


An exploratory analysis of Computing Ethics practices and instruction through Brazilian cyberspace

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Abstract

The heterogeneity and plurality of actors and the possible issues that influence Ethical Decision-Making (EDM) make EDM a multi-faceted phenomenon. This research aims to (i) investigate the training or instructional path in ethics or computing ethics, and (ii) investigate these phenomena from ethics of resistance disruptive, critical, and innovative perspective. The simplification and reduction of the holistic panorama partially explain that empirical research on this topic has failed to generate cumulative results. Therefore, we collect and analyze four hundred and thirty-four responses from a questionnaire, mostly from computer experts associated with their instruction on ethics and “immoral” or “unethical” practices that they have been involved in, directly or indirectly. Based on the results obtained, the main contribution is an interpretive and exploratory computing ethics/ethics discussion about instruction and the morality of practices through cyberspace.

Keywords: *Ethical Decision-Making, computing ethics, Cyberculture, computing ethics Instruction*

1 Introduction

Fifty years ago, Bohr and Kaplan (1971) coined a seminal term for the topic of Ethical Decision-Making (EDM), “complex ethical-decision making issue” (Luca Casali and Perano, 2020). In the context of the protests of health care professionals, an excerpt apprehend this term:

“As younger professionals come to perceive the societal aspects of their role, they are coming to view the delivery of health care as embedded in a social matrix. Perhaps because of the impact of the civil rights and peace movements, young professionals have come to question whether the providing of “ambulance service” to society’s victims is preferable to changing the underlying situations which produce accidents. The spread of protest testifies to the fact that many health care employees can no longer divorce individual treatment from its social context.” (Bohr and Kaplan, 1971)

Bohr and Kaplan (1971) perceive elements that are either specific or external to the domain and immediate context of the research, e.g., the age of professionals, civil rights and peace movements, the so-called victims of society, accidents, and ambulances, among others. The sum of dimensions and complexity combined with the relevant context expansion to the analysis hinders the subsequent effectiveness and efficiency of a positivist, deterministic and objective modeling (Bar-Yam, 2002). The ecosystem plurality makes an interdisciplinary or transdisciplinary approach necessary (Sovacool, 2014).

Context complexity increases involving EDM analysis progress in complexity as information is added to the context. If we consider ethics as the discipline that studies “right” and “wrong” (Gibson, 2014), the tendency to define someone’s practices as “wrong” is proportional to the dimensions and complexity in the respective model, the concrete and actual empirical perspective. Luca Casali and Perano (2020) summarize the reductionism of many EDM studies:

“From an empirical perspective, EDM is a multi-faceted phenomenon. However, scholars often neglect its

heterogeneous nature. Despite the diversity of approaches (e.g. influencing factors, models of EDM, adopted measuring scales), empirical research has also failed to generate cumulative results. One explanation for this is the general lack of consensus regarding the list of influencing factors and the degree to which each factor influences decision makers.” (Luca Casali and Perano, 2020)

Considering the concrete reality, we observe the heterogeneity and plurality of dimensions, e.g., actors, places, time, perceptions, and morals. The simplification and reduction of the holistic panorama of moral experiences enable accurate analysis, although limited to the selected or available data or information in the respective scenario.

Considering one of the computing ethics¹ most traditional phenomena: hacking. When thinking “X hacked Y”, there is a prognostic perception of immorality. If we think about the “Edward Snowden” case (Santoro and Costa, 2021) of improper access (Barger, 2008), initially and plainly “Edward Snowden hacked the USA government” became an influential ethical dilemma scenario widely analyzed in the literature (Blundell, 2021; Hasselbalch, 2021; Reynolds, 2019; Manjikian, 2017; Baase and Henry, 2017), and resulted in significant consequences:

“Following the mass surveillance revelations by Edward Snowden, the United Nations General Assembly in 2013 affirmed that the same rights that people have offline must also be protected online. This statement was based on the realisation that the power distribution and conditions of the Big Data Society were challenging not only the legal implementation of human rights, such as the right to privacy, but these new constellations of power were also enabling the questioning of the very justification of a human right such as the right to privacy.” (Hasselbalch, 2021)

This work presents two investigations on instruction and

¹The English literature presents several nomenclatures, such as computing ethics, computer ethics, computational ethics, ethics in computing, and cyberethics, among others. Here we adopt the term computing ethics (Hall, 2014).

training related to ethics or computing ethics and on possible “unethical” or “immoral” practices.

Brazilian higher institutional education, both in undergraduate and graduate levels, is associated with the human and symbolic subjective valuation of those attending or who have concluded — objective and subjective moral criteria. In objective criteria, people can obtain instruction² in how to perform medical surgery. However, only those in institutional compliance are legally allowed to perform it. In subjective criteria, health professionals, especially doctors, are morally honored for their instruction, supposedly anchored in rigid moral codes and norms.

Society usually reinforces the relationship between higher education and moral conscience. Although completing a higher education course is not necessary or sufficient to attest to someone’s accomplishment or moral conscience. For example, if someone has a medical degree, that person acts according to the codes of ethics of their training and related instructions. Concretely and existentially, there are no guarantees that that person acts with fulfillment, conscience, or ethical maturity. For example, the case of the anesthesiologist who raped patients during medical operations, after applying excessive amounts of sedative (Lucchese et al., 2022).

When Blundell (2021) indicates that some people will invariably find ways of using technologies for unintended purposes—sometimes to their advantage—even when it is disadvantageous to others, he envisions one only solution:

“This can only be countered through the continued infusion of ethically-desirable precepts into the technological and scientific landscapes. In this context it is crucial that those embarking on technology-related careers gain a clear insight into the value of obtaining professional status and a sound reputation for undertaking ethically-infused activity.” (Blundell, 2021)

In everyday life, we make several decisions that influence our actions and, potentially, the actions of others. Some trivial, routine decisions or only concern ourselves are far from sufficient and necessary conditions for ethical scrutiny. For example, playing solitaire, choosing a wallpaper, moving the computer around, printing an image, upload a photo on social media.

Some cases seem trivial concerning ethics or morals, and they are not. In these examples, the data and information are excessively reduced or limited. In this way, involving ethical consideration is an excess. As we add elements, the need for ethical or moral involvement increases proportionately. For example, if the chosen wallpaper is a pornographic image on a university lab computer.

For example, print an image. Is this image copyrighted? Are there any moral norms related to this impression? What will its use be? Is anyone depicted in this image who could feel bad about this? Does this image present sensitive data or information? Does it contain sensitive personal data, e.g.,

²Education is a complex concept, the extensive education or pedagogical literature is far from a consensus on what would be, concretely and practically, “education”. We opted for the terms “instruct” and “train” rather than “educate”, whereas instruction on computing takes place, e.g., state of the art or technique, composing a computing training. Education, in this sense, would be a high, broad, and institution-independent level, effectively involving positive values and virtues. Not all instruction or training entails education.

expose people to situations that could cause them concrete, material, or symbolic damage? Is it allowed to print, or is it business data and information that could bring future risk or damage? Is it a waste of organizational paper or ink?

In most cases “printing an image” will be morally banal. The intellectual potency of these concerns sets the ethics-instructed computer specialist apart from others. The ability and knowledge to rationally, freely, consciously, and responsibly analyze and evaluate a computing-related practice’s moral and ethical aspects.

So-called specialists must aim for moral or ethical knowledge and theoretical or practical knowledge about respective context specificity. In this same example, copyright when printing images, or the relationship of this printing with the matter of data protection, privacy, or the General Data Protection Law (*Lei Geral de Proteção de Dados – LGPD*) (Brasil, 2018).

Furthermore, we realize the need for a transformative worldview perspective (Creswell and Creswell, 2018). Consider the accountability of book piracy. As we have announced earlier, as the dimensions and complexity of scenarios increase, so do EDM instability and subjectivity. Nevertheless, it also covers the operator of the EDM in question, in which the rationality necessary for ethics arises (Vázquez, 2018; Ferraz, 2014). For example, Sci-Hub as a disruptive system for the powerful publishing market, promoting democratization of academic-scientific knowledge (Marple, 2018).

Suppose the EDM specialist is ignorant of how the publishing market and every transaction between authors and publishers works. This specialist follows a mercantile common sense, a simplistic parallel with basic quasi-feudal transactions. “I am buying Maria’s book, so Maria will receive all the value, or a large part of it, for it added most of the value and produced that artifact of knowledge”. Maria receives nothing or almost nothing. Moving on to the increasing complexity of the EDM model scenario, is Maria receiving nothing or next to nothing for a creative product of her intellect and cognition fair? Is Maria working for nothing? Why does she do it, then?

Moreover, by training these computer specialists in ethics and morals + intellectual property + technical competencies but remaining ignorant or silent concerning other aspects of the phenomenon, they generate conscious, free, accountable, and **partially** rational EDM, myopic. Therefore, the value judgment will always be biased and limited, reinforcing the *status quo*.

Aspects of privilege or power can bring complementary, and even necessary, insight to EDM scenarios. We consider the post-positivist perspective, a plurality of marginal elements, e.g., identity, with a rigorous analysis of subjectivity and aspects of privilege and power. These analyzes go beyond the positivist spectrum, requiring interpretive approaches (Buston et al., 1991; Neuman, 2014; Babbie, 2021). We deal with the ethics of resistance (Klikauer, 2014; Christians, 2007; Alakavuklar and Alamgir, 2018).

For example, with the popularization and dissemination of the “Edward Snowden” case, it was expected that the focus would be to debate, analyze and evaluate the phenomenon of

unscrupulous and immoral surveillance of USA government organizations. Several entities deviated from this focus and, instead, they kept their attention on Edward Snowden himself (*ad hominem*), or secondarily on the act committed. “However it’s not this act which is a focus of discussion but rather the ‘*embarrassing*’ revelation which ‘...put Obama in a very bad spot with America’s European allies’.” (Blundell, 2021).

The case of espionage predominates. Instead of the ethical analysis of a categorically immoral phenomenon of systematic surveillance and espionage, certain entities preferred to question or attack the values of those who exposed the phenomenon. Moreover, even if it is pertinent and valid to put the acting entity or the act under the spotlight, the comparison is absurd in terms of relevance and importance. Are there vested or ethically questionable interests behind this?

There is moralistic conduct oriented to the maintenance and sustainability of privileges and power, which the ethics of resistance comes to tension (Klikauer, 2014; Christians, 2007; Alakavuklar and Alamgir, 2018). In line with this research goal, we want to bring this tension to computing, synthesizing knowledge from this critical view. Moreover, these analyzes need to consider the concrete, realistic and existential reality (Vázquez, 2018), away from symbolism or abstract conjectures.

Hereupon, we went to trained computer specialists, or in the process of training, to bring an exploratory view of their ethical training and how they perceived their practices, qualified and perceived by themselves, as “anti-ethical” or “immoral”. How do they perceive instruction in ethics? What means do they resort to when they want to acquire autonomous instruction on this topic? What are the most common practices? How serious are these practices? What are the motivations? What do they feel when they engage in these practices?

We developed and published a questionnaire, using an online form³. We analyzed 434 responses, mostly from computer experts associated with (i) ethics instruction during the training trajectory and (ii) “immoral” or “unethical” practices that they have been involved in, directly or indirectly.

Our goal is twofold. First, to investigate the training and instruction in ethics or computing ethics. Is ethics included in the training path? What means and channels do they use to learn about it? From the respondent’s perspectives, how do we design a good quality class on this topic? Second, to investigate these phenomena from a disruptive and innovative perspective in Ethics, called Ethics of Resistance (Klikauer, 2014; Christians, 2007; Alakavuklar and Alamgir, 2018); by qualitative or mixed approach; without criminal, legal or penal judgment; considering as many elements and factors as possible extracted. Are institutionally trained computer specialists critically aware of their practices classified as “unethical” or “immoral”? What analysis can be extracted from these practices? Are the actions reasoned? Can we cross ethical principles through the

answers?

Regarding the responses related to ethics instruction, there is a perceived scarcity of ethics content in the curricula. Most respondents seek ethical instruction through informal means, and most resort to books and the internet. Regarding didactic, students prefer an expository, traditional approach concerning real cases and a wide variety of curriculum content, such as concrete realism, professional ethics, or consequentialism. When this content is present, in most cases, the students perceive the teaching of ethics as very good or satisfactory. As an in-depth analysis, students confuse ethics with laws and regulations; there are isolated cases of disqualifying social or human aspects.

Regarding the responses related to “unethical” or “immoral” practices, considering those who admitted having engaged in them, the majority committed only one type, predominantly practices related to intellectual property. Most cases involve audiovisual/movies or books. Some specific cases occurred freely, without a noticeable pattern, such as the practice of “cheating” in online exams. There is a presence of guilt and a sense of responsibility, but in many cases, based on rationally or concretely misleading intentions. For example, when pirating a book, they intend to buy it later to value the respective author as a legitimate and moral financial reward. However, authors receive a tiny share, or none, of their works marketed through publishers (where these respondents intend to buy), exposing a naivete concerning the concrete business process, despite a good intention.

Section 2 broadly presents fundamentals on ethics; in Section 3 we present the methodology and research method applied; Section 4 exposes the first analysis and contribution of this research, computing ethics training; Section 5 exposes the second analysis and contribution, on the morality of practices through cyberspace; Section 6 concludes with a brief discussion of possible solutions and future research proposals.

2 Theoretical Foundations

We divide this section into the ethics categories relevant to this present work, concluding with an example case. Initially and encompassing this work as a whole, we have cyberspace.

Some social phenomena present in this research are only enabled and permissible by the configuration of cyberspace. Cyberspace is the imbrication between the physical and virtual spheres, with different social and cultural characteristics, resulting in their own dynamics of ethics and morals. It forms a non-presential and immaterial space of sociability, presenting different phenomena and behaviors to separate spheres, which can only arise from their imbrication. The worldwide interconnection of computers enables and extends the material infrastructure of digital communication and houses an oceanic universe of information (Lévy, 2001). For example, the graduation of computing students at the Federal University of Mato Grosso (UFMT) through Minecraft (Rigueiras, 2020).

³<https://forms.gle/qZX5SFaeHQ3KT7s96> [accessed 09-09-2022 (in Brazilian Portuguese)]

2.1 Ethics and morals

Ethics fundamentally studies the practice of justifying the question “what should I do?”, based on reason, without going against ourselves or canceling ourselves, coinciding the subjective with the objective, exempting particularization and relativization. It is an agreement between individual interest and other subjects of rationality, unity between personal interest and moral interest. Transcending contemplation, when we act, we are endowed with practical rationality and reasons to act, justifications. *Ethos* is inextricably associated with “practice”, with a community, inserted in a community or society (Ferraz, 2014). The subject of ethics, in turn, is morals (Singer, 2022).

There are diverse interpretations of moral philosophy, ethics, and morals. We follow the definitions and concepts in Singer (2022) and Vázquez (2018). Ethics is synonymous with moral philosophy. When we philosophize about human practices and customs, habits, and traditions, we are philosophizing about morals and analyzing through ethics. We call this meta-ethics when we do this about ethics or its constructs. For example, is thinking about ethics ethical? How to think ethically about ethics?

Morals, then, is the subject of ethics. While ethics is about “what is good?”, morality is about “I am a good citizen?”. Ethics studies practices and values that can be attributed primarily to them and objects, such as people. For ethics, a person to “be good” need to have their moral values aligned with what that social, cultural, and historical context considers good. Additionally, how good is this person? Can a person be good **and** bad? Is someone good all the time? Is kindness a virtue that we are born with or that we develop? Moreover, if we develop, is this development natural or social? In this work, we adopt a transformative worldview perspective (Creswell and Creswell, 2018), admitting that goodness is socially constructed.

We need to start from the premise that ethics and morals, and their respective values, are socially teachable. For if they were innate or natural, as Plato reflect in his works (Marcondes, 2007), it would be useless to instruct computer specialists in ethics through training because this would already be determined *a priori* since their birth.

To be said to be ethical, the moral act needs rationality, freedom, conscience, and accountability (Vázquez, 2018). For example, Edward Snowden ethically reflected on his practices and carried them out, despite his later moral values or judgments. Furthermore, this perspective gives us rich reasoning subject to particular moral conflicts. For example, Nazi doctors acted ethically and immorally. These acted rationally, freely, consciously, and responsibly, dispelling the common sense that “a bad person is mentally ill” or “educated people cannot be bad”.

A central element of this work is epistemic responsibility (Rudy-Hiller, 2018). From it, we develop an idea of guilt about our actions, but epistemic responsibility can only occur when there is a perception of act value. That is why we mention ignorance in EDM. A person ignorant that downloading books is immoral will be unable to feel guilty about it. Like research ethics, a researcher ignorant of ethics committees will carry out all the possible

research until a specific event culminates in a moral conflict on this topic. For example, submitting research to a particular journal is rejected with the justification of lack of submission, appreciation, and acceptance by a research ethics committee.

Returning to ignorance, the idea of training yourself from specialized computer specialist instruction involves the minimum necessary skills, abilities, and techniques. This training should rationally instruct those involved in ethics and computational ethics about their importance. In the absence of this, rational development of ethics, and the moral values of practices associated with the specialized practice of computing, are absent. Then there is the burden of ignorance.

Ignorance is an important ethical component (Vázquez, 2018), as the ignorant are incapable of acting ethically, rationality impaired, or null. Institutional instruction should fill this gap. When the institutionally trained specialist completes his instruction without ethics or morals, it is primarily the responsibility of the training entity for any morally outrageous yet ethically trivial act. It is an epistemic responsibility conduction. If the student had to learn morality and how to handle cases ethically and failed to do so, there would be a training vacuum.

Even considering some arguments as “you only learn what you want” or “even with a specific syllabus, discipline, or content this does not guarantee the development of ethical or moral conscience”, there are institutional motivations, intentions, and justifications to back it up. Moreover, even if the quality of this teaching, or the student’s willingness to learn, may be compromised in a certain way and to a certain degree, he apprehended the existence of that subject. This alone is an improvement over the absence. As Gotterbarn (2010) points out about computing ethics training:

“However, if we do not mention professional moral responsibility in our classes and we simply tell students that the goal of a class exercise is to solve the problem exactly as presented, they get the impression that computing is an ethically neutral practice. Students only perceive what they are on the lookout for.” (Gotterbarn, 2010)

Part of descriptive ethical exploration deals with justifications when respondents point to them. Our moral acts are encompassed by moral justifications, divided into five, social, practical, logical, scientific, and dialectical (Vázquez, 2018). We will deal with the justifications with examples from this present work.

First, social justification. Journalistic communication reported the results of a survey carried out by anti-piracy organizations: “Brazil is one of the countries that most consumes piracy in the world” (Pignati, 2022). Social justification determines that a socially accepted practice directs society on a path of social interest and need. In this sense, in law studies, there is a term called the principle of social adequacy:

“The conduct, although typical and foreseen by law as a crime, is socially accepted by society, excluding the criminality of the act. [...] it seeks the minimum intervention of the State in conducts that, although in principle harm a legal asset protected by criminal law, are socially accepted in the face of the smallest injury” [our translation] (Nagima and Haiduk, 2015).

In this sense, if everyone is pirating, there is a social justification for pirating⁴.

The practical justification is trivial. It involves the requirements of accomplishment of the norms. If there are necessary and verified conditions, there is practical justification. For example, despite having institutional access to specific papers, people use parallel systems to obtain them because it is faster, simpler, and more direct.

We perceive a conflict in the logical justification. The logical justification: norms do not exist in isolation but form part of an articulated set or system, constituting the ‘moral code’ of the community (Vázquez, 2018). Standards must be consistent and logically valid. Hypothetically, let us consider that there is a rule at the university that determines that copies of each book must be available to meet the concrete demand of all professors and students simultaneously. If there are few copies of the Calculus base book in the library, the teacher defines this book as the base book for all his three classes full of students, essential for the discipline’s progress. His practice is inconsistent with the concrete parameters stipulated by the moral norm above his pragmatic freedom, i.e., it is wrong, and he is wrong accordingly.

Scientific justification is grounded in consensual scientific knowledge — for example, sexism in computing. There was a time in history when academic-scientists perceived scientifically, particularly biologically, that women were inferior in science, Technology, Engineering, and Mathematics (STEM). Academic-scientists overturned this discrimination by science through its academic-scientific practice (Ribeiro et al., 2020). So, if there is a case of machismo and the justification is “science has shown that men are better than women at programming”, it is invalid, discriminatory, and irrational.

The dialectical justification, which is crucial for the ethics of resistance, will be deepened in the section 2.3, defined as:

“A moral code, with the norms that integrate it, is a human product and, as such, forms part of the practical historical process of humanity, which also encompasses the moral historical process. Since the morals of morals has an ascending meaning [...], a norm or a moral code is justified by the place it occupies within this progressive movement. [...] a moral norm is dialectically justified when it contains aspects or elements that, in the moral ascension process, are integrated at a new level in a higher morality.” [our translation] (Vázquez, 2018)

The last concept that concerns explicitly the domain of ethics is moral advance, progress, or ascension (Vázquez, 2018). The idea of moral advancement can be wrongly understood as towards the “good”, considering the interpretation of the ethics’ primary goal as good-oriented (Marcondes, 2007), as an end. Moral advancement is about the progress of ethics, in which the most considerable possible portion of people acts from ethical precepts, i.e., rationality, freedom, conscience, and responsibility. Thus, there is moral deliberation as a social and cultural practice. The best path to moral advancement is in the ethical empowerment of society, rather than the pursuit of a subjective and morally biased “good”.

⁴First, this is just one of the justifications; second, this justification can be nullified or weakened by the others. In this sense, collective morality tends to accept the social practice of piracy, but ethical scrutiny may follow different reasoning.

One of the social functions of ethics is to drive moral advancement. Receiving shortsighted and simple instruction without critical conscience or broad vision will yield only morally trained, docile, and obedient experts, not ethical experts. These same experts will be ignorant of the insights that ethics can and should provide. For example, ethics and laws have an asymmetrical relationship (Barger, 2008). Additionally, with ethical conscience and reflection, laws are conceived, created, analyzed, criticized, questioned, altered, or overturned. On the other hand, the influence of legal norms on ethics is negligible. With a narrow and limited vision, the specialist can believe that “the legal norm is the categorical ethical imperative” and never criticize it.

2.2 Computing ethics and EDM

Ethical awareness, generalist or associated with a specific domain, is provided to rationality, therefore, potential to all human beings. However, the public and specialized sphere (Habermas, 1997) are distinguished as specialized objects. For example, we turn to a specialist in medical practice when we perceive the need for medical surgery, instead of anyone in a broad scope. We expect that surgeon is endowed with ethical conscience when practicing his technical and contemplative specialty, instructed during his institutionalized training career, e.g., university training. The same analogy serves Computing and its respective specialists. Broad society understands and expects that the computing specialist, as well as the surgeon, is endowed with reason and technical and ethical proficiency. We expect, *a priori*, ethical scrutiny in actions from institutionalized trained professionals or so-called specialists (Dexter et al., 2013).

Hall (2014) defines computing ethics as:

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

As we consider ethics to be socially constructed and taught-learned, part of computing ethics involves teaching-related knowledge to others, mainly specialists, also in training. In this work, as Blundell (2021); Gotterbarn (2010) argues favorably, we reinforce that one of the instruction perspectives is (or should be) institutional training. Colloquially, education.

The teaching and learning of computing ethics are resisted, even by professionals with a career in computing (Blundell, 2021; Gotterbarn, 2010). Computing ethics has extensive English literature (Blundell, 2021; Manjikian, 2017; Barger, 2008; Johnson, 2008; Baase and Henry, 2017; Spinello, 2020), while the Brazilian Portuguese is minimal, perceived from a simple search in formal or informal repositories.

Blundell (2021) and Gotterbarn (2010) reinforce the association between ethical action and who performs it, emphasizing professional ethics. Other authors recognize professional ethics without necessarily reinforcing professional ethics as the central foundation of computing ethics (Barger, 2008; Baase and Henry, 2017; Johnson, 2008; Spinello, 2020). The main and most famous artifact

of professional ethics in computing are codes of conduct or ethics. For example, the Association for Computing Machinery (ACM)⁵, Institute of Electrical and Electronics Engineers (IEEE)⁶, International Federation for Information Processing (IFIP)⁷, or Brazilian Computing Society (SBC)⁸ code of ethics.

Codes of ethics are suitable moral manuals to guide and guide computer specialists (Gotterbarn et al., 2018). Even so, they are statements of moral norms⁹. There is a design *rationale*, sometimes disclosed and sometimes not, behind these moral commandments. This design *rationale*, in turn, represents ethical scrutiny, regardless of its quality.

The IFIP code of ethics presents a brief explanation of each of the items present. For example:

“3.1 Ensure that the public good is the central concern during all professional computing work.

People — including users, customers, colleagues, and others directly or indirectly affected — should always be the central concern in computing. The public good should always be an explicit consideration when evaluating tasks associated with research, requirements analysis, design, implementation, testing, validation, deployment, maintenance, retirement, and disposal. Computing professionals should keep this focus no matter which methodologies or techniques they use in their practice.”

Ethical instruction goes beyond codes of ethics or just indicating that experts must follow codes of ethics. The codes of ethics presented above support wise and moral solutions. Even so, these are computing ethics artifacts. It is essential to decide based on ethical precepts (Johnson, 2008), i.e., EDM. Finding a way of reaching wise solutions is part of EDM.

Ethics being essentially practical, EDM analyzes how people, groups, or organizations make decisions from an ethical perspective. To the limit of our knowledge, an exploratory study on EDM related to the field of Computing is absent from the Brazilian context. As works close to this theme, Sposito (2011) deals with research involving students from higher education courses in computing and their relationship with Ethics, Barcaro and Freire (2009) points out the importance of the computing curriculum explicitly containing the teaching of ethics, and Masiero (2013) with a broad approach to ethics in computer science in Brazil. Expanding the context of analysis to outside Brazil, Luca Casali and Perano (2020) presents a comprehensive systematic review of the literature on the subject, summarizing other similar reviews.

Predominantly, EDM is normative or descriptive. The normative approach structures and formalizes the decision-making to be carried out; the descriptive approach analyzes and evaluates elements that make up a particular decision taken (Torres, 1998). What differentiates EDM from generic decision-making is the intrinsic principled

aspect associated with constructs derived from Ethics, for example, the segments of ethical thought.

Furthermore, we can specialize EDM in the field of Computing, theoretical or applied. Briefly exemplifying, theoretical analysis is about researching or developing an algorithm to make it challenging to track “pirated” intellectual property protected content; applied analysis deals with the impacts and influences of this algorithm. Differentiating and isolating Computing between theoretical (or technical) and applied is a challenge absent from this work.

Here we deal with EDM in Applied Computing, which we will name ISEDM (*Information Systems Ethical Decision-Making*). The epistemological elements that make up Information Systems (IS) allow a parsimonious conceptual dialogue between its aspects, considering software, hardware, data storage, and networks. If isolated, configure pure computing; added and integrated with people and procedures (Stair and Reynolds, 2018) make up IS.

As Laudon and Laudon (2020) announce:

“The study of information systems is a multidisciplinary field. No single theory or perspective dominates. [...] In general, the field can be divided into technical and behavioral approaches. Information systems are sociotechnical systems. Though they are composed of machines, devices, and “hard” physical technology, they require substantial social, organizational, and intellectual investments to make them work properly.” (Laudon and Laudon, 2020)

Complementing by Johnson (2008):

“Yes, the sociotechnical systems perspective seems to generate more questions than someone without the perspective would have thought to ask. Although this may seem a burden, it is unavoidable that better decisions involve taking into account more factors. Yet the sociotechnical system perspective does not just expand the range of factors to be taken into account; it helps in identifying or articulating particular kinds of concerns, and reveals new opportunities for resolution or intervention. For example, suppose Kathy is already concerned about the chip being demeaning and disrespectful of whatever autonomy her mother has. To figure out whether the chip will have this effect or not, if Kathy focuses on the chip alone, she will get nowhere. On the other hand, once she recognizes the chip as part of a larger system, she is led to gather information about the whole system and this may help her evaluate whether the system is demeaning or not. It depends on how her mother is treated during the surgical implantation, how the data is used by hospital staff, whether implantation means less human interaction with hospital personnel, and so on.

It may be that Kathy cannot do anything about the composition of the system; that is, her decision may be a matter of simply saying ‘yes’ or ‘no’ to the implant. But that yes/no decision can be made more wisely after the sociotechnical systems perspective reveals a range of options for hospital administrators and the systems developers. For example, if they find the device is being rejected because patients (or their loved ones) find it demeaning, they may be able to identify different nodes in the system where changes might be made. It may not be the chip itself that has to be changed or abandoned but rather a change in the implantation procedure, in the user interface, or in the training of hospital staff. Changes in one of these nodes will change the nature of the system and may alter perceptions or attitudes toward the system.

In summary, the sociotechnical systems perspective provides a richer account of situations in which ethical decisions are made, one that may help in articulating moral concerns as well as revealing additional avenues for addressing ethical questions and issues.” (Johnson, 2008)

⁵<https://www.acm.org/code-of-ethics> [accessed 09-09-2022]

⁶<https://www.ieee.org/about/corporate/governance/p7-8.html> [accessed 09-09-2022]

⁷<https://www.ipthree.org/ifip-code-of-ethics/> [accessed 09-09-2022]

⁸<https://www.sbc.org.br/institucional-3/codigo-de-etica> [accessed 09-09-2022 (in Brazilian Portuguese)]

⁹To announce them as “ethical” would be an extrapolation of moral philosophy.

We epistemologically stitch together these two perspectives. IS as a sociotechnical system and of the relationship between sociotechnical and computing ethics. A “purely technical” perspective ignores the social, cultural, and historical aspects necessary for ethics (Brasil, 2016; Vázquez, 2018; Ferraz, 2014). IS knowledge, discipline and epistemology present sufficient and necessary *episteme* to deal with computing ethics, when dealing with technical or technological aspects; organizational or procedural; human or behavioral (Stair and Reynolds, 2018). Enabling a disciplinary plurality.

The phenomena exceed the technical limit, striving for an interdisciplinary plurality, a complex analysis, given that the immanence of perceptions of reality is located adequately outside computing. In line with Gregor (2006), we find ourselves at the crossroads between technological and extrinsic disciplines, proposing rich, plural, and cross-border analyses.

For a conceptual reason, we classified respondents’ practices as “unethical” or “immoral” in quotation marks. There is a difference between an immoral, unethical, or perceived practice as one of two. Here we deal with the respondents’ feelings and perceptions of morality so that they may be ignorant about the concepts and definitions of ethics or morals. We could follow a postmodern perspective and anchor the valuation to the sensation or perception of the students. We interpret that this choice could fall into ethical relativism (Vázquez, 2018; Johnson, 2008) and generate an ethical conflict in the research *episteme*.

For example, suppose a student pirated a book and does not consider this practice immoral or unethical. In that case, there is a conflict with everyone else who does and considers it immoral or unethical. Therefore, we follow the values present in the answers, combined with the ethics and computing ethics state of the art and with the laws and regulations in force.

Even if a respondent indicates “accessed his girlfriend’s social network without her knowing and that this is moral because they are a couple, so he can or is entitled to do so”, it is considered unethical. The values and interpretations of this respondent are dissonant from the state of the art in ethics, computing ethics, and laws or regulations.

Is **the respondent** immoral or unethical because of it? Qualifying the respondent this way through a questionnaire response is a qualitative extrapolation and is far from our descriptive exploratory objective. Through the ethics of resistance, it configures a serious unethical or immoral phenomenon because it explores the dynamics of gender for its EDM concerning the privacy of its own girlfriend.

In this sense, two concerns arise: what would be effectively unethical and immoral (Vázquez, 2018). Second, the universe of the respondents’ subjective sensations and perceptions.

Immoral is a practice or behavior that violates moral norms. If there is a legal norm, there is potential and possibility for this case to be analyzed and evaluated through state institutional channels. Immorality would be the action involving “evil”, “wrong”, or “injustice”. Unethical, colloquially confused with immorality, is the denial, misrepresentation, or impediment of the ethical

quality related to actions. For example, when the boyfriend says “this is moral” he is misrepresenting ethical scrutiny, skewing the scenario to his moral interpretation, ignoring the other dimensions involved, and putting an end to moral appreciation (“this is moral”, as a final value judgment).

In conclusion, the responses of practices are directly related to moral values and memory disposition considering the questionnaire interaction. As for moral values, one respondent only responds to the “immoral” or “unethical” consideration through his subjective value judgment. Using the case of the boyfriend above, if his respective moral realization and conscience exempt this practice from negative valuation, it is possible that he will not even answer this question with it, guided by his particular moral compass.

Some examples of survey responses:

1. “I did not commit any illegal practice. This is against my principles”. The respondent associates unethical and immorality with the transgression of laws and regulations. To reinforce, he uses the principled argument, traditionally invoked following a line of virtuosity and moral elitism, i.e., “his” principles prevent him from committing supposedly illegal practices committed by those “unprincipled”.
2. “Some of these practices are almost unavoidable”. Being unavoidable, how did the respondent avoid it? An initially conflicting answer, as it also indicates not having committed any practices.
3. “Yes! I downloaded Kylie Minogue’s Infinite Disco show. In my defense, I bought the show online and liked it so much that I downloaded the show from a website.”. The respondent had already purchased the product or service with their financial resources and only for personal, private use. This practice has an ethical appreciation, and even if it is immoral considering *stricto sensu* intellectual property, we rule out bad faith.

Regarding memory, the respondent is restricted to the memories and memories available while answering the questionnaire. So besides the possibility of “this is not unethical or immoral to me so that I will ignore it”, there is the possibility of “I do not remember right now” and let it go. This limitation could be solved by interviews (Buston et al., 1991), in which we could instigate or motivate respondents to remember and better capture their subjective sensations and perceptions in relation to the respective practices.

As examples of dilemmas in ISEDM, use of digital platforms by government leaders to spread disinformation (Lisboa et al., 2020); romanticization of *dataveillance* and *cyberstalking* deteriorating Privacy (Carvalho et al., 2020); algorithmic racism (Silva, 2020); profession and gender oppression in Computing (Ribeiro et al., 2020); algorithmic accountability and electronic personality (Silveira, 2020); impacts and influences of *Language Models* (LM) (Bender et al., 2021).

2.3 Ethics of resistance and an example case

Table 1 exposes an ethical scenario, containing a list of hypothetical events. Before proceeding, if possible, reflect

on this content. We conduct an ethical and moral analysis of this scenario next.

Jorge's scenario illustrates that analyzing one's life and roaming is complex and multifaceted. The scenarios expose disputes and conflicts between us, like Jorge, subnets, families affected by the pandemic, or entire networks, the Disney+ platform, of unequal forces, privileges, and powers between parties. Scenario #1 can lead us to the impression that Jorge is merely a post-teenager, acting irrationally and without critical conscience, inclined to misappropriate digital goods, infringement of intellectual property, and use specialized knowledge for malicious purposes. Scenario #5, complemented by data, shows that Jorge acts rationally and consciously in purpose, intention, and objective, shuffling and blurring the Cartesian definitions.

Jorge's "piracy" is an act of resistance against Disney+'s attempt to surcharge users, reinforcing the culture of immediate consumerism (Skclair, 2012). Even so, supporting the subscription to the platform's *streaming* service.

Each ISEDM scenario, driven by specific ethical principle(s), will result in a different moral assessment. Emphasizing the semantic aspect, correctness, and completeness, of the scenario in question and the object analyzed, in this case, Jorge's practice. Some possible moral decisions based on ethical principles (Singer, 2022; Ferraz, 2014; Vázquez, 2018; Gibson, 2014) could be:

- Hedonism/Egotism, watching the movie, paying or not, guarantees Jorge the maximum individual pleasure;
- Kantian/Categorical Imperatives, Jorge must do to others what he would like them to do to him. If Jorge does not want his intellectual production to be appropriated without bearing the time and resources invested, he should not do the same to Disney+, and idealistically, Jorge encourages this practice, worsening his condition;
- Ethics of Care, Jorge places the happiness and fun of his sisters, emotionally damaged by the pandemic, above restrictive or categorically imperative reasons that prevent him;
- Consequentialism, thinking about cost-effectiveness, Jorge will not give up eating or having his sisters eat to watch a movie, just as the probability of being arrested or criminally penalized is minimal and the joy of his sisters is guaranteed;
- Based on Duties/Contractualism, Jorge is unsure whether downloading just one copy of the movie, without sharing it, through alternative routes for non-commercial or for-profit purposes is a crime or if it violates his implicit social contract with the state, laws are ambiguous and opaque in this area, and Jorge does not have the time to carry out a thorough legal analysis;
- Utilitarianism, in this aspect either improbable or potentially biased, due to the impossibility of objectively analyzing the data. For example, would "pirate the movie" really harm the production of the movie? All production or just financially interested parties? How would that lead to malice toward the stakeholders? Rationally, Jorge can not know.

These basic aspects of ethics point to an association of

applied ethics with specialists in the respective application domains. We discuss people formally trained in computing, corresponding to the specialized sphere of this specific domain (Habermas, 1997). It is expected that they have an ethical *rationale* regarding their own actions (Ziman, 2001; Gotterbarn et al., 2018). For example, Jorge is aware of his computing actions, and related to his virtues, both concretely and symbolically. He is aware of the impact and influence in the idealistic (Singer, 2022) and exemplary (Zagzebski, 2017) scope, for example, "Jorge do this and is an expert in this domain, so this is a valid practice". Social justification validates this reasoning.

In this work, we dialogue with the ethics of resistance (Klikauer, 2014; Christians, 2007; Alakavuklar and Alamgir, 2018). Ethical criticism is complex and combative, unlike the utilitarian quantitative view or the Kantian idealist reductionist view. Privilege, power, inclusion, political positioning, and sustainability, among others, substantiate the ethics of resistance.

Jorge's scenario is the least indicated because he is disadvantaged. For a scathing and plural review, shifting the analysis to Disney+ or the food delivery app management company would provide an effectively valid view. Analyzing Jorge's ISEDM is analyzing a tiny node compared to the potential analysis of the ISEDM of these other actors and, for example, charging an additional absurd price to access based on just one product. Improve payment and working conditions for application deliverers. None of this is analyzed, so at first glance, the scenario complement seems like an attempt to "justify" Jorge's practices, but do we think ethically about the other actors involved? Or does all the burden fall on Jorge?

At first (Table 1, #1), it is argued that Jorge is a cybernetic criminal due to his practice. As the complexity increases, it becomes clear that egoism does not guide Jorge; otherwise, he would encourage his father to cancel his Disney+ subscription and "pirate" all the content. He is also interested in boycotting the consumerist logic reinforced by the platform for his digital community, keeping the *torrent* online and sharing it in similar groups. At no time did Jorge advocate the abolition of the Disney+ subscription or the "piracy" of all its content. He surgically sought knowledge on the subject and made an ethical decision. In addition to enjoying the movie, Jorge understands that people significant to him should also do so. Furthermore, this is Jorge's way of operating his ideals of combating the culture of immediate consumerism and the practice of Disney+. Because, as he read, this could become a trend in this niche (Schaefer, 2020; Eriksen, 2021).

In line with the moral advance, we defend the reasoning present in the ethics of resistance as a mechanism of emancipation, liberation, deconstruction, and criticism. Therefore, the development of ethical and moral conscience should be promoted instead of promoting a moralistic instruction biased toward moral hygiene. In this sense, just teaching that "pirating is wrong" is status quo-oriented hygienic moralism. The phenomenon of piracy must be analyzed, criticized, and evaluated with multiple dimensions and equivalent complexity.

An ethics syllabus, discipline, or content must go beyond

Table 1. A clipping of Jorge’s ethical and moral itineraries in cyberspace

#	Context	Practice
1	March 2021. Jorge is nineteen years old; enrolled and active in an undergraduate course in the area of Computing; has specialist knowledge on the topic.	Jorge “pirate” movies.
2	Same as item 1. Jorge’s father subscribes to the <i>streaming</i> Disney+ platform for R\$27.90 per month. Jorge is interested in the movie “Raya and the Last Dragon” on Disney+, so he needs to pay an additional R\$69.90 to watch the premiere in theaters and on the platform, available only in the <i>Premier Access</i> package (Eriksen, 2021).	Jorge “pirate” a movie to watch, already consuming a similar service from the same company.
3	Same as items 1 and 2. Jorge’s father is unemployed due to the COVID-19 pandemic’s indirect influence. He is working informally through food delivery apps to support his family in a precarious economic situation. Jorge has two little sisters, and Disney+ distracts them and serves as entertainment. They want to see “Raya and the Last Dragon”, but because of social distancing, they keep in touch with colleagues over the Internet, and everyone in their group said they would see it closer to the premiere (no guarantee that this is true). Jorge and his sisters respect social isolation and do not leave the house. Jorge loves his sisters, is techno-politically aware, and wonders why Disney+ needs to charge an absurd additional amount for early access to content that will be available soon, much more expensive than a movie ticket.	Jorge “pirate” a movie he wants to watch, already consuming a similar service from the same company, to make his sisters happy and spare his father.
4	Same as items 1, 2, and 3. Jorge is suffering the pandemic scenario’s mental, social and physical setbacks. His father is constantly stressed by the precarious working conditions (Oliveira, 2020), which pressures Jorge to drop out of college or “make some money” with him. The cost to watch “Raya and the Last Dragon” is $\approx 5\%$ of Jorge’s father’s monthly income. Jorge questions himself ethically if “pirate” the movie will harm the people involved in its production. On the Internet prevails the speech defending the company’s operations or profit (Eriksen, 2021) or incoherent speeches such as “protects the rest of the distribution chain (rent/physical/cable/streaming) below” (Schaefer, 2020), it being unclear how this additional charge protects or favors anyone other than the company itself. The Disney+ subscription itself, R\$27.90, significantly impacts the month’s bills.	Jorge “pirate” a movie he wants to watch, already consuming a similar service from the same company, to make his sisters happy and spare his father. Consciously and rationally considers the extra fee for early access immoral. Jorge keeps his <i>torrent</i> service constantly operating and sharing the movie file and disseminates the link in groups of people against the platform surcharge.

teaching “good” and “bad”, “right” or “wrong”. It must cover elements of ethics that enable specialists to deal with their own reality in the networks they participate in or intend and forward moral progress. Preferably, dealing with aspects of privilege and power directed to the active fight against injustice, as guided by the ethics of resistance.

Brazilian concrete examples, the Woman In Technology (WIT) ¹⁰ workshop, which aims to empower and improve women’s access to computing. Some dynamics include computing, digital activism, and anti-racist practices (Santos, 2022). The project Take My Face Out of Your Aim (*Tire Meu Rosto da Sua Mira*. No ideal English translation) ¹¹, to ban the use of facial recognition by public security. Platform cooperativism unites the principles of collective ownership, associated work, decent pay, income security, transparency, and data portability (Grohmann, 2021).

Less directed to concrete action, PEGABOT ¹² is an initiative to enable bot transparency. One of its goals is to curb this technology’s use for disinformation dissemination. Unlike dynamics systematically oriented to combat negative values, such as machismo or racism, PEGABOT recognizes that bots are ethically complex constructs, generating positive results and subsequent consequences. So in this specific project, the approach moves away from a critical discourse of banishment or prohibition in parsimony with ethics and moral justifications.

Moreover, here we return to dialectical justification. Although state-of-the-art computing ethics instruction is essential, it becomes deficient without a social, cultural, and historical awareness that these same specialists, even in training, will be the operating agents of computing in the present or future.

The idea of impacting or influencing reality with computing oriented both to doing good to others and preventing, mitigating, or combating evil, is valid. It is an ethical negotiation between “carrying the burden of saving the whole world, at all times, and with all its potential” and “doing nothing, because anything I do will not help or generate any impact relevant”. In comparison, everyone should avoid inaction and passive appreciation of vices or negative values.

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The idea of impacting or influencing reality with computing oriented both to doing good to others and to preventing, mitigating, or combating evil is not only valid but also necessary, avoiding inaction and passive appreciation of vices or negative values. It is an ethical negotiation between “carrying the burden of saving the whole world, at all times, and with all its potential” and “doing nothing, because anything I do will not help or generate any impact relevant”.

relevant”.

For an ISEDM involving complex, multifaceted, and heterogeneous scenarios Luca Casali and Perano (2020), we need to go beyond the computing (*lato sensu*) knowledge of the computing domain and moral philosophy because different interpretations, perceptions, or structuring of reality are outside these bubbles of thinking-doing.

For example, to understand the dynamics of “pirating a book” and properly and ethically criticize it, it is necessary to resort to marginal cultures and understand the relations of privilege and power in this context. Only with these reflections can a specialist demystify the idea of “financial support to a researcher when buying his scientific article in the digital library”.

More than that, acquiring identity consciousness and positioning oneself in the domination matrix of the superstructure of society, ultimately (and at best) developing empathy for one’s peers or other entities in a state of systematic oppression, devaluation, or social attack.

3 Research methodology

We collected and analyzed data using the survey methodology (Recker, 2021), from four hundred and thirty-four respondents who were specialists or in the process of specializing in Computing. Despite the focus on this specific population and to avoid exclusionary behavior, we included respondents external to computing (12 in total, $\approx 2\%$). In respect of reproduction, verification and validation, we disclose the online database ¹³. For linguistic fidelity, the answers are in Brazilian Portuguese. The pertinent to this research will be translated and arranged in this document.

Survey methodology is suitable for this research, through a qualitative paradigm, by an interpretive and critical approach (Buston et al., 1991; Jansen, 2010; Babbie, 2021), given the perspective of the ethics of resistance. As is plausible in qualitative research, instead of a hypothesis, we deal with specific phenomena to structure and formalize knowledge about them, dialoguing with the literature and other authors and theorizing about it (Buston et al., 1991). “[...] the aim of a good qualitative study is to access the phenomena of interest from the perspective of the subject; to describe what is going on; and to emphasize the importance of both context and process.” (Buston et al., 1991).

We guarantee the criteria expected for qualitative research, credibility, transferability, confirmability, and dependability (Buston et al., 1991). Regarding the quality and adequacy of the survey, we followed the indications of Jansen (2010) and Babbie (2021), which we detail to ensure credibility.

Quantitative and qualitative surveys are significantly and expressively different and must be evaluated and built on different premises:

“The qualitative survey does not aim at establishing frequencies, means or other parameters but at determining the diversity of some topic of interest within a given population. This type of survey does not count the number of people with

¹⁰<https://meninas.sbc.org.br/sobre/women-in-informatic-technology/> [accessed 09-09-2022 (in Brazilian Portuguese)]

¹¹<https://tiremeurostodasumira.org.br/> [accessed 09-09-2022 (in Brazilian Portuguese)]

¹²<https://pegabot.com.br/> [accessed 09-09-2022 (in Brazilian Portuguese)]

¹³<https://cutt.ly/SxTJVQb> [accessed 09-09-2022]

the same characteristic (value of variable) but it establishes the variation (relevant dimensions and values) within that population.

In short, the qualitative survey is the study of diversity (not distribution) in a population.

[...]

[...] qualitative survey may be useful in a positivist or post-positivist project (including ontological realism and epistemological objectivism), but it could also be performed in the context of critical theory or constructivist projects.” (Jansen, 2010)

Qualitative surveys include all studies of diversity in a population without restrictions on the number of empirical cycles or the way of generating codes. There is a combination of open, inductive, and pre-structured, deductive content. The second predominates. We are limited to a specific topic, computational ethics; on a specific topic, ISEDM related to “unethical” or “immoral” practices. In this way, we articulate part of the phenomenon analyzed previously.

We start the investigation with a predetermined set of possible categories and types of practices without waiting for any of the practices present in the answers to configure a new category or type. Even so, we kept the perspective open (inductive), to the possibility of other phenomena, such as partially similar types and categories, with specific characteristics.

This work follows the one-shot method because of good prior knowledge or the availability of a pre-structured inventory of codes. There is only one empirical cycle (research question—data collection—analysis—report). We do not carry out pilot surveys.

The analysis considers mainly diversity, not distribution. Initially, data were encoded when encoding was appropriate; the multidimensional description follows holistic synthesis by core concept; we use specific deterministic explanations for each issue or phenomenon analyzed.

About sampling, Jansen (2010) says:

“In a qualitative survey, saturation is an empirical question, not so much a theoretical one, as in Grounded Theory. The goal is not to detail concepts exhaustively for a theoretical domain (i.e. to cover all theoretical possibilities), but to cover relevant diversity (in terms of aims) diversity in an empirically-defined population which may comprise only a small number of units.” (Jansen, 2010)

In this specific case, we consider this feature of this present research a weakness. Focusing on the phenomenon(s), we opted for an open and free sampling of the Brazilian geographic location. Even though this characteristic is far from invalidating or harming this research, it weakens the possibility of contextual positioning of the results, given that we obtained responses from different places throughout Brazil. Even so, the critical profile criteria were rigorously respected, involving specialists, specialists in training, or specialists who deal directly with computing.

After collecting the data through the online questionnaire, we started coding and structuring the data and information. Reiterating that the objective is beyond the creation of new codes, whether categories or types, primarily in interpreting the phenomena crossed with the ethics of resistance. About encoding, Jansen (2010) says:

“Usually, however, the synthesis of diversity is produced in an explorative analytic process after the data collection. It starts with coding, i.e. segmenting data (dividing data into meaningful parts) and attributing topical, dimensional and/or categorical labels to segments. Many authors have provided guidelines for coding; all have their personal preferences [...]. These may be helpful. But these guidelines are always secondary to the core task in coding, which is to determine the relationship between the data fragment and the knowledge aims of the study. Therefore the quality of the coding is not so much a technical methodological issue, but involves theoretical sensibility and creativity.” (Jansen, 2010)

In this present work we analyze the answers from the questions present in Table 2. For better organization and structuring, the ordering of the questions is rearranged in Table 2, different from the questionnaire.

Observing Table 2, questions Q1 to Q5 deal with the training and instruction path regarding computational ethics; questions Q6 through Q9 deal with practices and behaviors across cyberspace; question Q10 is a complement to all the others.

Coming from an ongoing questionnaire, the first response occurred on December 12, 2020; the last was on March 3, 2022. In all, we collected 434 valid responses, with free, informed, and consented participation and without the occurrence of an answer invalidated by absurdity. We detail the Free and Informed Consent Term in Section 3.1, dedicated to the ethical aspects of this research.

Specific questions were optional to answer, so not all of them reached 434 answers. After being accounted for and verified for minimum adequacy, the response data were organized and processed.

We collected the following data about respondents, followed by the possible responses:

- **“I study...”**: Find out what level of training in computing the student is. From free courses to graduate courses. Additionally, it can answer if it is not from computing or if it is not from computing and works directly with computing;
- **“To complement question 1, what is the specific name of the course you take today? (or did, if already completed and professional)”**: Free answer in plain text;
- **“In which institution do you take this course? (or did, if already completed and professional)”**: Free answer in plain text;
- **“Is the institution where you take the course public or private?”**: Public, private, I don’t know;
- **“How long have you been in this course/training? (or works in the area, if professional)”**: Increasing response ranging from less than 1 year to more than 4 years.

We will conduct cross-analysis using these personal data as input, with an interpretive purpose. We refrain from associating the answers with the personal data of the respondents, as this information is alien to the primary objective of this research. For example, we do not care if “X% of undergraduates engage in more unethical practices than graduate students”. As this is ethical research, in Ethics of Resistance, this type of construction of punitive

Table 2. Research sub-questions and answers

#	Questions
Q1	Consider only your current course. Is there a specific discipline for Ethics?
Q2	Consider only your current course. How many disciplines have/had content on ethics or subjects directly related to ethics?
Q3	Consider only your current course. If the answer to the previous question (question 2) was not 0, what did you think of this learning?
Q4	What do you think would make a computing ethics class fun, useful, and interesting?
Q5	If you want to learn about Ethics (remember, in computing), what would you do? Which means would you use? Where would you go?
Q6	Considering the interval from two months ago to the present day, have you committed any practice that could be considered immoral or unethical in Computing? Which one(s)? If you haven't committed any, just answer "None".
Q7	What motivated or led you to commit the practices in the previous question (question 6)?
Q8	What do you feel when you think about these practices in question 6?
Q9	Do you want to freely complement your previous answer (question 8)?
Q10	Would you like to add any information?

and categorically inquisitive knowledge is useless. Labeling a Law student respondent or someone from a military institution as “ethically differentiated” reinforces an ideal of “identity moral scale” and configures a spurious, elitist and deterministic conceptual correlation.

While intending to analyze, understand and deal with reality as it is, we avoid looking for right or wrong, good or bad, or any “objective truth”, only focusing on the domain of ethics. Despite this, we forward pertinent value judgments based on moral or ethical bases, for example, criticizing responses showing slips, errors, or inconsistencies. In the same way, we avoided normalizing and adjusting the answers as much as possible, as this research escapes the positivist paradigm of searching for absolute truth or reason.

This research adopts an interpretive approach, through which we analyze, delve into, and extract knowledge relevant to the central objective through the pertinent data (Recker, 2021). Certain questions in Table 2 presented diversified and differentiated answers. In the respective sections dedicated to them, we explain the specificity. In this case, we use the principles and general concept of open coding and axial coding from the grounded theory (Corbin and Strauss, 2014; Charmaz, 2014). We extracted categories from the answers, or excerpts from them, relevant to the intention of analyzing and discovering the scenario.

Figure 1 shows the coding of responses related to “unethical” or “immoral” practices and their motivations. We observe in the answer an immoral practice of the intellectual property type, of the movie, book, and generic sub-type (pirate anything). Exposes only one type of practice involving intellectual property, demonstrates a relationship with financial aspects, and the reasons (and other details) are quality of access and urgency. It is noticeable that “urgency” is not explicitly included in the diagram, as some responses have particular and isolated occurrences without the possibility of adequate generalization, and we include them in “Others...”.

In a mixed approach, we analyzed the responses quantitatively and qualitatively. Whether by the number of occurrences, codes, and categories, as well as in-depth and detailed if the specific objects show relevance. In the background and additionally, cross/combined analysis.

3.1 Research ethics considerations

In this section, we cover three ethical aspects of this research, ethics committee; Free and Informed Consent Form (*Termo de Consentimento Livre e Esclarecido* – TCLE); ethical aspects of meta-research (CNS, 2012; Brasil, 2016).

Considering the ethical characteristics of this research, we ruled out involvement with the Research Ethics Committee (*Comitê de Ética em Pesquisa* – CEP) (Brasil, 2016). The current determination considers that any research involving human beings, and their participation, must be evaluated by a CEP (CNS, 2012; Brasil, 2016). We take into account the preservation of the anonymity of the participants; omission of any personal data, sensitive or not; minimal risk, with no physical or psychological influence (for example, remembering a trauma); innocuous information such as opinions or recent experiences in cyberspace is requested; presents TCLE; presents the benefit of building knowledge that brings sociotechnical and material improvements to the participants; promotes the self-reflection of participants as ethical and moral entities acting in cyberspace. In this sense, in a joint deliberation, we consider that the involvement of a CEP for this research would primarily configure an excess of research ethics bureaucracy, Ethics Bashing (Bietti, 2020).

Additionally, the research deals with sensitive content and immoral or unethical practices associated with the computational and cyberspace context. We perceive a potential risk scenario to the research and indirectly to the participant, where a participant reports a severe or heinous crime. For example, breaking into and taking down the computer network of a hospital or breaking into the bank account and subtracting monetary values from someone else. In this case, we would stop the research and contact the authorities. This scenario did not occur.

We communicate the TCLE at the end of the survey. As explained on the questionnaire cover, we placed this information at the end to avoid bias or preconception, thus compromising the research. Even so, given the freedom of action available in the data collection application, the participant could stop answering or close the questionnaire at any time in case of discomfort. Therefore, avoiding participation and filled data would be deleted.

Regarding ethical considerations in meta-research, one of the main objectives is the study of practices and

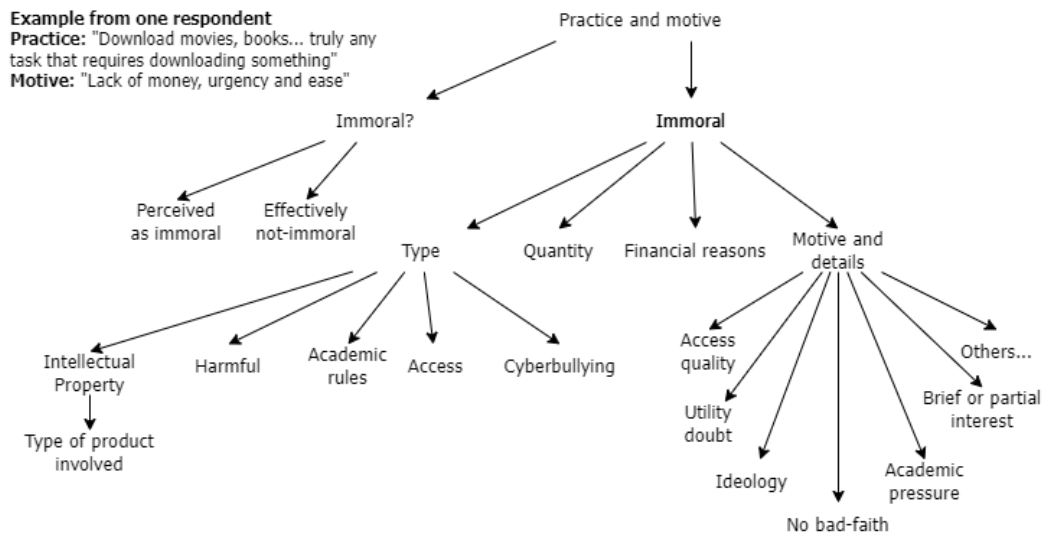


Figure 1. Coding from one response regarding practices and motives.

behaviors through cyberspace. In this sense, our proposal is interpretive and aims to study the phenomenon to a certain degree (Babbie, 2021; Neuman, 2014; Buston et al., 1991). For this reason, we exempt ourselves from epistemic liability related to minor or medium infractions provided by legislation, especially those whose responses did not show substantial risk to third parties. Thus, one might think that we should, as a civic duty, denounce those involved in the “criminal” practices to the authorities of the institutional executive powers. This reasoning is sound. However, in this research, we seek to study the symptoms, not the causes, to capture and understand the related phenomena. Instead of serving as bait for institutional punishments for immoral actions, we analyze, study, and seek to understand them to mitigate or stop them (at least as we expose in this research).

Fictitious automatic responses can flood the *Google Forms* system. Respondents lack restrictions, as the same interface can send numerous responses. One of the ways to avoid this flood of responses from bots and the same interface is to use the mechanism to request that the respondent is logged into their respective e-mail to respond. The intention is twofold. We request the participants’ e-mail at the beginning for security reasons.

They are providing the e-mail address and deposing his immoral practices. Requesting the e-mail reinforces the respondent’s faith in the social research contract. If the respondent were suspicious of the research, they would abandon it, aggravated by the fact that the TCLE, containing research details, appears only at the end.

Therefore, if they answer, they believe faithfully in the procedural ethics of the research, in their answers, in preserving their anonymity, and that the research will not bring unusual harm or risks. Otherwise, they would be exempt from participation.

The second intention is related to the participants’ good faith concerning the ethical quality of the research as a soft goal. Even far from the main objectives, it yielded curious and unusual results in ethics. Three respondents in Q10:

“Research has the enormous bait look to catch anyone who

commits any type of copyright violation or accesses data from third parties.”

“I think it’s best to add a non-exposure disclaimer to the previous questions, so that people who respond will feel freer and more relaxed about saying the things they’ve done.”

“You asked for email at the top of the form and then said there was complete discretion. As much as you are being honest, many people will avoid being 100% honest (especially on the question of ethics) for fear of being tracked through email. Suppose she made some slip to college and just put the email she uses to talk to professors... Then in the future consider another means of identification”

Externally, this aspect occurs in a *ad hoc* way and outside the strict border of the research *praxis*. Even between jokes, pranks, or serious comments, the participants analyzed this ethical aspect of the research and expressed recommendations, showing organic concern; for example, recommending using a *captcha* system without identifying respondents. We considered other identification methods, keeping the email to reinforce and analyze the respondents’ trust.

4 Ethics through specialization and professional training

In this Section, we analyze aspects of computing ethics instruction.

4.1 Q1, Q2, Q3

As shown in Table 2, these three questions are related to the course of instruction in computing ethics during training. Q1 and Q2 received 434 responses, and Q3 received 267 responses. The graphs shown in Figures 2, 3, and 4 illustrate the responses.

Isolated, the answers to these three questions seem sound and coherent. The question seems objective and unbiased, and the answers show that the student’s perception of this information is subjective and variable. When cross-analyzed

Q1. Consider only your current course. Is there a specific discipline for Ethics?

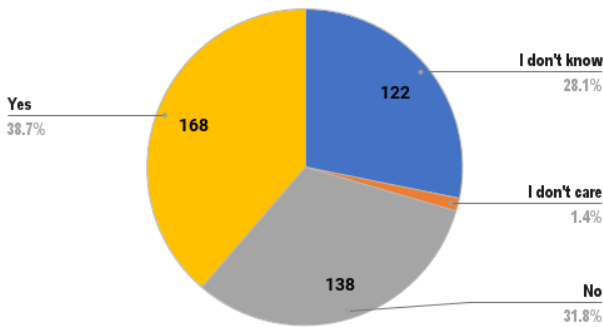


Figure 2. Perception about ethics disciplines.

Q2. Consider only your current course. How many disciplines have/had content on ethics or subjects directly related to ethics?

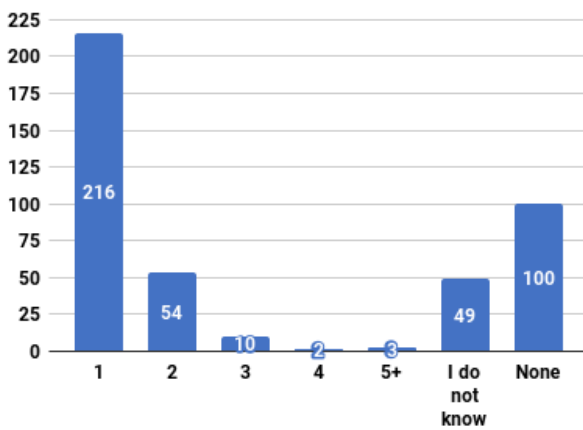


Figure 3. Qty. of ethics content.

Q3. Consider only your current course. If the answer to the previous question (question 2) was not 0, what did you think of this learning?

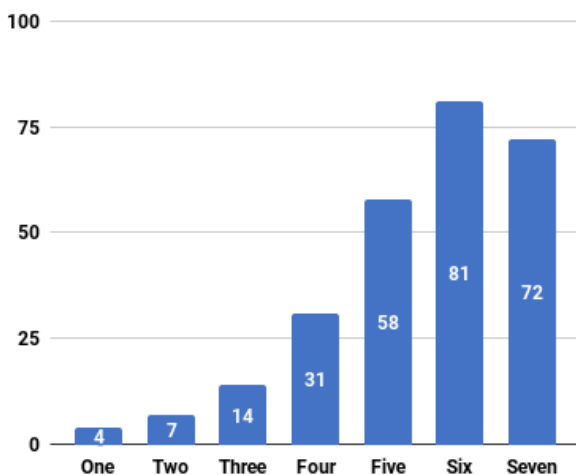


Figure 4. Perception about ethics content quality. One for worst experience, seven for best experience.

with the personal data exposed in Section 3, inconsistencies and conflicts between the data arise.

Just as Barcaro and Freire (2009) indicates the importance of ethics in computing courses curricula, there is a variation in the students' view of ethics in their courses and curricula variability depending on the student trajectory. This data behavior, in positivist research, would invalidate the results of these questions. In our case, it exposes us to the complexity of perceptions between different individuals.

In many scenarios, there is a lack of specific teaching of computing ethics in the best Brazilian computing courses, qualified by the Brazilian Ministry of Education (Carvalho et al., 2021). Curricula and syllabuses are inaccessible or difficult to access. Ethics-related content spread across random disciplines. "Humanistic" disciplines that dedicate a small part of their proposal and syllabus to ethics, such as the famous (and its variations) "computing and society". Curricula presents ethics through law studies subjects, such as "computing and law" ¹⁴.

As for the students' view of ethics in their courses, several students from the same institutions presented conflicting answers, for example, answering that both have and do not have disciplines dedicated to ethics in the same course and institution. This phenomenon can occur because students are ignorant of their curricula or syllabuses or because institutions have failed to instruct them about this information. In the last case, we could consider the student's unwillingness to access this information when answering this questionnaire, which is valid. Nevertheless, the inconsistencies and conflicts were generalized. We notice students from the same institution and course indicating the absence of an ethics discipline, while others indicated the presence of two, or even three, ethics disciplines.

As for the variability of curricula depending on the trajectory of each student, as university subjects, we know that the contents and knowledge of the disciplines vary according to the intention of the respective professors or between different professors. During their course, some students may have studied some ethics content in a discipline, while others not because of the variation of class, professor, or content in the school period in question. Additionally, the student may have missed or been uninterested in this information.

Despite the subjectivity inherent in the answers to these three questions, the amount of "No" and "I don't know" in Q1 ($\approx 60\%$) is worrying; as well as the amount of "None" and "I do not know" in Q2 ($\approx 35\%$). In this particular aspect, we intend an ethical discussion in Q1 and Q2 on the perception and presence of ethics in computing curricula.

There is a middle ground between radical ethics washing (Biatti, 2020), where all disciplines should dedicate part of their curriculum to ethics, and all courses should have at least one discipline dedicated exclusively to computing ethics; until complete absence. Currently, the scenario is closer to the latter (Carvalho et al., 2021). Although the debate on the need for ethics or computing ethics is beyond the scope of this present work, we realize that the current reality is problematic for many reasons. Here we will discuss

¹⁴We will refrain from the associative debate between law and ethics in this work, laws are necessary and sufficiently related to ethics, while the reverse relation is weak. At the contextual and conceptual level, ethics is not necessary or sufficiently dependent on the laws, transcending it.

one quite pertinent.

While there is some ignorance or negligence about the perception of ethics or ethics content, in the respective curriculum (Blundell, 2021; Gotterbarn, 2010), students would have certainty and clarity about the perception of programming or software development disciplines or related content. While there is a profusion of papers, articles, books, journals, editorials, and lectures, among others, indicating the “growing influence or impact of computing on society” or “how computing applications already influence or impact society irreversibly or excessively”... the curricula and syllabus still show negligence concerning ethics and a technical overestimation, such as programming in most cases. We perceive a more outstanding agency for “doing”, while critical or reflective development, “thinking”, is put aside.

Looking at Q3’s responses, most students consider ethics classes or content positive or qualitatively good. While value four indicates a fair experience, the vast majority of experiences were classified as positive (between five and seven); and only 25 respondents had bad experiences (≈10%). Just as the negative results spread across different courses, institutions, and levels, that is, the result was also positive in this sense. The concentration of bad assessments in a specific course, institution, or level would demonstrate a concentrated phenomenon, requiring attention and further in-depth study.

4.2 Q4

Q4, as shown in Table 2, was an open-ended question with plain text. In total, we got 216 responses. The wording of the question appeals to the subjectivity of the respondents. At the same time, the pedagogical practice presents a negotiation between the teacher’s intention, what is desired by the student, what they expect from the training method and the institution’s focus (Hall, 2014). Here we focus on the student’s desire, understanding it as the central part of the pedagogical practice to which it is dedicated. That is, the objective is to instruct the student.

We followed the education concepts and definitions in Libâneo (2018); Libâneo and Alves (2018) to code these responses. We separated into three types: learning method, with the answers represented by Figure 5; didactic approach, with the answers represented by Figure 6; and expected curriculum, with the answers represented by Figure 7.

As helpful, the answers to this question can help teachers elaborate on programs, disciplines, or classes on computing ethics. These data can serve as a generic guide, considering the subjectivity of each pedagogical scenario. For example, discussing the pedagogical dynamics with students beforehand is interesting rather than blindly following the answers presented here.

Regarding learning methods, of the 216 responses in Q4, we extracted this data from 125 of them. An answer can present more than one result related to it. For example, “Showing cases, debating solutions, how to act ethically” resulted in exposition and debate, two outcomes.

Exposition, the most frequent, is the unilateral transmission of knowledge in the instructor → instructed style, the most frequent teaching method nowadays.

Q4. What do you think would make a Computer Ethics class fun, useful, and interesting? [Learning]

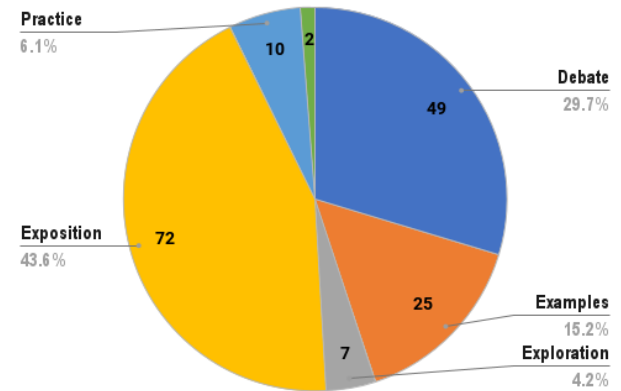


Figure 5. Learning methods preferred by respondents.

Q4. What do you think would make a Computer Ethics class fun, useful, and interesting? [Didactics]

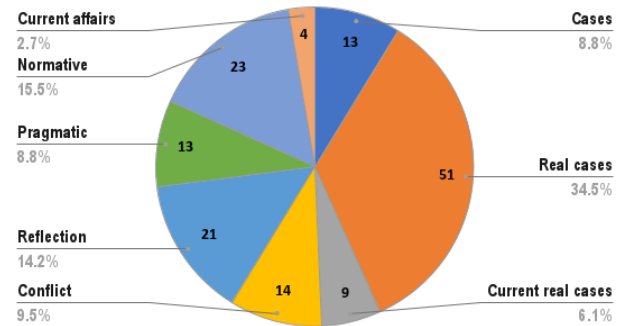


Figure 6. Didactic approach preferred by respondents.

Q4. What do you think would make a Computer Ethics class fun, useful, and interesting? [Curriculum]

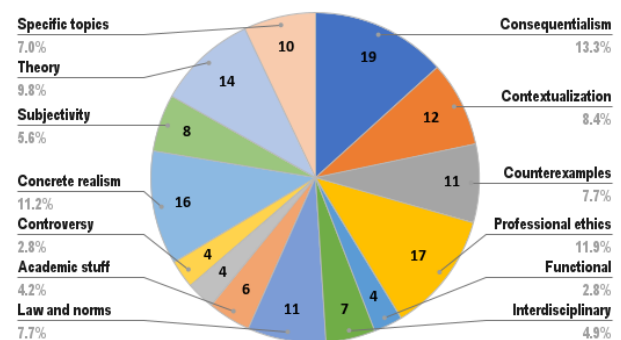


Figure 7. Curriculum preferred by respondents.

Examples are fictitious or real cases that must be approved, followed, disapproved, and abhorred. **Debate** contains discussions and dialog, exchanges of ideas, possible conflicts and controversies, and joint participation in ethical questions. **Practice**, the learner has an active construction intention and wants to elaborate, develop ideas, or participate in dynamics not limited to verbal, abstract, or theoretical interaction. **Exploration**, students and instructors seek truth or reflection together; not only does the instructor propose the object of analysis, but it is also a collaborative search. **Theatrical** is the appeal to staging, theater, aesthetics, humor, interpretive interaction, and the like; only two

occurrences.

Regarding the didactic approach, of the 216 responses in Q4, we extracted this data from 120 of them. An answer can have more than one result related to it. For example, “Minimally demonstrating examples of codes of conduct and examples where people well-applied ethics.” resulted in cases and normative outcomes. We consider the types with three or more occurrences, illustrated in Figure 6, for synthesis.

The vast majority of respondents prefer a dynamic based on cases ($\approx 50\%$), among these: generic **Cases**, whether actual or fictitious and regardless of when they occurred or the time in question; **Real cases**, the cases must be real, regardless of when they occurred or at what time, for example, the real case of the “Melissa Virus” from 1999; **Current real cases**, the cases must be real and current, for example considering the current year 2022, the “WannaCry” crypto-ransomware from 2017.

After focusing on cases, the following categories appear. **Normative**, it mainly involves the transmission and exchange of objective, categorical and conclusive knowledge, such as laws, norms, codes of conduct, values, and virtues, among others, being a traditional method. **Pragmatic** requires that the transmission or exchange of knowledge takes place through practice and must have an activity involved. **Reflection** encourages reflection and a critical, empathetic appeal or one that shakes the comfort zone of those involved. **Current affairs** involves themes, whether cases or not, current and contemporary, for example, ethics and misinformation and freedom of speech (Spiekermann et al., 2022); **Conflict**, involves polemic and controversial issues with referrals inciting conflict between students.

Regarding the expected curriculum, of the 216 responses in Q4, we extracted this data from 113 answers. An answer can have more than one result related to it. For example, “Explain the harm caused to third parties by not having ethics” resulted in consequentialism and counterexamples, two outcomes. We consider the types with three or more occurrences, illustrated in Figure 7, for synthesis. In this category, we prioritized constructs from the domain of ethics (Ferraz, 2014; Gibson, 2014; Vázquez, 2018).

Consequentialism deals with the computing impacts, outcomes, consequences, and influences, among others. **Professional ethics** deals with content such as a code of conduct, social norms for interaction between professionals, and how to behave and develop professional character, among others, regarding the formal professional environment. **Concrete realism**, excluding any imaginary, speculative or symbolic content, focuses on naked reality and bare truth. **Theory** considers foundations, definitions, and concepts in ethics or computing ethics. **Contextualization** calls for content close to the reality, background, and experience of students, detailing and delving into the respective context. **Counterexamples** is simply about presenting immoral or unethical content; instead of appealing to “what should or can be done”, focus on “what should not or can not be done”. **Laws and norms** is intuitive, directing the content to normative ethics, formal and institutionalized. **Specific topics** deals with specific

content, such as privacy, security, sustainability, and gender issues, among others.

Some responses had less expressiveness, in less than ten responses. **Subjectivity** appeals to the subjective elements of moral and ethical aspects of humanity. Progressive or constructive human values, for example, “That would make us reflect and generate empathy too, looking at users as in fact human beings and not just machines and a source of profit.”. **Interdisciplinary**, content from different knowledge areas and domains intertwined, for example, promoting a dialogue with Sociology, Psychology, Engineering, among others. **Academic stuff** involves a classic and traditional approach, dedicated to content like academic articles, journals, famous books by prestigious authors on the subject, and lectures from these same authors.

The last three categories with the fewest occurrences: **Functional**, the content must be useful and “be functional”, forward a resolution or expected or ideal result, for example, if something happens, then do this. **Controversy**, the content must present antagonistic points, for example, both biases dealing with censorship and freedom of expression in the question of misinformation. **Perspectives**, unlike controversy, does not need antagonistic points but specific points of view; for example, what is the hacker’s perspective in the case? The answer must overrun the moralistic and institutionally pleasing perspective.

Through data analysis, we realized that a potentially attractive class for a generic group of students involves exposure to learning, dealing with real cases, with contents of consequentialism, professional ethics, and concrete realism. Even if this combination is far from the ideal, the current categories can serve as a guide for the pedagogical practice of specific scenarios, for example, submitting a questionnaire to students asking which learning, didactic, and curriculum are most interesting to them.

Analyzing the answers, we extract some information that exposes their phenomena. Many students confuse laws and regulations with ethics, associating a better quality computing ethics class with instruction in laws and regulations. That is, “being ethical” or following a righteous path ethically consists of knowing, analyzing, and following laws and norms. As the influence/impact of computing grows in society, the probability of formalizing and institutionalizing moral norms as legal norms increases (Moor, 2005), so it is essential that laws and norms be involved, combined with ethics. Reducing ethics to laws and norms is both dangerous and erroneous. Teachers need to emancipate students from this reasoning and, subsequently, instruct that ethics serves as a mechanism for the critical dialogic of laws and norms. As customs, habits, and traditions change, laws and norms change, and ethics lead to a formal and structured debate. Slavery is a famous Brazilian example, legalized and standardized decades ago, currently abhorred and rejected in 2022.

Another interesting phenomenon is about what expect beyond the discipline, also involving the teacher and teaching. Regardless of category, many answers delegate the onus of interest and moral realization to the teacher. In other words, the teacher is primarily responsible for the quality of pedagogical practice. Therefore, students have

little responsibility in this scheme, and the teacher is the only agent in charge of this burden.

This reasoning is complex because it falls into a selfish ethical logic and disregards the collective. In the first case, the student devalues participation in that scenario, reinforcing the traditional discourse that the teacher is the vehicle of knowledge and that all pedagogical practice is his responsibility. Secondly, the student belittles the other students because the pedagogical practice that is effective for him may not be for the others. Hence, the student puts his desires above the implicit negotiation of a better scenario for most of those involved. This individualistic reasoning can challenge pedagogical interaction between students, student (class) groups, and teachers.

If the institution offers a discipline or class, does not that already indicate some importance? For example, “With examples and real cases demonstrating the importance of ethics in computing.” Because if it is unimportant, the pedagogical practice will not cover it. Again, we can bring this reasoning to programming, to what we perceive as common and notorious sense to know that no programming teacher needs to emphasize, praise or convince their students of the importance of this discipline, class, or content. So, why is convincing related to computing ethics so necessary?

After an in-depth analysis of all responses, we highlighted two as ethically relevant for further scrutiny. The first:

“Many students enter the university to prepare themselves as professionals for the job market, and ethics is not exactly one of the pillars and objectives of the market, especially if the path taken by ethics is far from the path of profit. I believe that the most interesting way to teach this to students, who mostly seek to make a difference in the market, would be how to become a productive professional (that is, profitable for the company) without detracting from ethical concepts.”

This answer brings up the debate about the “function” of pedagogical practice, especially in undergraduate courses, and on computing ethics as a utilitarian fetish of capitalist agendas. The rationale for uplifting and preserving the culture of profit and profitability is subject to ethical scrutiny. This reality is strongly criticized by the ethics of resistance because, as proletarians or subalterns in a private capitalist organization, the idea of “profit first” can overshadow other human values. This reasoning can also overshadow ethical criticisms related to sociology or anthropology of work phenomena, as in cases involving surplus problems, discrimination against minorities, burnout, moral or technical harassment, and copyright dispute, among others. And the second answer:

“Practical implications of decisions in the field of computing in the users lives instead of reiterating generic concepts such as prejudice and machismo.”

This reasoning is academically unsound. Prejudice and machismo are already properly formalized moral problems, structured and addressed by computing ethics (Barger, 2008; Johnson, 2008; Spinello, 2020; Baase and Henry, 2017). Both when it comes to social inequality in the computing job market (Ribeiro et al., 2020) and the possible negative setbacks generated by computing solutions, such as racism and artificial intelligence (Silva, 2020; Buolamwini

and Gebru, 2018). Disqualifying prejudice and machismo as “practical implications” in meta-discourse reinforces the agency of the discourse of prejudice and machismo, especially when they are already well established in the area.

We deal with this response through the ethics of resistance. The problem intensifies considering the problem mentioned above of the burden of interest. Because if this reasoning guided the pedagogical practice, contempt for the scenario of prejudice and racism would either be an omission, or even reinforcement, related to the phenomenon. Belittle the interest of the students potentially empowered or emancipated by the instruction of this topic. For example, by omitting content about algorithmic racism from the computing ethics class, then black students present in the class, if not yet instructed about this phenomenon, would remain in ignorance. That is, when dealing with ISEDM, this is a primary topic that can influence the professional future of students, especially if they occupy positions of privilege and power in organizations so that they actively decide to fight these problems.

There is a decades-long discussion that crosses the interdisciplinarity between certain areas and moral philosophy, “who should teach ethics, or be responsible for the discipline?”. One respondent states:

“Ethics in Computing, should be taught by Computing professors. Just knowing philosophers, philosophical doctrines and concepts of Ethics and Morals, are far from the reality of computing (which is a topic that has been changing a lot over time).”

When asked where they would look for information or knowledge, some respondents indicated that they would consult specific specialists. And the question remains: which specialist? Who is the “specialist” in computing ethics? The computing specialist or the philosophy specialist?

This is properly an ethical dilemma, with no “right answer”. Johnson (1994) indicates that computing ethics, or ethics specifically, should be the responsibility of an ethics specialist. Computing and society, a very traditional subject in computing curricula, should be the responsibility of a computer specialist. On the other hand, the author indicates that, in her ideal world: “[...] computer scientists who have practiced in the real world, and been trained beyond the undergraduate level in philosophical ethics and/or the social sciences should be teaching such courses” (Johnson, 1994).

But Johnson (1994) extends this problem and stings the computing educational scenario, also suitable for the Brazilian reality:

“The hidden message that students may get if such courses are taught by faculty outside of computer science is that such courses are less important than their technical courses and that they are separable from computer science. Students need, I believe, to see computer scientists (who are their models of what it means to be a computer professional) taking an active interest in these topics and struggling with them. For this reason, it is important that some of the issues be introduced within technical courses by computer science faculty.” (Johnson, 1994)

As long as training specialists receive dubious or negative valuation signals about computer ethics, the topic

will continue to be negatively evaluated, as Blundell (2021) realizes. Which is curious, because Johnson (1994) and Blundell (2021) are more than twenty-five years apart, which indicates that the criticism of the former remains significantly perceptible many years later, through the latter. Concretely, the culture has changed nothing, or very little, to a positive valuation of computing ethics.

4.3 Q5

Q5, as shown in Table 2, was an open-ended question with plain text. In total, we got 434 responses. Of these, we considered 29 of them semantically inconsistent, incoherent, or far from the intent of the question and discarded them. Of these, we considered 29 of them semantically inconsistent or incoherent with the intention of the question and discarded them, considering 405 responses.

We extract three types of information, means type and formality, and separate the means explicitly indicated, with the answers represented by Figure 8.

We separate means type into physical, digital, or both, which are self-explanatory. Traditionally, as a classic behavior, the search for formal or specialized knowledge would occur through physical means, such as the library, university courses, and meeting with specialists or professionals. Only 25 ($\approx 6\%$) respondents expressed specific and solely physical means, such as taking courses at universities, resorting to libraries or books, and finding specialists.

186 respondents ($\approx 46\%$) indicated exclusively digital media, such as YouTube, Forums, Internet, or indicated the digital environment explicitly, for example, “I would resort to Internet research to find out about renowned books on the subject.”, “I would look for videos and books on the internet.” or “I would look for videos on youtube (probably foreign content), and if I didn’t find something that satisfied me, books in pdf format.”. In these cases, they are explicitly through digital means.

One hundred ninety-four respondents ($\approx 48\%$) indicated both ways. For example, contacting professionals or teachers can be digital and physical; taking a course can be digital and physical; Materials such as books can be accessed and consumed digitally and physically. Answers like “I don’t have a specific place, but I would try to search in several places and try to get a big picture.” fit here.

We separate means formality into formal, informal, or both, but this category is not self-explanatory like the previous one. Answers indicating that they will seek generic courses (online or not), turn to professionals, read books, and attend lectures, among others, do not necessarily indicate a formal means. Just because they are books, they are not synonymous with formal quality, as are lectures, courses, or “professionals”. The freedom offered by the internet allows content by various stakeholders, so some self-proclaimed experts can publish books or post their talks on YouTube. In this sense, we admit to privileging the hierarchy of specialization and institutionalized formal knowledge when we consider “search for teachers” as formal and “search for lectures or videos on the internet” as informal. The exception is when the **qualification** is explicit, for example, “I would

look for books by people who are reference in this area” or “The institution’s library or professors’ guidelines.” in these cases, we fit these responses as formal.

It is imperative to highlight that this categorization is free from value judgment or fact about the respective means, in addition to typifying its formality. Students can find high-quality computing ethics instruction in informal means; however, we consider the risk-benefit scenario in this sense. Although existing formal means are less likely to provide malicious, negative, or harmful content, the risk of doing so through informal means is considerably greater. Formal means require more effort and resources to be accessed, which is their setback, and the benefit of informal means is the ease of access and wide availability. In case of naivety or ignorance, this content, through the respective responsible, may wrongly instruct the students, liable to complex (or no) correction in the future.

Eighty-two respondents ($\approx 20\%$) indicated formal means, for example, university classes, undergraduate courses and disciplines, professors or renowned entities, libraries, articles¹⁵, and responses that positively qualify the means in question. For example, “I would search for some video on YouTube. However, a video from someone with expertise in the subject.” searching on YouTube is considered informal, but this search has different properties.

Two hundred thirty-six respondents ($\approx 59\%$) indicated informal means. Informal means are independent of formalized and well-established institutional or community quality criteria or indicators, including YouTube, the internet, generic professional recommendations, videos, lectures, courses, documentaries, movies, or courses. Courses without specific qualifications are considered informal.

Eighty-seven respondents ($\approx 21\%$) indicated both means. “Search for a specific author, professor or course”, professor is formal, while course is informal; “I would ask how I can find this information with older students in the course or teachers”, while older students are informal, teachers are formal. “Published books or scientific articles.” a published book is informal, and a professor is formal. “I would look for a course/classes on the subject. Alternatively, some elective, if any.” the course is informal, elective is formal.

Q5 indicates the respective means. Figure 8 exposes a great variety of means selected by the students, and one answer could contain several means. The good old book prevails as the primary source of knowledge for several of the respondents. Although the understanding of “video” and “YouTube” can be considered almost the same, we respect semantic fidelity and separate both. Some responses would likely lead to YouTube, such as lectures or documentaries. Some respondents have a predilection for learning through video or audio-visual, exposing the subjective plurality of ways to search for knowledge. “[...] If there were no such possibility, my study on Ethics would be done through videos because that is where I get it to learn more, unlike very technical books.”.

The expert recommendation is subjective, and its significance is unique here. “Expert” is based on the

¹⁵We consider every mention of an article as an academic article due to the colloquial culture

Q5. If you want to learn about Ethics (remember, in computing), what would you do? Which means would you use? Where would you go?

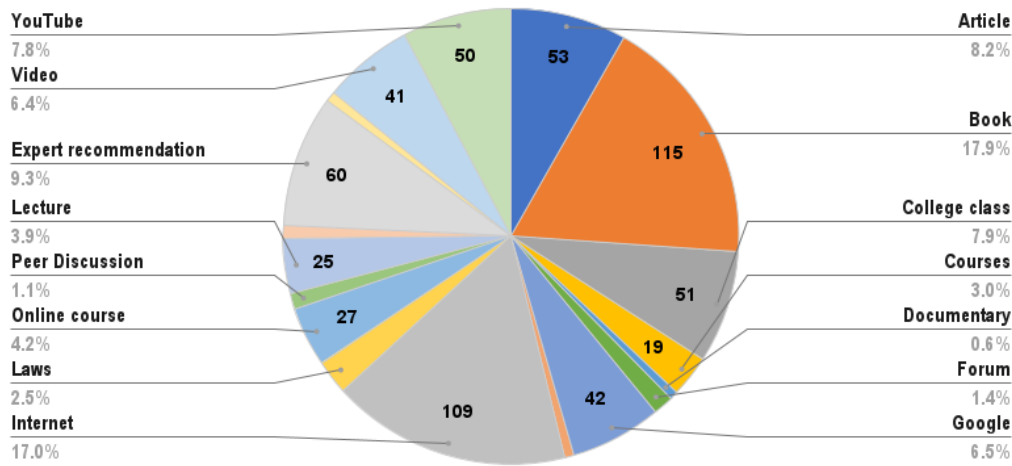


Figure 8. Means used for computing ethics learning.

respondent’s perception, and whether we agree or not, the respondent will absorb the information and knowledge of trusted and significant peers. Then the respondent may seek instruction from a professor, industry professional, or course veteran who is ignorant (or thinks they know something) about computing ethics.

Internet is exactly how respondents answered — no additional information. Moreover, even though, like video and YouTube, currently “internet” and “google” are almost the same, we respect the division by semantic fidelity.

Courses are any variations of courses, like Coursera, classified as informal. College classes are university courses, formal, at the undergraduate level or higher. Otherwise, the other categories are self-explanatory.

Through data analysis, we realized that the reality expected two or three decades ago, in which students would seek knowledge and information from traditional and institutionally reliable sources, no longer reflects the current scenario. The search is primarily informal and digital or mixed. Even though seeking specialized knowledge from sources with “guaranteed” quality is outdated, most students seek independent and autonomous learning in cyberspace, even if it is like a compass to indicate the direction of computing ethics instruction.

We perceive a challenge for ISEDM, as the digital realm of cyberspace is full of erroneous, malicious, or incomplete content. It presents a risk that these same students in instruction fall into the traps of potential informational problems today, enabled by/in the same computing they are learning.

Thinking from the perspective of the ethics of resistance, this emancipation from conservative, classical and traditional means has its positive aspects. It is now both easier and cheaper to produce and share knowledge. While books are expensive and some are difficult to access, the internet provides channels and means with better accessibility and availability by moral, legal, immoral, or illegal means.

Through moral or legal means, interested in computing ethics instruction, such as teachers, can publish materials using, almost freely, the mechanisms and functionalities of the internet, for example, videos on YouTube, speeches; class slides; own books, and articles, among others. It is in these places that students will seek instruction.

In this sense, the indication is that *de facto* specialists engage in the digital sphere, whether producing or making material available, organizing an online course or lecturing, among others — mainly qualified professors from socially and culturally prestigious institutions, such as universities. The quality/qualification of the communication agent proved relevant in several responses as a differential in these circumstances. For example, they explicitly expose formal organizational affiliation in the published material.

Another moral or legal aspect is about communicating with professors or experts. Cyberspace functionalities allow people from (almost) anywhere in the world to communicate easily. Therefore, a student can ask for recommendations for someone in another country, and if language is a barrier, they can resort to free online text translation mechanisms.

On the other hand, we cannot ignore the nature of this research and the advantages of immoral or illegal cyberspace practices. The practices exposed here are immoral or illegal through. We disregard immoral or illegal practices to seek well-being, benefits, and pleasure. For example, an opportunistic pseudo-specialist organizes and makes available an online course in computing ethics, which is biased and of poor quality.

The internet and its anarchic, decentralized, and chaotic disposition has enabled, and enables, as in Section 5, almost unrestricted access to knowledge. This same knowledge extends to expensive books or out-of-print materials. For example, they are accessing parallel repositories to get scientific articles, as indicated in several Q6 answers about using “parallel” services, such as *Sci-Hub*¹⁶.

¹⁶<https://sci-hub.se> [accessed 09-09-2022]. The domain varies depending on specific events, such as authorities fighting it or closing it

Here we return to Jorge’s case, in Table 1. He makes the movie available to others through the torrent system out of techno-political rebellion. In this sense, Jorge is providing entertainment material with no educational purpose. Thinking non-structurally, when Jorge actively engages and mobilizes others in scenario #4, he is instructing them about his techno-political ideology. That is, he is leading them morally through his example (Zagzebski, 2017), and disseminating his ethical and moral ideology¹⁷.

After an in-depth analysis of all responses, we highlighted some responses as ethically relevant for further scrutiny.

The first and most problematic point is the occurrence of respondents looking for technical and legal norms, and laws, as a basis for learning computing ethics. The association between law studies, laws, and ethics occurred in 18 responses (≈4%). Although it is quantitative without significant relevance, answers such as “I would look for laws and material on the Internet.”; “I would consult someone from Law Studies”; “Google, websites, blogs, legislation (LGPD)” exposes the expressive association that some respondents build between law and ethics.

As an instance of “ethics expert” misperception, one of the respondents mentions Jordan Peterson¹⁸, “[...] My main source is Dr. Jordan Peterson at the University of Toronto.”. Despite Jordan Peterson routinely making value judgments and expressing his moral ideology in cyberspace, known mostly for the general critique of political correctness and identity politics, he is not an expert or trained in ethics. At least in a formal and institutionalized way.

Considering all 434 answers, including the invalid ones, 23 (≈5%) respondents have uncertainties in the search without indicating any objective means. While respondents with wrong premises can be corrected or recovered if they wish, the uncertain ones are surprise boxes. The concern about these cases lies in the possible distortion of instruction on ethics or computing ethics.

The answers of Q5 exposed the relevance of ideals like free and open knowledge, universities and science, and breaking the data or information borders and limitations using the internet.

5 Cyberspace practices and ethics

In this Section, we analyze aspects of respondents’ cyberspace practices and behaviors regarding ethics and morality.

5.1 Q6

Q6, exposed in Table 2, brought up this research controversial issue. The answers exposed rich data and information for many ethical and moral analyzes. We seek to analyze, study, and interpret more than criminalizing, abhorring, or rejecting these practices.

down.

¹⁷Is categorically essential to reinforce that morals, morality, or collective moral are ideologies (Vázquez, 2018). Morals, *per se*, is a human social construction; and morals, too.

¹⁸https://en.wikipedia.org/wiki/Jordan_Peterson [Accessed in 09-09-2022]

One hundred fifty-four respondents (≈35%) indicated none, and 280 respondents (≈65%) indicated one or more practices. Eleven of these 280 responses were discarded due to inconsistency or inconsistency, leaving 269 responses (≈62%) for analysis. For example, they only answered “yes”. Of the eleven, two stand out for not being immoral or illegal practices, “I received access to pirated academic material through professors” and “[...] I checked how far away I was from a guy I was dating. On a dating app to ensure he was not lying and wasn’t in town [...]”. Figure 9 graphically displays the number of practices carried out.

Qty. of immoral practices committed

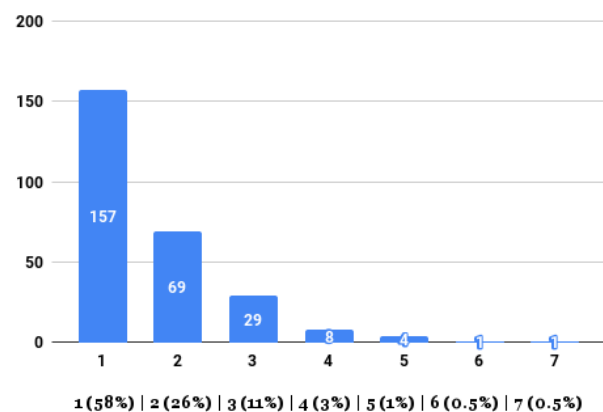


Figure 9. Qty. of immoral practices.

Complement of Q6. Category of immoral or unethical practices committed

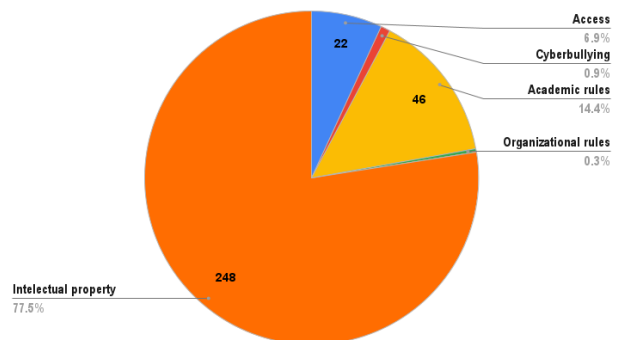


Figure 10. Immoral practice categories.

We consider that each type of material involved in the infringement of intellectual property would count as one practice. For example, “downloaded pirated movies and games” counts as one.

157 respondents (≈58%) declared only one practice; 69 respondents (≈26%), two practices; 29 respondents (≈11%), three; 8 respondents (≈3%), four; 4 respondents (≈1%), five; 1 respondent (≈0.5%), six; 1 respondent (≈0.5%), seven.

Of the 269 respondents, 248 (≈ 92%) indicated intellectual property practices, and 67 (≈ 26%) related to other practices. We have divided the others into access, academic rules, harmful, or *cyberbullying*. Two response was categorized as harmful for lack of data (“I sold malicious service” and “I programmed a trojan”). These categories were taken from Masiero (2013); Barger (2008); Johnson

(2008); Blundell (2021); Baase and Henry (2017). Figure 10 graphically displays the practices.

Access involves accessing data or services not allowed to the respondent. We grouped privacy into this category because some cases implicitly involved improper access to personal data, whether sensitive or not. For example, “[...] I hack into some networks”, “Countless downloads without copyright permission and invasion of privacy for work purposes.” and “Of everything that can be considered unethical in computing, I only do piracy and hack some networks.”, 22 occurrences.

Organizational rules involve explicitly violating or circumventing academic or organizational institutional norms, for example, “I paid to take my test during EAD”, 47 occurrences. The only occurrence of an organizational rules infraction, other than academic, was “[...] I installed free software on my corporate computer (my computer is blocked from doing so).”

Cyberbullying is an intuitive, ongoing offense and oppression in the digital realm, three occurrences.

Harmful, two respondents are straightforward. Even if they are harmful, their literal wording disregards any openings for interpretation of heinous crime cases, as indicated in Section 3.1.

As intellectual property is the recurring and significantly relevant response, we detail this category. Three hundred eighty-one respondents pointed to several types of files involved in their practices. Several responses contained more than one type. Figure 9 graphically displays the number of practices carried out. Figure 11 graphically displays the type of material or content pirated. We summarized some answers, as anime was considered audiovisual and manga or HQ as PDF.

We will discuss the data and information extracted after the results of questions Q7, Q8, and Q9, at the end of Section 5.2.

5.2 Q7, Q8, Q9

We gathered questions Q7, Q8, and Q9 for their semantic proximity, subject to joint analysis.

Regarding Q7 and Q8, Table 2, 174 respondents associated their practices with financial motivations, ranging from “not having the money” to “did not want to pay”; 41 respondents were motivated by the quality of access, such as convenience or urgency; 19 respondents justified it by difficulty in finding, for example, without official distribution in Brazil, cannot find where to buy, delay for the product to arrive in Brazil; 11 respondents indicated fear of loss due to doubt of legitimate utility, for example, buying a game and later regretting it or a book without certainty of content or quality; 6 respondents indicated brief, punctual and rapid interest, so that they only needed a portion of the object in question; 21 respondents demonstrated ideological reasons, that is, there was deontological rationality, for example, “knowledge should be free and available to all”; 40 respondents indicated academic pressure, for example, “I needed the content for my research but it is too expensive”. One of the respondents intensifies this dilemma by announcing: “Request from the manager”.

Some respondents, although few, expressed less virtuous or noble responses, as usual, “I did it because it is a daily practice. I do it all the time.”; fun, in the case of the respondent who programmed a trojan; or to support a hobby, “The plug-ins perform very simple functions, music production is just a hobby of mine and they cost around R\$700 each, which attempts to use the original program unfeasible.”.

The violation of academic rules relates to “cheating”, e.g., paying others to perform entire exams in EAD by the respondent. In this category, there was no standardization in the configurable answers that could be typified, for example, “Questions in the test outside the given content and poorly formulated”, “Laziness and the feeling of being overloaded”, or “[...] I did not want to get bad grades”.

We use the Likert scale in Q9, Table 2. There was no recognizable or significant pattern between dimensions. For example, the association between this answer and the number of practices (Question 6) is inexpressive. We range from 1, apathy, to 7, guilt, when thinking about the practice of Q6.

Q9 results demystify the common sense of conscience and guilt in proportion to their acts or correlation of self-criticism for the practice perceived by themselves as “unethical” or “immoral”. Respondents indicated a share of guilt, demonstrating the situation’s complexity and their collective or indirect epistemic responsibility. “I know I should not have done that, but I did not want to fail by six tenths.”, or “I already come to a halt to reflect on this practice, and I felt terrible, but the money is meager;”.

Financial influence is present in most respondents who engaged in any practice or not. Only one respondent explicitly indicated financial condition to justify his absence from these practices. From the financial aspect, we perceive certain recurring phenomena. There is economic or capitalist criticism underlying the actions, and there is a reason for the subversion of the economic values of companies seen by them as excessively rich or powerful.

They think of the less privileged and powerful. In contrast, confident respondents are categorically against engaging in harmful practices against entities they perceive as vulnerable, underprivileged, or well-meaning. For example, *indie* game developers or individual programmers.

The sense of responsibility or symbolic intent is perceptible. Respondents indicate maturity in their actions and reach the commitment to reimburse them in the future. “I strongly believe in rewarding quality content” or “[...] when I could, I bought original products that I had consumed illegally before”.

We deal with a specific subset of a specific population, so we avoid macro-comparisons with the Brazilian scenario, avoiding threats to the technical validity of qualitative research (Babbie, 2021; Neuman, 2014). Still, there is a dialogic approach to some elements of the Brazilian reality with the phenomena perceived in this present work. The most expressive case is piracy and infringement of the institutional moral norm of intellectual property.

Brazil is one of the ten most unequal countries in the world (Sasse, 2021), with increasing inequality over the last few years, after growth until 2014 (Alisson, 2022). When considering that the consumption of piracy and social

Complement of Q6. Types of pirated content

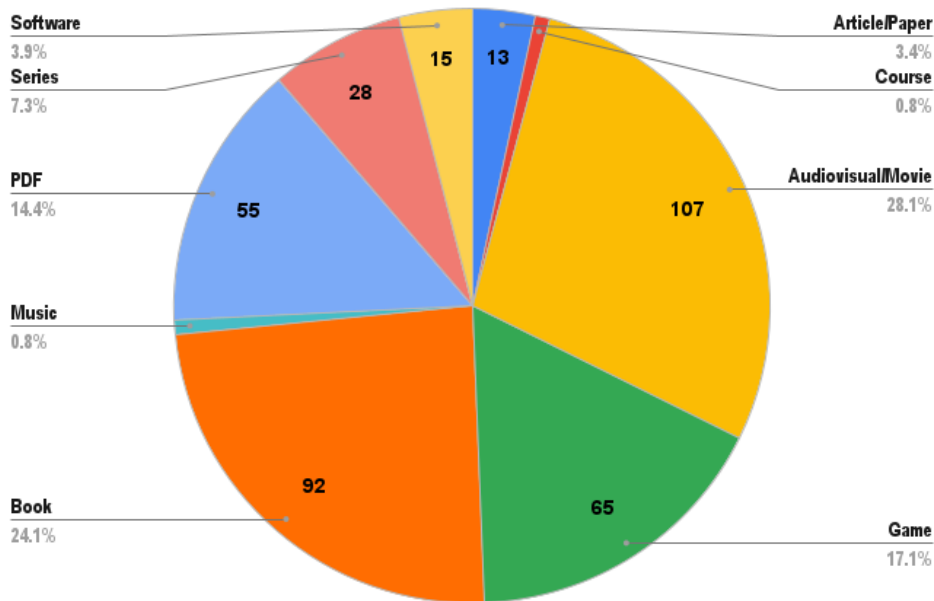


Figure 11. Material or content pirated.

inequality are related to (Dall’ara, 2022), the behaviors exposed in this research follow the correlated phenomena.

Our primary focus is the relationship between moral fulfillment and the complex moral engendering in cyberspace. Although the practice is abundant, we note that a moral conscience predominates concerning whether it is deficient or null. So even if the answer is “whenever I can, I will pirate”, “I only pirate what is outside my financial condition”, or “I never pirate”, which are practices firmly anchored to moral values, our focus is on justification, i.e., ethics.

Regarding epistemic responsibility, either respondents indicated feeling guilty or displeased with their practices or did not care about a dissociated minority. For example, “I know what I do is against the law, but morally I do not see any problem”.

A small group of respondents believes in the franchised, open, and accessible agenda regarding knowledge. “The discussion of ethics in computing should not only apply to the individual. It is not ethical for research funded by public investment to have its results blocked by a paywall, so I do not believe using sci-hub is unethical even though it fits the criteria described”.

A minority, less than 3% of respondents, is against or condemns these practices; others are relativists. They condemn some practices and not others. For example, “I agree that none of these items should be committed, respecting the intellectual property of each company/individual” or “[...] the series is old so I believe it is no longer on Netflix. I became interested in her after watching a few episodes on Twitch.tv during a live. But I’m not in favor of piracy, and downloading this series doesn’t make me 100% comfortable [...]”.

A minority shows empathetic reactions. They put

themselves in the position of those they perceive as harmed by the practices. For example, “I have not felt guilty about having a poor background and pirating content for years, but after becoming a developer, I feel bad about pirating software/games, and I avoid it as much as possible”. Another tiny group expressed an idea of “inescapable immorality”, as these practices are unavoidable in our daily realities: “Some of these practices are almost unavoidable”.

Some testimonies disconnected the respondent’s practice from what we understand as bad faith: the absence of intention to do so or damage. For example, “I cheated in EAD, but teachers do not condemn the practice and know that it occurs (some encourage it)” and even so, the respondent indicated this as an “unethical” practice, despite the context determining it as morally acceptable and permissible.

A majority of respondents show relativistic ethical perspectives. We observed that some respondents have relative moral values without solid criticism of the context or scenario. Although we avoid punctual moral value judgment, it is worth noting that this bias, whether due to alienation or naive ignorance, is harmful to the construction of a collectivized and conscious ethics perspective. They lack a well-founded *episteme* on the reality that allows them to wage an ideological clash over the techno-political circumstances surrounding them. For example, “However, in some cases, in my head, it will not make any difference to the author of the works; for example”, this statement that the judgment gives a structuring of individualized reality (“in my head”) demonstrates specific gaps in techno-political instruction in computing. We researchers do not receive anything for our formal intellectual, scientific and academic production while publishing companies and markets explore this market built through our production.

Another phenomenon observed is the ignorance of respondents concerning the systems and schemes of certain businesses, such as the publishing market. For example, “I feel unwell, but I could not claim that I fully understand the issue. I do not know if the money would benefit the author or the author’s research.”. Some respondents followed the same reasoning, claiming to have pirated books or articles and committed to helping the authors, acquiring them through legal means in the future. That is, there is an alienation that authors receive a significant transaction value, which is untrue. In this case, there is no need for formal references, as we researchers experience this reality.

6 Extended discussion and final remarks

The analysis and contribution of this present work are twofold, collecting data and information through a questionnaire dedicated to, in the majority, specialists in computing. In the end, we analyzed 434 valid responses. The first analysis and contribution deal with the computing ethics instruction; the second deals with their “unethical” or “immoral” practices through cyberspace, motivations, and emotions or sensations about it. We dialogue from the ethics of resistance as an ethical principle, dealing primarily with concrete and material elements of reality, such as a financial condition, or symbolic ones, such as privilege and power.

We notice a scarcity, limitation, and deficiency in the Brazilian literature on computing ethics. It jeopardized our intention to present crossings between the findings and contributions of this work with the Brazilian reality, for this reason we punctually resort to foreign authors.

We propose an EDM approach for applied computing focusing on information systems, ISEDM. We explored the questionnaire responses focused on studying “unethical” or “immoral” scenarios declared by the respondents, not limited to the technique. As we observed in this research, the reality is complex, multifaceted, and plural, with a constant dispute between entities aligned with the ethics of resistance. The complexity of decision-making through ethical dilemmas is proportional to the scenario involved – as dimensions and variables increase, the less clear or objective the decision.

As final results, we have the answers to Q10 from Table 2, asking respondents if they want to supplement with any additional information:

- Praise and good criticism regarding the informality and relaxation of the survey communication, “I liked how the questions on the form were prepared. Whoever wrote it has a sense of humor and that made it fun to answer the form”;
- Recommendations for additions or improvements and future approaches to the research;
- They indicated the topic’s relevance and importance, praising the research and recognizing its relevance, “Congratulations on the research, I believe that the results will help many researchers to know about ethics and apply it in their research.”. Answers like this are

essential for valuing research as desired, moving away from the paradigm of self-centered scientific research.

- They reflected on their practices while thinking-answering the form, generating self-criticism and proper moral conflict, “Great survey. Just answering these questions made me reflect a lot.”. Dynamic interactions with participants’ behavior may occur in survey research (Morwitz, 2005). As we perceive here, by promoting reflection and self-criticism.
- One respondent indicated that the “normalization” of these practices might lead other respondents to respond that they did not commit them, as they do not perceive them as “immoral” or “unethical”;
- One respondent pointed out that the form has too many “jokes” and suspects that it will be used seriously in scientific work;
- Reinforced the ideological and practical direction for the future. For example, “I believe that if access were more democratized and unified, people would not resort to piracy so much”, “We live in Brazil, a country where half of them barely have internet and most students do not even have one room”, or “fair prices reduce piracy and strengthen business”.
- The research served indirectly as computing ethics instruction, “I simply congratulate you for the questionnaire, as it helped me to reflect, as I did not know that downloading a pdf without permission can be considered an immoral practice.”
- In line with the findings of Dexter et al. (2013) (although USA located), respondents praise the relevance and importance of ethics and computing ethics, whether in a generic scope, for spiritual advancement, or for professional improvement. “I loved the questionnaire and would like to have more debates on the topics in classes focused on Computing Ethics”.

From an interpretive and critical qualitative paradigm (Babbie, 2021; Neuman, 2014), we analyze the phenomena of reality through the answers to ten questions about computing ethics.

Regarding the computing ethics instruction scenario, we realize that the situation is confusing when respective students perceive computing ethics in their courses, with different views and perceptions of students from the same institution and the same course. Most respondents already exposed to computing ethics disciplines, courses, or content evaluated them positively, so learning brought them positive consequences. Most students prefer expository learning, where the instructor exposes the content and guides them, with case-based didactic, emphasizing real cases, and a curriculum ethically focused on consequentialism, professional ethics, and theory.

Regarding the learning means, most students resort to the digital and informal environment, for example, watching videos on YouTube or enrolling in online courses. Regarding specific means, most resort to books and, *ipsis litteris*, to the internet. Unlike what we culturally expect of university students, few resort to the physical sphere, such

as library books and face-to-face classes with professors, and formal means, such as academic articles and renowned and recognized professors. Moreover, even if books are the most used specific media, their quality is uncertain and just “being a published book” does not guarantee formality or the quality of its content.

Regarding the scenario of behaviors and practices regarding computing ethics in cyberspace, the primary motivation is financial, and most actions involve intellectual property, such as “piracy”, the most frequent pirated content is books, demonstrating that there is an interest in knowledge and culture; and movies, for entertainment. Most respondents performed only one practice. Others, although significantly less, performed two to seven different practices. Infractions to academic rules boil down to “cheating” in assessments. Accompanied by these, we perceive other diverse ethical or moral phenomena, such as epistemic responsibility for their actions, ideological manifestations in favor of free knowledge, or economic criticism of companies and the capitalist system.

It is worth emphasizing that this research avoids law judgment, categorical inquisition, or idealistic utilitarianism. Instead of judging, condemning, and labeling negatively, the intention is to build inclusive alternative paths of emancipation, respecting the ethics of resistance ideals. If the future belongs to us and we are responsible for it, shall we think collectively?

Based on the ethics of resistance foundation principles, the analysis needs to go beyond the semantic contribution and propose practical directions. Actions that alleviate or resolve the perceived problems, together with the responses of the respondents for a less “unethical” cyberspace:

1. **Offer partial versions of products and services.** For evaluation and quality analysis, stakeholders can access smaller parts of composite materials, like book chapters;
2. **Price review, transparency and rationale.** Why are games from a decade ago still so expensive? Why does software that, through transactions, has already “paid for itself” and achieved the expected Return on Investment (RoI) remain expensive and inaccessible?;
3. **Make material and content broadly available.** Several respondents indicate resorting to piracy to access and consume old or unavailable materials and content, such as old series or movies. Promoting adequate availability and trusteeship in the digital environment improves this scenario. Mainly operating fair pricing on content that, like item 2 on this list, has already “paid for itself”.
4. **Better integration between content on streaming platforms.** With affordable prices, providing content in a shared ecosystem;
5. **Teachers make available the material or content they request or use as a reference source in their disciplines.** Mainly in public universities and initiatives, with a potential presence of students in situations of financial vulnerability. It is understood, in some cases as an internal institutional rule, that the material used or requested by teachers must be available through the

respective institution, as in libraries in most cases. For example, there is a basic and trivial physical limitation to account for the number of students and available copies of books.

Therefore, forcing a scenario like “use the books requested, because many of the exercises will be imported from them” is morally perverse and irresponsible, leaving students to their own devices and delegating the burden of curriculum material. Mainly while the teacher could, by himself, provide his exercise lists;

6. **In their disciplines, professors request accessible and open materials.** This point is self-explanatory, whereas the defense of open knowledge presented by the respondents;
7. **Teachers carry out constructive and formative assessments.** Avoid the pressure of traditional or punitive assessment;
8. **Research and development content must be publicly available.** Initially, thinking through the “public” and “private” schemes, we follow the common sense that only material and content financed by the public initiative should follow an Open Science dynamic. However, as Fernández Pinto (2020) points out, restricting the demand for opening data and information only to what is understood as “public” can have significant negative consequences. Therefore, due to the ideal and principles of scientific virtue, we set the agenda for a total opening of knowledge, even if gradual;
9. **Alternatives to remunerate researchers and scientists for their published intellectual productions.** Indirectly cited by several respondents, they reiterated their intention to remunerate the producers of knowledge artifacts. Currently, the business of the research and scientific publishing market is perceived as unethical and parasitic (Smith, 2006; Walter and Mullins, 2019), while the body of shareholders or executives share the profits and add nothing to the final product, scientists and researchers add the actual value, knowledge, without receiving even a tiny part of this profit, achieved by the fruits of their arduous research;
10. **Instructing students to find good quality knowledge and information** about computing ethics through the internet, rather than limiting them to traditional, formal, and physical means.
11. **Produce and make available content on computing ethics on various topics.** As a knowledge specialty, few are specialists in computing ethics. Even so, professionals and specialists can generate and disseminate specialized content about their respective specializations. For example, an information security specialist may not produce material on computing ethics. Traditionally and institutionally, we expect information security specialists to receive instruction in ethics and computing ethics during their training (Hall, 2014). This knowledge, formalized and structured, is welcome in cyberspace so interested students can find, access, and consume it.

We emphasize computing ethics to avoid a moralistic or legalistic approach. In this case of computer security, forwarding a discussion about hackers and hacking as if they were villains, evil, or strictly immoral is far from suitable for both ethics and computing ethics;

12. **Support content producers.** For example, using crowdfunding systems. Strengthen smaller development companies with greater transparency.

Survey-oriented research present some traditional limitations (Babbie, 2021; Neuman, 2014). We potentially miss some phenomena or specific insights caused by the questionnaire standardization, “fitting of round pegs into square holes”. It is deficient compared to contextual social life, which we seek to mitigate by allowing several open questions. They are inflexible. Even if the scenario or associated parameters change, the questionnaire persists. The open questions and informal communication sought to alleviate the phenomenon of artificiality common to questionnaires.

We rigorously analyze and evaluate the form questions in specific rounds, reinforcing the reliability factor. There is a gap between our understanding and the respondents’ understanding, which generated interactions such as “The question was not clear, what do I think about who practices or what do I think about having practiced? Anyway, as I answered item A and did not practice, I doubted how to answer this one.”. Responses like this occurred in less than 1% of all questions from all respondents.

Respondents indicated strengths, weaknesses, and also survey limitations:

“I don’t know if this is a very constructive opinion, but the only question that I found a bit out of line was ‘how do I imagine a class that is nice/useful/interesting’ of ethics, because I consider this a challenging question for a form, is a question that could easily be the subject of a conversation in the room, and the way it was arranged, at least I did not feel like putting what came to my mind, because I felt it should be all or nothing (maybe I’m picky or tripping). But other than that, excellent questions!”

In future research directions, approach other target audiences; follow each of the topics perceived in this research in detail; revisit this research with the same participants who agreed to participate in a dialogic relationship of knowledge; advance the topic of ethics of resistance in computing, engaging other stakeholders.

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