Ethics: What is the Research Scenario in the Brazilian Symposium SBIE?

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Abstract. *There is no doubt about the relevance of Computing in Education (CE), especially after the COVID-19 pandemic. However, the more we deal with computational artifacts in Education, the more we will have to face ethical dilemmas and concerns behind the engineering of the educational artifact and its values and qualities. In the context of the Brazilian Symposium on Computers in Education (SBIE), this paper aims to answer the question: what is the panorama of the occurrence of ethical aspects in SBIE publications between 2011-2020? To answer this question, we followed the methodology of Systematic Literature Review. We analyze topics such as Informed Consent, Ethics Committee, technological domains, ethical principles, and research contexts.*

1. Introduction

There is no doubt about the acquired, perceived, and practical relevance of Computing in Education (CE) after the beginning of the COVID-19 pandemic. All actors, levels, and spheres of education were "pushed" to the digital realm, be it basic, fundamental, technical, specialization, postgraduate, master's, doctorate. If anyone doubted that CE was important, the COVID-19 pandemic left its message, in addition to being, having been, more than it ever is. However, great power brings about significant responsibilities.

The Brazilian Symposium on Computers in Education (Simpósio Brasileiro de Informática na Educação – SBIE) is the largest academic-scientific congregational event dedicated to CE in Brazil. Our objective is to answer the question: what is the panorama of the occurrence of ethical aspects in SBIE publications in the decade of 2011-2020? Within this tension, we aim to analyze topics such as Informed Consent (IC), Ethics Committee (EC), as well as technological domains, ethical principles involved, research contexts, among others. To answer this question properly, we use the methodology of Systematic Literature Review (SLR) proposed by Kitchenham [Kitchenham 2004].

Ethics studies the values of human practices, in short, "what to do?". The subject of Ethics is Morality, the first being objective and the second dependent on subjectivity. It

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is analyzed through reflection in context, where there is a negotiation between individuality and collectivity, without the individual acting against himself or against his autonomy or needs [Fieser 2020, Ferraz 2014]. Computational Ethics is defined by [Johnson 2008]:

> "The study of the ethical questions that arise as a consequence of the development and deployment of computers and computing technologies. It involves two activities. One is identifying and raising into focus the issues and problems that fall within its scope, awareness of the ethical dimension of a particular situation. The second is providing an approach to these issues, a means of advancing our understanding of, and finding ways of reaching wise solutions to these problems." [Johnson 2008]

Regarding CE, [Kemczinski et al. 2020] points out:

> "The insertion of the computer in education generated and still generates a kind of revolution in theories about the teaching-learning relationship. In order to carry out the process of incorporating computational artifacts as media in education, four fundamental elements are basically needed: the computational artifact itself, educational software, the teacher prepared to use such artifact as educational media and the motivated student for a new way of learning mediated by a theory of learning." [authors' translation] [Kemczinski et al. 2020]

For each of these four elements we can think of ethical dilemmas and concerns, behind the engineering of the educational artifact (epistemology), the computational educational artifact and its values and qualities (ontology), and in relation to inherently human aspects, educators and students, both categories free from neutrality or impartiality, endowed with principles and values. CE has the potential to promote social, economic, cultural, and environmental sustainability [Kemczinski et al. 2020]. And, in this case, we extend, why not also the awareness and maturation of an ethical spirit? If sociopolitical, including academic, interest in CE in Brazil was based and mirrored in the US and European movements [Kemczinski et al. 2020], we are able to think of an ethical and aesthetic turn to break these foreign bonds and walk for ourselves, based on our own epistemontologies [Escobar 2018].

Thinking about a decolonial or anticolonial way, in the decolonial turn and in the break with the subordinate reason, is to think about ethics. As [Canclini 2006] announces, it is to unite and break up organized collections and cultural systems, deterritorialize symbolic processes, take the relations of command and obedience and subvert them, redefine key elements by expanding morally "impure" genres. Thinking about a Brazil for Brazilians, also in Research and Science [Miglievic 2016].

Crossing through decolonial ideals, [Sposito 2011] points out that ethical instruction in computing courses should be contextualized in the students' experience and context, that is, in the Brazilian reality; [Freire et al. 2011] contextualizes Paulo Freire's principles, rooted in local autonomy and sovereignty, in teacher education. [Silva et al. 2016] encourages undergraduate computing courses to cover free software in their disciplines, enabling social awareness of the importance of open source; and [Barcaro and Freire 2009] talk about the importance of Ethics discipline in Computing courses. In this sense, ethical and decolonial awareness must go hand in hand so that there is a rational intervention of practices, breaking with the colonizing morality.

We were unable to find related works linking CE and Ethics in line with the purpose of this paper, not even concurrent literature reviews. The search in English returned results of deficient transference to the Brazilian context or reality, i.e., the conclusions, contributions, and findings are distant or strongly localized geographically. It is noteworthy that there are works dealing with either Computing, Education, or Ethics, and simple combinations between them, as in [Sposito 2011]; however, the primary and dominant focus is one of these elements, while the others are undervalued. Others are disconnected from the scope of this present work, e.g., "development of an educational game to teach ethics" [de Sousa et al. 2018], yet, the computational ethics aspect behind the research itself is disregarded.

It is also important to highlight that societies and organizations in the computing' field have made efforts to discuss and promote ethical aspects. For example, the Association for Computing Machinery (ACM) has introduced several Policies and Procedures. Specifically, ACM recently approved the ACM Publications Policy on Research Involving Human Participants and Subjects [1], in which it presents the definition of human participant and subject research, policy statement, roles and responsibilities for authors, editors, program committee chairs, peer reviewers, violations and penalties, among others. Following the decoloniality agenda, we need to think about policies, norms and good practices, associated with ethics and intrinsically Brazilian, for Brazilians and in the Brazilian context. We can use these referrals from ACM, or from other international entities, as a reference basis and never as a verbatim copy.

The review exposed results of potential contribution to the Brazilian CE community, as well as to its research and scientific communications. The concern with ethical aspects has grown over the years, reaching its peak in the 2019 edition. There are no papers primarily dedicated to Ethics, however 13 stood out among the more than a thousand systematically analyzed. Among encouraging and alarming results, there is space to debate this topic at the SBIE and a long way to go, but it does not start from scratch.

This work is structured as follows: Section 2 presents the research methodology and method; Section 3 covers the SLR and the SBIE 2011 – 2020 decade; Section 4 closes with discussion and conclusion.

2. Research methodology and method

To identify and interpret the State of the Art, or to elaborate a well-defined panorama based on formalized and structured procedures, we use the SLR methodology [Kitchenham and Charters 2007], and in this work we followed the guidelines of Kitchenham and Charters [Kitchenham 2004, Kitchenham and Charters 2007]. Based on this guideline, we collected, selected and summarized relevant research associated with a certain theme or topic in a particular knowledge domain, allowing for the reproducibility of the process. In order to enable a collaborative operation, we use the Google Sheets service as a support interface and data sharing in this SLR, allowing us to work remotely from a shared database. This Section is dedicated to detailing the SLR protocol.

[1] https://www.acm.org/publications/policies/research-involving-human-participants-and-subjects. Accessed: 07/07/2021

2.1. Objective and research questions

The primary objective of this research is to present a panorama of ethical aspects through scientific communications published in the SBIE event between 2011 and 2020 (currently, the last edition). Our analysis covered ten editions. We selected this range as representing the full decade of 2010, covering recent researches. Although the Brazilian Congress on Computers in Education (*Congresso Brasileiro de Informática na Educação* – CBIE) is holding its tenth edition, the SBIE has been held since 1990.

The main question was divided into sub-questions to enable a perception of better quality, panoramic and comprehensive, in line with the main objective, **how does ethics permeate research published in the SBIE between 2011 and 2020?** The sub-questions and possible answers to them are presented in Table 1.

Table 1. Research sub-questions and possible answers

ID	Questions	Answers
RQ1	Did the production of works based on ethics show quantitative variance, absolutely or proportionally?	Ethical terms detailed in Section 2.2 and quantitative analysis
RQ2	What technological domains are involved?	Open answer. Technological domains are research dependent
RQ3	Do the occurrences of ethics refer to ethics as metaresearch, application, or both?	Metaresearch, Application, Both
RQ4	Quantitative analysis of ethics committees and terms of consent?	Ethics committee, Informed Consent Form/Term
RQ5	Which research institutes or universities in the country stood out in ethics-related research?	Research institutions/universities
RQ6	What is the methodological research approach?	Quantitative, Qualitative, Pragmatic, or Literature Review
RQ7	What ethical principles or foundations are covered?	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 research application environment?	Open answer. Where the research took place

In line with the SLR objective, 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 paper analyzes "right" or "wrong" behaviors that teachers can engage in relation to Online Education, if it does not mention ethics or morals, the protocol of this research disregards this object, even if it is implicitly an ethical analysis or evaluation.

2.2. Search strategy and data extraction

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

Involvement of an Ethics Committee or Informed Consent were also extracted, as an intrinsic, albeit indirectly, Research Ethics element [Brown et al. 2016, Amorim et al. 2019]. Even if by weak association, explicitly exposed cases indicate direct concern with ethical aspects. *Ethics Committee* is captured by the search for the

term ethics, considering its official nomenclature. Regarding consent, we searched for the term "consent", both in Brazilian Portuguese (e.g., *consentiram, consente, termo de consentimento, formulário de consentimento*, among others) and English (e.g., consent term, consent form, consent, among others).

In the specific case of IC, an inherent reinforcement of the research and science culture of the CE area is necessary [Brasil 2012, Brasil 2016], **assent** [2]. Requesting assent when necessary represents ethical respect, even if the affected persona is socioculturally perceived as supposedly lacking in moral capital. For example, underestimating a teenager precisely by the age group and being content with the legal guardian's IC, "using him" as an object of study because he "does not understand the magnitude of what is happening" is disrespecting it as a human being endowed with moral values and dignity. In this topic, a proposal for future work is to analyze whether the appropriate SBIE research is effectively instrumentalizing free and informed assent. In this present work we pay attention to the IC, because even if there is assent, the IC is still mandatory.

The year of the event and the number of publications analyzed were considered, respectively, 2020: 184; 2019: 203; 2018: 229; 2017: 201; 2016: 147; 2015: 140; 2014: 152; 2013: 109; 2012: 146; 2011: 138. Between 2011 and 2020 we covered 1649 published papers. All available papers, short and full, have been downloaded. The string-based search took place in a semi-manual way, using search automated functions.

Relevant information and data were extracted from selected studies through the data extraction process [Kitchenham and Charters 2007]. The items used in the data extraction process are presented in Table 1. An open question means that answers depend on what comes up, if it does, in the content. Interpretative questions are based on quality criteria defined and consensually accepted by all the authors. In case it was impossible to extract or infer information objectively, we indicate accordingly.

2.3. Review conduction process

The wide and narrow screening stages encompassed the two review stages. In the wide screening, the initial extraction took place, where two researchers searched for the terms detailed in Section 2.2, one performed the extraction, and the other reviewed it, ensuring impartiality. After being separated, these initial papers were categorized by relevance and adherence of ethical aspects to the context of this SLR, as detailed in RQ1. In narrow screening, we looked for papers deepening ethical and moral analyses, regardless of the number of terms, i.e., both cite the terms and talks about ethical aspects. In this case, the focus is on the quality of occurrences, not the quantity.

The categorization regarding relevance and adherence is one of the SLR subjective moments, and some mechanisms are present in the literature to smooth or mitigate this phenomenon [Kitchenham 2004, Kitchenham and Charters 2007]. However, as [Bock et al. 2021] mentions in its SLR dedicated to Ethics and Information Systems, Ethics is a complex construct to objectively limit and classify, i.e., strictly quantitative approaches are inadequate. In this way, we rely on the definitions and epistemologies of

[2] " [...] acquiescence of the research participant - child, adolescent or individuals temporarily or otherwise prevented from consenting, to the extent of their understanding and respecting their singularities, after clarification on the nature of the research, justification, objectives, methods, potential benefits and risks. Obtaining the assent does not eliminate the need for the consent of the legal guardian." [Brasil 2016]

Computational Ethics, as in [Johnson 2008], and on the deliberation and consensus of the present authors to mitigate possible biases.

Figure 1 depicts the SLR process. 1649 papers were extracted from the SBC OpenLib (SOL) digital library and from the SBIE's own community-managed repository. The migration from last to first is currently in progress. Then, we removed 1474 papers, as detailed in Section 2.2. After an in-depth evaluation, the qualitative synthesis stage included 13, read in full.

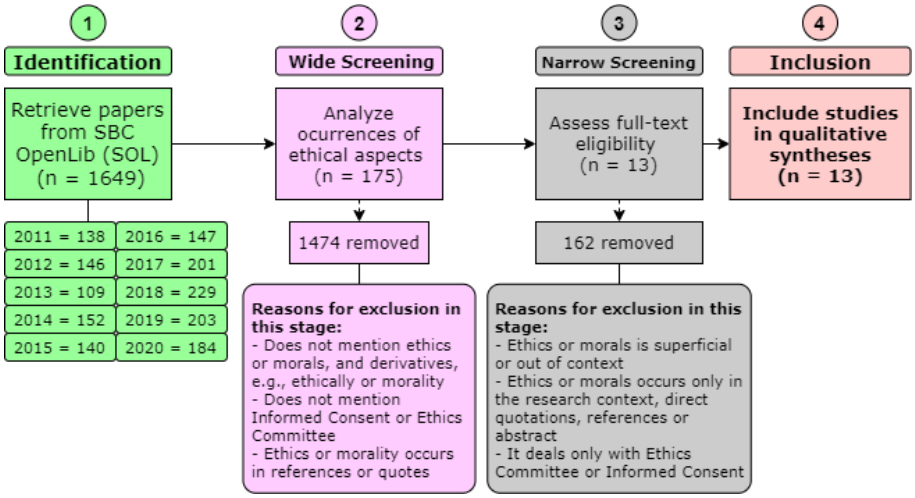

Figure 1. Diagram of the literature review process.

In the second screening, adherent papers were separated in the narrow screening [Freire et al. 2011, Dantas et al. 2013, Araújo et al. 2015, Silva et al. 2016, Pimentel 2017, Canal and Pereira 2018, Urtiga and Castro 2018, Bispo Jr. 2019, Schneider et al. 2019, Moraes et al. 2019, Machado and Oliveira 2020, Preuss et al. 2020, Santos et al. 2020]. A deep and detailed extraction of information was conducted. These are publications that address ethical aspects with relevance and significance. The researchers involved, the authors, appreciated this list and reached a consensus, agreed by all.

We selected and distributed the papers into equal amounts for data extraction, or with a maximum difference of two, between the researchers. In order to minimize subjectivity and extraction errors, a second researcher was assigned to analyze and review the extraction for each selected paper, ensuring each researcher reviewed data extracted by the others. In the end, researchers resolved the disagreements and reached a consensus in a synchronous meeting. The results of the extraction were consolidated and consented.

3. A decade of SBIE and Ethics, 2011 – 2020

We present here two perspectives of analysis, based on the results of wide and narrow screening, as indicated in Figure 1. The first involves 175 papers, presenting quantitative and comprehensive insights; the second involves the 13 adherent papers, through a qualitative synthesis of ethical aspects. Research Question 1 (RQ1) deals specifically with the classification of papers by ethical aspects. The 175 articles selected in wide screening were involved only in RQ1 and RQ4; the 13 articles selected in narrow screening were involved in all RQs.

RQ1. Publication adherence and numbers. For this question, we conducted an analysis of the ethical aspects explicitly present, configuring the initial categorization of this SLR. The screening took place as follows: (i) papers that only mention IC and EC, relating them to the epistemology of their research or that mention the terms ethics or morals, and variations, were classified as *Not Adhere*; (iii) papers that both mention the terms ethics or morals, and variations, and deliberate on them with propriety and significance were classified as *Adhere*. Table 2 shows the broad scenario.

Papers categorized as *Not Adhere* present superficial ethical aspects that do not allow a proper analysis, e.g., "Inside the lesson plans, there is also some learning goals regarding the movie, such as the learning subject, the social-emotional learning, and the ethical emphasis" [Woloszyn et al. 2017]. As the paper's only ethical occurrence, we are unable to extract data other than those exposed. What ethical emphasis? What would an ethical emphasis be? This paper has been classified as not adherent, i.e., there is an ethical concern, albeit superficial.

The categorization of 1649 papers resulted in: (i) not adherent, 175 (10.61%); (ii) adherent, 13 (0.79%). Figure 2 graphically displays these data, absolute and proportional by year. 2019 was the year with the highest occurrence of ethical aspects, 34 (16.7%). Initially, we expected a graphic behavior of constant rise of ethical aspects from the beginning, with the lowest record of proportional occurrences in 2011; however, we noticed a valley, with the lowest record being the year 2014. This data is worrying when we see that in 2011 there were 138 publications, and in 2014, 152.

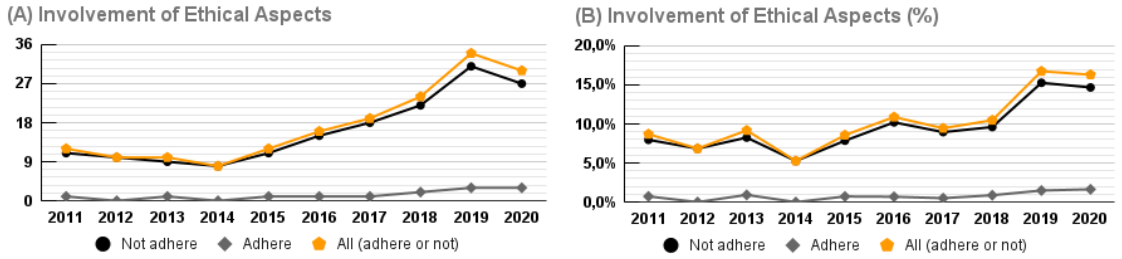

Figure 2. Involvement of Ethical Elements, absolute and proportional

Table 2. Wide screening results

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	T	T(%)
Total (T)	138	146	109	152	140	147	201	229	203	184	1649	100,00%
EC	0	2	1	0	1	3	1	5	4	9	26	1,58%
IC	6	6	3	4	7	7	14	9	20	12	88	5,34%
EC+IC	2	1	1	1	2	3	2	2	6	4	24	1,46%
Not adhere	11	10	9	8	11	15	18	22	31	27	162	9,82%
Adhere	1	0	1	0	1	1	1	2	3	3	13	0,79%
Adhere or not	12	10	10	8	12	16	19	24	34	30	175	10,60%
Not adhere (%)	8,00%	6,80%	8,30%	5,30%	7,90%	10,20%	9,00%	9,60%	15,30%	14,70%		
Adhere (%)	0,70%	0,00%	0,90%	0,00%	0,70%	0,70%	0,50%	0,90%	1,50%	1,60%		
Adhere or not (%)	8,70%	6,80%	9,20%	5,30%	8,60%	10,90%	9,50%	10,50%	16,70%	16,30%		

Figure 2 presents the quantitative results from the wide screening, we noticed a significant increase in concern about ethical aspects from 2014 onward. While in 2014 it was 5.3%, in 2020 there was an increase of 11%, i.e., 16.3%. Positively, the amount of adherent work also increases, timidly. As the overall quantitative is low, the absolute and

proportional linear behavior is similar. The proportional representation allows us to see there was a drop between 2016 and 2017, while the absolute one indicates growth.

The categorization of each type of work, by ethical aspect focus, is available in the online database [3]. Ethics was not a primary topic of any of the papers, however we would like to highlight [Moraes et al. 2019] as a great paper, among the adherent ones. Despite the ethical aspects being accidental, given that it is a literature review, they are presented with very high quality.

RQ2. Technological domain. The technological domains were diverse, considering that the publications had ethical aspects as a non-primary interest. Only two domains were repeated twice, Digital Games [Machado and Oliveira 2020, Dantas et al. 2013] and Social Networks [Canal and Pereira 2018, Urtiga and Castro 2018]. In this category, [Preuss et al. 2020] deviates from the standard, software, and deals with hardware, tangible tables. According to the authors, ensuring the inclusion and maintenance of computer equipment and teaching materials, especially assistive technologies, is a moral need to guarantee inclusive and universal education.

RQ3. Research ethical association. Three results are possible: (i) application, when the authors indicate ethical aspects associated with their main proposal or analysis; (ii) metaresearch, when the authors discuss ethical aspects in the development of scientific thinking-doing or; (iii) both, ethical aspects consider metaresearch and application. EC, for example, is an ethical metaresearch element, as it deals with thinking-doing research.

Two papers brought metaresearch considerations, one direct and one indirect. Direct, [Dantas et al. 2013] present an entire section dedicated to the ethical aspects of the research: "Whenever any change in the children's behavior was noticed, during the test, there was a pause in the game, and then we tried to listen her and let her feel free to continue the activity or not, respecting her freedom and autonomy [...]" [authors' translation]. Indirectly, [Pimentel 2017] explains: "Researchers are not always interested in what teachers and students have to say about the projected artifact. In our research group, we have always been sensitized to the need to understand users as *thinkersdoers*, and we combat the sarcastic notion that 'the user is dumb', which is widespread among computer system developers, which devalues users' opinions." [authors' translation].

[Moraes et al. 2019], as a literature review, brings considerations related to both categories. However, the use is only applied, i.e., they detail the metaresearch and application of third parties.

RQ4. Ethics Committe and Informed Consent. Based on the papers extracted from the wide screening, we elaborated Figure 3 representing the occurrence of EC and IC. It should be noted that we do not present the proportional analysis because several researches do not require IC or EC [Brasil 2016]. In this SLR, for example, [Pimentel 2017, Bispo Jr. 2019, Moraes et al. 2019] do not require EC or IC. Despite this, considering, for example, that in 2018 there were 229 publications, the quantitative of 5 IC; 7 EC; and 2 EC+IC is very low. It is unlikely that only 14 papers, out of 229, involve human participation in the respective research.

Of the 13 papers, 4 have human participants and there is no occurrence of

[3]https://cutt.ly/mQrLNxe. Accessed: 07/07/2021

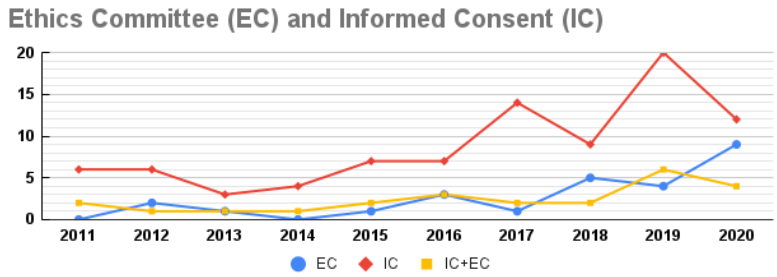

Figure 3. Ethics Committee and Informed Consent occurrence

IC or EC related to the respective research [Araújo et al. 2015, Urtiga and Castro 2018, Preuss et al. 2020, Santos et al. 2020]. [Urtiga and Castro 2018] is a special case, teenagers are interviewed and there is no mention of IC or EC. The research phenomenon is sensitive, cyberbullying, and sensitive personal data is extracted from social networks and used in research, again without the consent of the data subjects.

For clarification, we do not intend to promote an inquisitorial crusade in favor of IC or EC. Even so, we intentionally consider it mandatory that researchers clearly and objectively disclose the relationship with these elements, e.g., "We do not submit to the Ethics Committee because [...]". This is a matter of even greater sensitivity considering that CE research commonly involves underage participants. Taking a normative perspective, the National Health Council resolution for research with human participants is a recommended guide [Brasil 2016].

RQ5. Research Institutions/Universities No institution prevailed numerically over the others, only IFSertãoPE occurred twice. Two international institutions appeared, University of Zaragoza and Colorado State University.

RQ6. Methodological approach. One of the minimum requirements for ethical scientific communication is to point out the methodological approach and research method clearly. Despite this, some of the papers analyzed after the deep screening do not indicate the methodological approach, methodology, or method. We only selected the highest-level methodological approach, and yet some have omitted this information. For completeness, we infer data based on the details of each paper.

The majority, 5 (38.5%), are purely qualitative research. Quantitative approaches, pragmatics or literature reviews, and combinations, are scattered in one or two occurrences. Non-standard, [Pimentel 2017] features an essay-style paper, although he does not label it that way.

RQ7. Ethical principles. [Bispo Jr. 2019] cites deontology; [Moraes et al. 2019] cites several ethical principles: Ethics of Justice, Ethics of Care, Ethics in Praxis, Ethics in Epistemology; [Santos et al. 2020] proposes a framework in which one element is ethics, but there is no principle or ethical foundation to build upon.

RQ8. Ethical limitations or difficulties. [Urtiga and Castro 2018] implicitly expose the complexity of extracting and using personal data as research objects; [Pimentel 2017] instigates the complexity between traditional scientific methodologies and the researcher's position, and their ethical values, in research; [Schneider et al. 2019]

point out their disquiet at developing an Literature Review that does not cover topics or answer critical questions, e.g., privacy is a pressing topic in Internet of Things and yet it is neglected.

RQ9. Research application environment. One aspect that predominates in applied research in the field of CE is where they occur. 2 are LR, excluded from this analysis. Considering the remaining 11: (i) the majority, 6 (55%) take place in university contexts, considering professors or students; 3 (27%), high school context; [Dantas et al. 2013] involve a toy library and; [Canal and Pereira 2018], online social networks.

4. Discussion and conclusion

We present a SLR covering ethical aspects in publications in the SBIE, between the 2011 and 2020 decade. [Kitchenham 2004] protocol for SLR procedure was followed, to structure and formalize the research objectives and build an SBIE meta-scientific view. We analyzed 1649 papers, 175 presented some ethical aspect and, from these, 13 stood out and were included for qualitative and detailed synthesis. We extracted knowledge from both wide and narrow screening, bringing a panoramic and also in-depth view.

Since 2011, despite small variances, there has been a small increase in the occurrence of ethical aspects in SBIE publications. The year with the highest number of publications with broad-spectrum ethical aspects was 2019, with 16.7%; 2020 was the year with the highest number of publications dealing with specific ethical aspects, 7%. Despite increasing through a linear trend, IC and EC show an inconsistent behavior, as indicated in Figure 3, interspersed years with varying amounts.

Most research is focused on application in/of research, a few deal with ethical aspects as metaresearch. The technological domains, research institutions, research methodologies, and research application environment are diverse and plural. As none of the papers' primary interests are ethics, there were no challenges or limitations strictly associated with this topic. Finally, two papers mention ethical principles [Moraes et al. 2019, Bispo Jr. 2019]. Presenting foundations in the ethical domain is very enriching when dialoguing with this topic, an analogy would be a publication in Software Engineering citing "we use a programming language" without saying what it is, how it uses it or where it uses it, which would be totally inadequate technologically.

As for the limitation, we restricted the search universe by context (SBIE) and time (2011-2020), the result presented here does not represent, in full, "the state of ethical aspects in CE in Brazil", it is a cutout considering the largest scientific congregation event dedicated to the CE theme. As a threat to validity, some papers had garbled characters or coding problems. Negative both to our research and a warning to the next ones that follow. It should also be noted that this SLR does not deal with "ethical or not research", it deals with the occurrence of ethical aspects. Research that does not mention the terms ethics or morals IC or EC can be considered ethical, and vice versa. Categorizing research as "unethical" is a complex task and goes beyond the boundaries of a more or less 10 pages paper. Even so, explicitly presenting these terms or elements and discussing them with quality is a step towards an effectively ethical research.

As future work, the search can be expanded to CE research outside the SBIE; some practical and constructive steps to encourage ethical awareness and criticism in SBIE

productions, e.g., IC and EC; continuous monitoring of SBIE's productions through the years to come.

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References

Amorim, P. F., Sacramento, C., Capra, E. P., Tavares, P. Z., and Ferreira, S. B. L. (2019). Submit or not my hci research project to the ethics committee, that is the question. In *Proceedings of the 18th IHC-Br*, IHC '19, New York, NY, USA. ACM.

Araújo, F., Araújo, G., and Lima, M. (2015). An exploratory study about the influence of the web 2.0 on digital education of socially vulnerable youths. *XXVI SBIE*.

Barcaro, E. and Freire, E. (2009). A importância da disciplina Ética no curso de informática. *Fasci-Tech*, 01(01):17–28.

Bispo Jr., E. (2019). Questões epistemológicas em mineração de dados educacionais. *XXX SBIE*.

Bock, A., España, S., Gulden, J., Jahn, K., Nweke, L. O., and Richter, A. (2021). The ethics of information systems: The present state of the discussion and avenues for future work. Number 51 in ECIS 2021 Research-in-Progress Papers.

Brasil (2012). Conselho Nacional da Saúde. RESOLUÇÃO Nº 466, DE 12 DE DEZEMBRO DE 2012. Disponível em 07/07/2021: https://cutt.ly/mmS8Eua.

Brasil (2016). Conselho Nacional da Saúde. RESOLUÇÃO Nº 510, DE 07 DE ABRIL DE 2016. Disponível em 07/07/2021: https://cutt.ly/yjSF2Lm.

Brown, B., Weilenmann, A., McMillan, D., and Lampinen, A. (2016). Five provocations for ethical hci research. In *Proceedings of the 2016 CHI*, CHI '16, page 852–863, New York, NY, USA. ACM.

Canal, M. and Pereira, R. (2018). Avaliação de comunicabilidade em rede social online para apoio à formação continuada de professores da educação inclusiva: uma visão orientada a valores. *XXIX SBIE*.

Canclini, N. (2006). *Culturas híbridas*. Edusp, São Paulo, SP.

Dantas, A. L., Pinto, G., and Sena, C. (2013). Apresentando o bem: Um objeto de aprendizagem para mediar o processo educacional de crianças com deficiência visual e videntes nas operações básicas de matemática. *XXIV SBIE*.

de Sousa, F., Rasmussen, I., and Pierroux, P. (2018). Zombies and ethical theories: Exploring transformational play as a framework for teaching with videogames. *Learning, Culture and Social Interaction*, 19:40–50.

Escobar, A. (2018). *Designs for the Pluriverse: Radical Interdependence, Autonomy, and the Making of Worlds*. New Ecologies for the Twenty-First Century. Duke University Press.

Ferraz, C. A. (2014). *Ética Elementos Básicos*. NEPFIL online, Pelotas, RS.

Fieser, J. (2020). Ethics. In *The Internet encyclopedia of philosophy*. https://iep.utm.edu/ethics/. Accessed: 03/03/2021.

Freire, R., David, P., and de Oliveira, F. (2011). Dialogicidade na formação online de professores de matemática. *XXII SBIE*.

Johnson, D. (2008). *Computer Ethics*. Pearson, 4 edition.

Kemczinski, A., Gasparini, I., and Gomes, A. (2020). Informática na educação. In Maciel, C. and Viterbo, J., editors, *Computação e Sociedade, Vol. 2*, page 141.

Kitchenham, B. (2004). Procedures for performing systematic reviews. *Keele, UK, Keele Univ.*, 33.

Kitchenham, B. and Charters, S. (2007). Guidelines for performing systematic literature reviews in software engineering. Technical Report EBSE 2007-001, Keele University and University of Durham.

Machado, Y. and Oliveira, F. (2020). Uma experiência de orientação profissional com jogos por meio do gamifique. In *Anais do XXXI SBIE*, pages 511–521, Porto Alegre, RS, Brasil. SBC.

Miglievic, A. (2016). Intelectuais e epistemologia crítica latino-americana: do anti-colonial ao decolonial. *Rassegna Iberistica*, 39(105).

Moraes, M., Folkestad, J., and Birmingham, D. (2019). Critical lens in learning analytics research: A systematic literature review. *XXX SBIE*.

Pimentel, M. (2017). Design science research e pesquisas com os cotidianos escolares para fazerpensar as pesquisas em informática na educação. *XXVIII SBIE*.

Preuss, E., Vieira, M., Coutinho, K., Henriques, R., and Baldassarri, S. (2020). Uso de mesa tangível na educação inclusiva. In *Anais do XXXI SBIE*, pages 742–751, Porto Alegre, RS, Brasil. SBC.

Santos, J., Ribeiro, A., Brito, I., Souza, M., Matos, E., and Sampaio, L. (2020). Uma experiência de avaliação multidimensional de cursos de redes de computadores em ambientes de testbeds. In *Anais do XXXI SBIE*, pages 1703–1712, Porto Alegre, RS, Brasil. SBC.

Schneider, G., Bernardini, F., and Boscarioli, C. (2019). Ensino do pensamento computacional por meio de internet das coisas: Possibilidades e desafios. *XXX SBIE*.

Silva, J., Gomes, A., Ramos, J., Souza, F., and Rodrigues, R. (2016). Dificuldades e sugestões para a adoção de software público em atividades acadêmicas. *XXVII SBIE*.

Sposito, C. (2011). O ensino da ética em cursos de computação : normativo ou dialógico? Master's thesis, UFMT, Instituto de Educação, Mato Grosso, MT.

Urtiga, T. and Castro, T. (2018). Detecção de bullying escolar em redes sociais e suas implicações na educação de adolescentes. *XXIX SBIE*.

Woloszyn, V., Machado, G., Oliveira, J., Wives, L., and Saggion, H. (2017). Beatnik: an algorithm to automatic generation of educational description of movies. *XXVIII SBIE*.