presented some ethical aspects, and from these, 25 stood out for qualitative and detailed synthesis. We extracted knowledge from wide and narrow screening, bringing a panoramic and in-depth view.

Ethical aspects grew timidly between 2006 and 2015, advancing significantly between 2016 and 2021. In 2020, ethical aspects occurred in 60% of publications, excluding isolated citations to IC/EC, less than a quarter addressed them.

There is a growing concern with ethical aspects, not necessarily associated with GranDIHC-BR. EC and IC are also increasing, demonstrating that the authors are adapting more and better to the ethical standards of quality in research involving human participants. On the other hand, the bases and foundations of ethics are absent for the most part.

Summarizing, we move deliberations forward aiming the discussion of topics selected from extractions and qualitative synthesis. We reflected on the dilemma of submitting or not submitting research to an EC. We point out the perception that the area of HCI seems to handle ethical aspects with extra attention at the same time that it guides the north of this theme in the panorama of Brazilian computing research. We suggest valuing ethical aspects at a level that is more than occasional, accidental, or coercive, but cultural. Encourage greater appreciation for multilingual communication as well as transparency and disclosure in research. We propose extra care when it comes to the technical aspects of publications, e.g., the correct encoding of characters.

This research comprises three nested layers. The first layer, at the highest level, studies in the most comprehensive way possible the panorama of ethical aspects related to Brazilian Computing, formal or informal, institutional or not. In the second layer is a panoramic survey on ethical aspects in publications of Brazilian symposia held by the Brazilian Society of Computing (*Sociedade Brasileira de Computação* – SBC), which is the largest formal institutional organization related to Computing in Brazil. By equivalence of corporate significance, SBC is the "Brazilian version" of ACM. The third layer is precisely this study on the IHC-BR.

We intend to dialogue primarily on Computing, focusing on Applied Ethics in Computing (commonly known as Computational Ethics or Computer Ethics). The discussions, contributions, and findings of this research, secondarily, dialogue with the native domain of Ethics. It is beyond our intention and scope of this research to present contributions, findings, or referrals to the Philosophy body of knowledge, specifically Ethics, but to Computing.

Thus, this present work promotes a dialogue between three domains, respectively, in this order of importance, Computing, Metascience/Meta-research, and Ethics. The combination of the first and the third makes up the well-established Computational Ethics (and correlated). The difference is precisely this triad, using academic-scientific approaches to address Ethics and Computing in Brazilian HCI science and research. Intending to promote ethical and moral advancement in the Brazilian HCI science and research, we seek to unveil the scenario so it can be appreciated by communities such as Philosophy, Computing, HCI or Science Studies.

The automatic search of the 2011 and 2015 proceedings was impossible in some files. As an internal threat to validity,

some files had character encoding problems. Adverse both to our research and a warning to the next ones. Then we conduct the extraction manually one by one. Developing a computational system that automates the protocol of this research is a potential future work.

The limitation involves the analyzed time interval and the analyzed set. However, the data analysis indicates that events prior to 2006 would present occurrences quantitatively close to or smaller than those that occurred afterward. We limit the scope to the IHC-BR by the event's very essence, so we do not generalize to the set of "all HCI research produced in Brazil" but to the most relevant event dedicated to this area. As a differential, we encompass both full and short papers.

It is worth highlighting the specificity of this present work, which is not a limitation, as a trigger for future work. Like Bock et al. (2021) in their review of Ethics and Information Systems, we see a similar scenario oriented to HCI. Possible directions for the debate on HCI can be research-based, HCI-based, and design-based. This work focuses mainly on HCI research-based ethics, exposing abundant opportunities focused on the other two strands. For example, Shilton (2018) presents a design-based work and the international HCI community focus on HCI-based (Frauenberger et al., 2017; Fiesler et al., 2018; Munteanu et al., 2019).

In future work, the search can be expanded to HCI research outside the IHC-BR; this research can be extended to the end of the GranDIHC-BR 2022 term to cover all the ten years of the initiative. SLR dedicated to the Post-death digital legacy at IHC-BR is also relevant, as Privacy and Ethics, from the Human Values, challenge 4, have already been investigated. With regard to understanding and effective communication, analyzing and evaluating the quality of the CI and associated documents, syntactically by their structure, and in an applied way, regarding people's perception. Forward a deeper and richer debate as a philosophical referral to the topic of Ethics, Computational Ethics and HCI-based Ethics, with the potential to propose an ethical framework.

Finally, conduct more in-depth research on both IC and EC, whether considering the main normative acts related to them (resolutions 466/2012 (CNS, 2012) and 510/2016 (CNS, 2016)) or not. For example, which reference or citation do authors use when referring to EC or IC in their research? Resolution 466/2012 (CNS, 2012) or resolution 510/2016 (CNS, 2016)? Neither? Foreign standards? Books? Discussing norms, resolutions and research ethics is an urgent topic for Brazilian computational research.

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