Thesis Research paper

Social risks and opportunities of AI integration. Discrimination and privilege in AI use considering EU AI acts

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ABSTRACT

This research paper examines the European Union's approach to artificial intelligence (AI) policy, focusing on potential risks and opportunities for discrimination and privilege. It highlights the societal risks and opportunities of applied AI technology and their alignment with the EU policy discourse with a case in the educational system. The study aims to answer the research question: How will the EU AI policy affect risks and opportunities in the societal environment taking into account discrimination and privilege? The literature used the most are concepts such as the digital divide and intersectionality theory. It underlines the importance of policy papers in influencing society and to protect public interests in AI implementation and development. The methodology employs qualitative content analysis of EU AI policy acts. EU AI policies recognize the appearance of diverse forms of discrimination, and the analysis found some attempts to address the digital divide by promoting equal access to AI technologies and protecting vulnerable groups. In the education system study case, the analysis of the acts indicates one of the features of AI to provide personalized learning experiences for students while accentuating the limitation of the need for solid benefit-risk analysis before getting it involved on a larger scale.

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Keywords

Artificial Intelligence, risks, opportunities, discrimination, privilege, EU policy disclosure, society, digital divide, education, technology

1. INTRODUCTION

1.1 Context

Artificial Intelligence (AI) influence is becoming increasingly difficult to ignore in all areas of life, therefore this paper will state the societal risks and opportunities of applying AI technology and how they align to the policy disclosure providing a case study in the educational sector. As companies introduce AI systems into their practices, new challenges, concerns, and opportunities arise. For numerous of these companies, AI is a completely new venture, and they often lack an understanding of the subject (van den Broek et al., 2021). While AI has enormous potential to enhance processes and outcomes in various fields (e.g. finance, law, health care, and education), it also holds some dangerous short and long-term risks, such as security risks (privacy and cyber intrusions risks, inability to control malevolent AI), economic risks (e.g. job-displacement risks), and ethical risks (lack of values and regulations) (see also World Economic Forum 2018). Today, AI remains the most spectacular IT application, a technology that has gone through unequaled development over the last decades (Lee et al., 2018). However, the benefits and immense possibilities offered by AI make it a market of the future par excellence (Pwc, 2019). AI has driven a new way of managing information, and this represents both a challenge and an immense opportunity for organizations; but seizing this opportunity requires a change in culture, mentality, and skills (Di Francescomarino and Maggi, 2020; Lee et al., 2018; Sikdar, 2018).

Description of concepts

The main concepts analyzed are potential Risks and Opportunities of AI systems regarding EU Policy disclosure focusing on the educational (university) level. As mentioned by Debreceny (RS, 2013), AI integration into the education sector has sparked widespread discourse, presenting a landscape rich in both promise and peril. Due to increasing adoption in educational institutions of AI technologies, there can be enhanced learning experiences and more administrative efficiency, making daily life activities better and more comfortable for everyone. Moreover, for that to be ethically acceptable there is a need for alignment with the rules and regulations of EU AI Policy disclosure. In 2017, Siemens, G & Gasevic, D mentioned that "understanding the nuanced relationship between risks and opportunities becomes paramount". Ergo, the need to analyze both variables taking into account the influence they have on daily life in different sectors. Furthermore, AI-powered analytics offer valuable insights into student performance and learning trends, empowering educators and administrators to make data-driven decisions (Lockryer, L., Heathcore, E., & Dawson, S. 2013)). One of the main risks in reliance on AI technologies raises important ethical considerations regarding data privacy concerns, security in online environments and consent for data gathering. As educational institutions collect and analyze vast amounts of student data to power AI systems, one question provided by Floridi, L., & Cowls, J., in 2019 was about the responsible use and safeguarding of sensitive information. From the above-mentioned article, in 2017, Siemens, G & Gasevic, D added that by leveraging AI algorithms to analyze data educators can create instructions for individual learning styles, preferences and pace, thereby maximizing student engagement and academic outcomes.

1.2 Research goal and objectives

The research goal is to investigate the societal risks and opportunities associated with the application of AI technology examining how these are addressed in policy discourse, particularly in emphasizing discrimination and privilege in the educational industry.

The objective is to gather qualitative content analysis answering the question of how much and in what way the European Union's AI policy addresses intersectional discrimination and privilege, as well, how it will directly or indirectly affect the population. Meanwhile, the second step would be to provide a case study of the educational sector and how Artificial Intelligence and EU AI policy would affect intersectional discrimination and privilege in this sector. By conducting a review of existing literature on the European Union's AI policy and looking for academic papers, policy documents and articles from reputable sources the research goal will be completed. Additionally, the policies that exist at the moment can heavily regulate the terms of what can be done with AI and particularly regarding where and how, as well as showing the consequences and punishments for unethical use. Likewise, there will be an analysis of some case studies within the educational sector where AI technologies are being implemented, focusing on intersectionality, equity and inclusivity. The collected data will characterize the pedagogical approaches, student engagement and learning outcomes.

1.3 Research questions

1. How will the EU AI policy affect risks and opportunities in the societal environment taking into account discrimination and privilege?

2. How do teachers and students within the educational system perceive the societal risks, opportunities, discrimination and privilege of AI technology integration?

1.4 Relevance

1.4.1 Theoretical relevance

The paper has theoretical relevance as it will validate or refine existing theories about social norms and adaptation. The study provides empirical evidence that supports existing theoretical perspectives and the analysis provides more details and explanations regarding the research topics. Given the interdisciplinary use of AI especially in education, the study can combine insight from disciplines such as sociology, psychology, and social behavior. Moreover, it includes an explanation of the ways that EU policy is affecting AI integration in different systems and what the social risks and discrimination outlines are. A study by Castells, M. (2010), explains that by integrating multiple theoretical perspectives, the research can provide a comprehensive understanding of the social implications of AI adoption.

1.4.2 Practical relevance

At the same time it has practical relevance as it will explain real world challenges, possible problems and issues usually encountered by users of AI and how they can be inferred from the EU AI acts, therefore, the findings will have a direct explanation and analysis for better practice in different fields. Additionally, there will be an empirical analysis of discrimination and privilege based on the backgrounds of the people involved and how it is understood and involved in AI use. Practical insights interpreted from the study can inform well structured strategies for resolving social risks, lowering

discrimination and misleading privilege. Likewise, ensuring equal and fair access to AI-driven educational resources, and helping inform about the challenges that users of new AI techniques encounter daily.

1.5 Complication and Problem Statement

The complications that this paper will assess are the potential risks and will compare with the opportunities regarding AI, the identified problems are the high-risk level and whether they will outgrow the positive influence and their overview and understanding of the EU policy acts. Correspondingly, it will take into account the issue of discrimination and privilege in the case that some students/teachers can receive based on their previous education, their family's income, their childhood situation, inequality of resources, and geophysical location. Therefore, the problem statement will determine using qualitative content analysis EU policy data the impact it has on AI integration.

1.6 Theories

The study will explore the risks and opportunities of AI and how they are addressed in policy disclosures within the educational system. To expand more on the chosen subject, the following theories will be used, described and analyzed throughout the paper:

Intersectionality Theory by Kimberlé Crenshaw - one of the main theories that this research will be based on is the intersectionality theory, a special focus will be awarded to this theory in explaining how different aspects of a person's identity (race, gender, class...) intersect, which will finally lead to specific experiences of discrimination and privilege.

Digital Divide Theory - the second theory that will be used to emphasize more on the subject and go into detail about discrimination and privilege encountered in policy disclosure of AI integration will be the digital divide theory. This theory proves disparities in access and usage of AI based on income, education, and geographic location, besides it shows the influence on various aspects of society environments (law, education, and economics). It can be used to make a comparison in the use of AI technology because it shows how it affects individuals' opportunities, background information and their outcomes.

2. Literature Review

The second part begins by laying out the theoretical dimensions of the research and looks at how theory can prove the findings and draw reliable conclusions.

2.1 Risks and opportunities in EUAI Policy Disclosure

To begin with, from the introduction, it can be emphasized that articles and papers all worldwide show that the public perceives artificial intelligence as a double-edged sword: a risk and an opportunity. The European Union has been developing policies regarding the disclosure of AI technologies, trying to address concerns surrounding the digital divide. The digital divide refers to “the gap between individuals, households, businesses, and geographic areas at different socio-economic levels with regard to their access to information and communication technologies (ICTs) and their use of the internet “ (Dewan, S. and Frederick, J.R. 2005). When discussing the disclosure of AI, the EU has been focused on ensuring transparency and accessibility of AI systems. The reason behind this approach is to reduce potential differences that could appear from unequal access to AI technologies, thereby preventing further increases in the digital divide. Policy disclosures related to AI should promote educational initiatives, diversity, and inclusion in AI development, and create an environment appropriate for innovation and exploration.

Furthermore, the functions of policy papers are influencing society, as Smuha, N. A. (2021) mentions in his paper, the EU can make rules to protect society’s interests when it comes to AI and suggest three ways to do it. By Public Oversight, Public Monitoring and Procedural Rights. It suggests that there should be ways for the public to share their thoughts on AI usage, and share information about how it is affecting society and they argue that people should have certain rights when they deal with AI, besides, they have the right to seek justice if something goes wrong and the right to be apart in decisions that affect everyone (Smuha, N. A. (2021)). From the above-mentioned reasons, there can be concluded the relevance and importance of policy papers and why this research paper has theoretical relevance.

First, there is transparency and accountability, also by making public information about the functioning and decision-making processes of AI systems, the European Union aims to motivate individuals to engage with these technologies. As mentioned in some papers, the EU often conducts impact assessments to evaluate the potential effects of AI technologies on different groups within society. By identifying potential risks and benefits, policymakers can design targeted interventions to address the problems and ensure equitable access to AI for everyone (Novelli, C., 2023). The next concept worth mentioning is Data Access and Sharing, the EU has been working on initiatives to promote data sharing and interoperability while also protecting privacy and security (Pick, J.B. and Nishida, T. 2015). Alongside, it involves giving global access to AI technology and requires giving assurance that personal data is being handled responsibly and that AI systems used are designed with the safety and security of the users in mind. There are concerns about the impact of AI algorithms on social dynamics, additionally in the policy disclosure of the EU there are mentioned concepts and limitations of social media interactions (Smuha, N. A. 2021). Policies ensure the consideration of risks and opportunities that individuals have and their personal understanding of how AI algorithms impact their lives and receive due credit for their contributions.

The next part of the research goal is to explain the uses and benefits of AI in the educational system, at the same time what the risks and opportunities are for different individuals, and why the same use of AI could have different effects on people with diverse backgrounds. There is education and training that addresses the digital divide and requires not only access to technology but also the skills and knowledge to effectively use it. This approach includes questioning whose perspectives are prioritized based on authority and power, and how gender and racial biases may be embedded in AI algorithms. For instance, having power could show imbalances based on race shape the design, implementation and deployment of AI technologies (Jogie, M.R. 2021). Furthermore, digital division can also be influenced by the generation gap, individuals looking for social connection and a sense of belonging in society no matter their age, thus AI technology can facilitate social interaction through social media platforms, online communities and virtual environments.

Some of the reliable sources for EU policies are the European Commission's White Paper on Artificial Intelligence, the European Union Agency for Fundamental Rights, European Digital Strategy, and Eurostat. These sources can provide more information about the EU's policies on AI disclosure and their implications for addressing the digital divide that will be analyzed in this paper. By promoting transparency, accountability, and fair access to AI technologies, policymakers aim to ensure that the benefits of AI are shared by all members of society.

2.2 Discrimination and Privilege in AI technology

Discrimination and unfair outcomes stemming from AI algorithms have become a hot topic within the media and academic circles (O'Neil, 2016). AI should be designed for universal usage and not discriminate against people, or groups of people, based on gender, race, culture, religion, age or ethnicity (Amnesty International/Access Now (2018)). In this paper to prove the methodology and analyze the qualitative data about Discrimination and Privilege will be used the Intersectionality Theory by Kimberlé Crenshaw. Intersectionality theory helps understand discrimination and privilege by recognizing that people's experiences are shaped by the intersection of multiple identities, such as race, gender, class, sexual orientation, and more (Crenshaw, K, 1991). The main advantage of using this theory is the consideration of how different social structures and backgrounds shape individuals' experiences of discrimination. Next, there will be a clear explanation for both of the included aspects.

The first one is Discrimination, Ryan, M., & Stahl, B. C., (2020) mention that intersectionality theory highlights how it can occur when someone experiences unfair treatment because of multiple aspects of their identity. Intersectionality helps to understand how the experiences of discrimination are not just the sum of racism and sexism but can be unique due to the interaction of both factors, therefore in the educational system, there could appear different treatment for women of color as an example (two discrimination factors: woman and different skin color). These aspects can increase the individual's desire for recognition, respect and self-worth, thus people may seek validation and acknowledgment for their contribution to AI development or utilization. In the educational system, structural racism manifests in inequalities in access to resources, opportunities, and quality of education based on race.

The second one is Privilege, intersectionality refers to the advantages and benefits that certain groups enjoy in education or other environments based on their identities (Amnesty International/Access Now, 2018). Privilege is often invisible to those who possess it because it is seen as the norm, this concept will be later explained and analyzed in the paper. Intersectionality theory shows that privilege is not just about one aspect of identity or socio-economic background (wealthy family, etc), as an example can be, that a white-skinned woman may experience gender discrimination but still benefit from racial privilege compared to women of color. It needs to be checked if AI's decisions might be unfair to certain groups of people based on gender, location, religion, or social class. For example, AI-driven assessment tools may disproportionately penalize students from marginalized backgrounds due to biased data. As Zuiderveen Borgesius, F. J. (2018) mentions, "AI systems can be used to collect and analyze personal data for profiling purposes, and subsequently subject individuals to targeted manipulation". "The harm suffered by an individual who faces discrimination, manipulation or an unjust judicial or administrative decision, …. , primarily focuses on legal remedies for the individual directly subjected to the practice, rather than to 'society'. From the above-mentioned information, it can be concluded that the effect of AI on the discrimination problem.

3. METHODOLOGY

3.1 Research Design supported by case study

To start with, due to the purpose of this research endeavor, for the methodology part, content analysis has been selected as the primary means of data evaluation and exploration. Content analysis is a functional qualitative research technique that allows systematic inspection and perception of textual data. (Boettger & Palmer, 2010) (Kleinheksel et al., 2020) (White & Marsh, 2006). Content analysis assesses words, phrases, or in-text sentences; it can be defined as a research technique for making replicable and valid inferences from texts (and other meaningful matter) in the context of their use" (Krippendorff, K., 2004. p. 18). This approach is especially convenient for the ongoing research paper as it enables to delve into the nuanced and underlying themes present within the qualitative data (Mabuza et al., 2014) (Kuckartz, 2019). The content analysis technique equips the researcher with the tools necessary to uncover subtle meaning, identify complex patterns and elucidate the complex social phenomena under study (Leech & Onwuegbuzie, 2008) (Kuckartz, 2019). The decision to employ content analysis is further justified by the nature of the research questions and objectives underlying this study. In order to examine how AI policies are helping to avoid risks and take opportunities, this research paper will inspect the European Union's Artificial Intelligence Act, which supervises the implementation of AI technologies, and any uncertainties and problems it might be facing. In order to gather this information, reliable EU AI acts and regulations will be used, the inclusion and exclusion criteria will be provided. This research will present the dangers of discrimination and privilege and how they can be interpreted from already existing acts and what is not addressed in EU policy. The research design will be qualitative content analysis and comparison between documents regarding the EU acts. This method allows a deeper understanding of AI integration and how AI policies are helping to avoid risks and take opportunities, and its alignment with the EU AI acts. This research paper will discover relevant documents, and analyze the most appropriate ones for the subject selected.

3.2 Sample and Measurement

The sample for analyzing the EU AI Policy Act will include finding relevant documents, policy papers and legislative text that explain the implementation of AI technologies within the European Union. Some of them might be governmental reports, legal texts and public databases of information. During the sampling and measurement there will be found information in the documents/acts/papers about risks and opportunities of discrimination by creating a framework design with subcategories (environment, gender, race, age, income). Furthermore, after the content analysis there will be a sample for the case study of AI technological use in the education system. The sample for examining already existing case studies will consist of published online information, academic papers, and reports with details about AI. Characteristics of this sample will include information from various institutions within the European Union with the population being educators, researchers, policymakers, and stakeholders involved in the

educational field. To measure these cases, the most reliable instrument will be qualitative content analysis methods.

To select the best suitable documents to answer the research questions, Appendix F displays tables with inclusion and exclusion criteria used to select the papers used further in the analysis. The main concepts found are: relevance to AI, focus on discrimination and privilege, risk assessment, opportunities, digital divide, ethical and legal guidelines, official provenience and dimensions. Some papers include most of the subjects, meanwhile others focus only on a certain one, for instance, not numerous papers take into account digital divide, specifically for this reason, the subject mentioned can be overlooked when selecting decent papers. The table presents in detail how the articles were selected further for analysis, it had to include a high relevance for AI and discuss discrimination and privilege at some level. For the Digital Divide subject, there was selected a paper that covers more subjects extensively and most of the needed criterias (ethical/legal guidelines, official provenience, the dimensions). One standard principle used to select papers was their dimensions, if the paper had just a few pages (max 10-20 pages), the paper was thoughtfully read and concluded if it can be combined and compared with others. For instance, an EU AI act of 400 pages would be harder to compare based on reliability and stability with an article of 10 pages. Moreover, there was a meticulous background check on the origin of the articles (by who it was written, the time frame, the location, the free access online), taking into consideration all of the above, the articles chosen have provided qualitative results and analysis.

3.2.1 Coding scheme/table

Constructing a comprehensive and well-structured research paper requires the utilization of important and diverse tools or techniques to formulate and present information (Elliott, 2018). This paper will include one particularly useful element which is a coding table with decent keywords and in-text examples from the papers analyzed. Coding tables or schemes, which prove the methodology used to draw conclusions, can allow users to navigate the content, easily reference relevant information and ensure that the flow of ideas is cohesive as the codes contribute as a united system that categorizes and interconnects the various components of the paper (Zhang, 2014). In the Appendices A, C, D, there can be seen a table/scheme representing the pattern and characteristics that were followed to select information and generate conclusions from the papers and official acts based on the discrimination and privilege opportunities and risks in the context of the AI EU acts. That table will help in categorizing and analyzing the data regarding AI integration, with a focus later on the educational sector, including the societal risks, opportunities and how EU policies address these aspects. The table defines the criteria that make documents suitable to analyze and extract information as it refers to all European countries. This paper took into consideration five official European AI acts reliable for answering the research questions. The list of relevant keywords provided in Appendix B gives a more thorough analysis of the documentation and the necessary information to form well-informed conclusions over the acts taken into account.

3.3 Data Collection and Analysis

The content analysis will be conducted to provide an overview of the EU AI policy and the risks and opportunities over the social part. To be more precise, it will include clauses and paragraphs referring to the discrimination subject with an analysis of the deducted risks and opportunities claimed. Besides analyzing the acts and their influence, there will be discovered patterns and characteristics that are similar and that differ in the selected documents about the AI domain and possible discrimination issues. A single study might be full of bias and lack precision, which is why the analysis will be based on several official acts and trustworthy documentation from solid sources (Neuendorf, 2017). The analysis will consist of the theories that are useful for analyzing the research questions, in this case will be the Intersectionality Theory by Kimberlé Crenshaw and the Digital Divide Theory. To ensure achieving the intended goals, the analysis will be empirical, based on already existing theoretical evidence and official documents on EU policy. From all the selected acts to be used, there will be extracted the key information and most important findings regarding potential risks of AI over the discrimination subject which will be helpful to come up with solid conclusions in the areas of interest. There will be a thorough analysis of the public access papers, reports, and data of the EU AI Policy to provide an overview of the risks and opportunities influencing the social aspect. Information and findings will be selected from acts that are most appropriate and they will be validated through multiple analyses of documents to make sure that the information is described the same in different sources. There will be used academic papers, EU AI acts, AI national documents, policy papers, journals and other reputable sources of literature.

Study case of AI discrimination in the educational sector

The coding scheme provided in the appendix includes a paper with examples and in-text citations specifically related to the educational sector and how it is influenced and affected by the European Union Artificial Intelligence acts. The analysis which involved the assignment of specific codes or labels to different aspects of the research, can support the results and conclusions (Sutton & Austin, 2015), in this particular case, the study about the educational system and AI influence was made using an official act adopted in the last few years.

4. Results

An analysis will be made using the Excel sheets provided in Appendix C. The first sheet has an overview of the gathered data from the act “Artificial Intelligence Act (European Parliament 2019-2024)”. The second sheet is based on the act “Regulation of the European Parliament and of the Council". The third sheet includes the data from the paper/book “Study on the impact of artificial intelligence systems, their potential for promoting equality, including gender equality, and the risks they may cause in relation to non-discrimination”, the fourth sheet is about the study case in the educational system “AI and Education: Guidance for Policy-Makers” which will be mentioned further in the paper. The fifth sheet is called “The Netherlands Artificial Intelligence. Legal500” provides a clear and national view of the subject, because of the niche focus on national regulations, it gave wonderful insights that proved to have multiple similarities with the main EU AI acts envisioned. Last but not least, the sixth sheet has some tables of results and analysis. Appendix E displays how many of the intended subjects to be analyzed can be found in each of the papers, the “X” signifies that the subject can be noticed in that paper. The articles/acts were chosen in an effective way for them to incorporate all or most of the necessary topics. One exception is the digital divide topic, which called for individual research and other criteria for selection.

The results part will be explained individually per subject, with the first one being Discrimination. Some of the sub-parts analyzed with examples are: racial bias, gender bias, cultural bias, age discrimination and unfair treatment. The first paper covers various forms of discrimination, including racial, age, cultural bias and unfair treatment. It provides examples such as AI systems perpetuating historical patterns of discrimination against certain groups based on race, ethnicity, gender, age or disabilities. The second and third documents taken into account for this research provide very similar outcomes regarding discrimination. Some examples from the first paper can be seen in the second paper as it is a revised, updated and improved version. The third paper has more information about cultural discrimination and unfair treatment, it clearly states how the AI system recognizes each feature and how it differs from user to user working with already known historical data (age, gender and social background). From all the provided documents, it can be seen as a result that some papers are missing numerous details about discrimination possibilities, and focus more on social risks and opportunities, not paying enough attention to the favoritisms and negligence provided by AI by using too standardized systems. Nevertheless, the discrimination principle can be seen and understood from other aspects, looking at Appendices D and E, favoritism and prejudice can be included in the papers while mentioning other related keywords (e.g access to technology, inequality of resources..).

The second subject analyzed is Privilege, it was divided into more sub-parts: inequality of resources in each country or family, access to technology that can not be the same for everyone (AI systems), and geophysical location. The first paper highlights the inequality of resources, such as AI systems determining access to financial resources or essential services. It also mentions the importance of safeguarding procedural rights and the effect that AI has on humans and the law (authorities). The second and third papers do not mention many things about the inequality of resources but more about the geophysical location and its influence over the privilege received unnoticed while using AI by some users. The geophysical location can make a substantial change as each person has different access to information based on the place, VPN and country rules. As for European territory, everyone has equal access to provided information online and use of any AI systems according to the aforementioned EU AI acts (Ethics guidelines for trustworthy AI | Shaping Europe's digital future, 2019). Moreover, papers four and five mention some examples of access to technology as being the main problem for privilege, the paper focusing on the national law of the Netherlands proves the point from the following paragraphs " In the Netherlands, companies appear to be at the forefront of this trend, with 54 percent indicating that their nontechnical users have full access to AI" (Willems, J. (n.d.). The Netherlands Artificial Intelligence. Legal500. p. 12). From the results table, the scheme shows all the major aspects describing and influencing the privilege (e.g. location, transparency..), therefore, the privilege subject can be seen in most EU AI acts.

The third subject considered is Digital Divide, some of the sub-parts characterized with corresponding examples are: technology integration, transparency, age/geophysical location. The first paper does not directly address the digital divide but it has some information about technology integration and substantial examples about transparency rules and guidelines that have to be respected. It emphasizes how some practices have to be prohibited, allowing traceability and providing protection for private life. The second paper briefly mentions facilitating access to information and prohibiting certain algorithmic system features under consumer protection laws. It has large data about transparency rules and requirements which is necessary to generate proper conclusions about AI influence. The third paper discusses the lack of equality data limiting the identification of inequality in access to services for minority groups. It also covers ensuring access to digital technologies and protection from their harmful consequences, the same information discussed in the first and second papers. Furthermore, it indicates the measures taken by the member states to inform the broader public about the ongoing changes. The fourth act offers the most examples of the Digital Divide and its influence on society, as can be noticed from the following paragraph: "The digital divide is further exacerbated by the increasing concentration of power and profitability in a small number of international technology superpowers, across just a few countries. Without effective policy intervention, the deployment of AI in education is likely to mirror this inexorable process, inevitably magnifying rather than ameliorating existing learning inequalities." (AI and Education: Guidance for Policy-Makers, p.21), from the results table it can be emphasized that the Digital Divide subject can be recognized through other keywords such as data privacy and technology integration. The fifth paper does not mention in detail the divide, some aspects such as transparency can be recognized throughout the paper but still it does not contain enough information if looking only at the national act of the Netherlands. From everything explained above, it can be concluded that the Digital Divide is a concept not described in every paper (see Appendix E) but the majority of them include clues and characteristics related to it, more about the theoretical implications will be discussed later.

The fourth point evaluated is Societal risks, this part was divided into some sub-parts to make it easier to understand, they are: society, risks for society, opportunities, and data privacy/security. The selected papers acknowledge the large-scale societal effects of deploying algorithmic systems in decision-making processes; they highlight the risks of automating existing inequalities. Additionally, it mentions the potential for AI systems to generate risks and cause harm to public interests and fundamental rights protected by Union law. The first and second papers recognized the potential negative impacts on students, teachers, and wider society, including issues related to data ownership, consent, privacy, and the efficacy of AI interventions in education. Likewise, the third paper mentions the need for robust benefit-risk analyses before adopting AI technologies at scale to mitigate potential risks and downsides, one in-text example can be: "In other terms, the deployment of a new AI system should be "purposeful and intentional in its inclusivity" and "must empower communities and present a benefit to all of society" (Study on the Impact of Artificial Intelligence Systems, Their Potential for Promoting Equality, Including Gender Equality, and the Risks They May Cause in Relation to Non-discrimination, n.d., p. 72). It indicated the broader obstacles society must overcome to unleash the potential of AI while minimizing its downsides. Besides, the fifth paper includes justification for the societal risks at the national level, for instance, "This is also reflected in a parliamentary letter on AI, public values, and human rights, in which the Dutch government discussed the opportunities and risks of AI, as well as existing general policies in which AI occurs" (Willems, J., Netherlands AI, p. 3). Reflecting on the aforementioned information and table of results (Appendices D and E), societal risks are highlighted in the studies and need for throughout benefit-risk analysis to ensure AI is inclusive and beneficial.

Empirical mini case in educational sector

Artificial Intelligence has become exponentially important in diverse fields, including education (Ojha et al., 2023). Its introduction into the educational system has produced numerous new ideologies and advancements. However, there is increasing interest in how AI systems may continue to discriminate and privilege within the educational system (Gillani et al., 2023). Even though AI has the potential to build up new techniques in teaching and learning experiences, it is important to seriously check its effect on educational access and equality (Gao & Wang, 2023). This research report analyzed a paper about the study case in the educational system "AI and Education: Guidance for Policy-Makers", the results and examples can be seen in the Appendix.

The paper mentions examples of racial bias in AI systems negatively impacting students based on race, socioeconomic status, etc., it also discusses the need to prevent harmful and discriminatory applications of AI. From the article, it can be understood the use and application of the Intersectionality Theory by Kimberlé Crenshaw mentioned before. It highlights the importance of openness as a core value of AI technologies and data, ensuring equal access, bridging information inequalities, and promoting transparency (Cukurova et al., 2023). It discusses the potential of AI to provide personalized resources and outcomes for learners. It points out advancing access to AI-based technologies and providing help with local AI expertise, especially in developing countries. The international reach and benefits of AI will allow students from both developed as well as developing nations to take advantage of better learning experiences (Gurrib, 2023). For the next part, the paper covers extensively the digital divide, highlighting disparities in access to core digital technologies like the internet and AI, especially in developing countries and rural areas which impacts the Sustainable Development Goals. Further, it mentions one key issue identified by the students is the lack of digital readiness among their staff and institutions. This lack of readiness can interfere with the utilization of the internet within educational settings, thereby creating a digital divide between students who have access to digital resources and those who do not (Afzal et al., 2023). It emphasizes providing access to high-quality, personalized and lifelong learning opportunities. Moreover, there is a need to apply open-source strategies for sharing data and algorithms to support local innovations and mitigate this divide between countries and social groups (Bentley, 2024). As for the social risks, it briefly describes the potential ethical concerns around available data and bias in AI systems impacting human rights. From analyzing the paper, it can be affirmed that AI can enable personalized resources and insights tailored to individual learners' needs, skills and knowledge across different contexts, while allowing them to control their own data and digital identities (Surani, 2023).

5. Discussion & interpretation

The analysis of the results will be made according to all four subjects that were mentioned in the previous step and will be compared with the theoretical information specified in the literature review.

To begin with, the biggest and most important subjects discussed are Discrimination and Privilege of AI regarding society and each individual person coming from different social/ethnic/cultural backgrounds. These aspects can be referred to as the Intersectionality Theory by Kimberlé Crenshaw mentioned before as one of the main concepts for this research paper. The theory emphasizes how diverse forms of discrimination and disadvantage can influence individuals with distinct backgrounds and offer privileges and unfair treatment to others just because it was programmed that way.

As an analysis, there can be considered the coding scheme from Appendix C which highlights examples that the theory is explaining, such as racial, cultural, age, gender bias that AI systems can perpetuate or amplify. For instance, one paragraph from the AI EU act emphasized that AI recruitment systems may discriminate against certain racial or ethnic groups, women, older individuals or people with disabilities. According to the Intersectionality Theory, context-specific experiences are absolutely crucial in this area, as employment does not only count on culture or gender but more on experience that can not always be assessed easily, necessitating tailored approaches to understand the experiences of marginalized groups that are unique and context-dependent. One connection between policy instruments (regulations) and expected effects of discrimination and privilege can be influenced by the low-risk AI systems that can have a positive and a negative impact. The positive impact analyzed from the papers can lighter regulations and foster innovation which will allow for rapid deployment of AI tech and access to AI tools, meanwhile, the negative impact can be the perpetuation of biases, especially if there can appear critical problems without adequate pre-evaluation. The next one is high-risk AI systems, the positive impact is stricter oversight and testing which can reduce discrimination by ensuring that AI systems are verified for biases before worldwide use. The effects on society will be more equitable outcomes in the areas of hiring, lending and law enforcement. The negative impact is that smaller companies may struggle to meet more strict requirements leading to more power concentration into larger corporations. Given that, it can be assumed that governmental parties are informed about the risks and are willing to change and introduce rules that would make AI systems safer and more reliable.

Another example is "Biometric identification systems" that can produce the same biased results regarding age, gender, color and disabilities. The acts analyzed recognize the potential for AI to reinforce historical patterns of discrimination and create new discriminatory impacts if nothing new is implemented or if the past information is not changed or corrected. Quoting the EU AI Regulation from 2021 (p.26) "Technical inaccuracies of AI systems intended for the remote biometric identification of natural persons can lead to biased results and entail discriminatory effects. This is particularly relevant when it comes to age, ethnicity, sex or disabilities.", this part gives the results that systems can now recognize or make a difference between minority groups and use outdated information, like lower salaries for women and particular benefits to people of a younger age than the older ones. Another aspect inferred from the Intersectionality theory by Kimberlé Crenshaw is the overall characteristics that a person has which make it being discriminated against by AI without realizing, for example someone can be an elderly black woman with some physical disabilities, these different parts add up and interact in ways that can create unique challenges or advantages. The whole society will benefit from providing fair information access and the same assessment methods for everyone not taking into account race or other discrimination ways. To mitigate discrimination risks, the European AI considers diverse and inclusive development teams, including gender balance, to help address biases. Furthermore, the sources highlight intersectional discrimination such as "proctoring software having difficulty recognizing dark-skinned students, impacting both racial and age groups" or also "Amazon's AI recruitment tool

systematically disadvantaged women's resumes, reflecting the gender gap in the workforce and intersecting gender and employment discrimination" (Study on the impact of AI systems, p. 24-25). Reflecting upon that, it can be concluded that AI systems should be checked by humans while making an employment decision and updating the software to be more inclusive, this problem could be affecting the society greatly. From the data collected, another risk-based AI system acknowledged in the EU AI acts shows the potential for AI to exacerbate inequalities and privilege certain groups over others. A key concern mentioned several times is "the use of AI systems to evaluate credit scores or creditworthiness, which can determine access to financial resources and essential services like housing and utilities" (European Parliament, EU AI act 2019-2024, section p.58); this section underlines the risk of AI systems perpetuating socioeconomic inequalities and limiting opportunities for disadvantaged groups.

Another responsibility for the risk-based systems encountered in the AI acts is transparency requirements which can lead to more or less discrimination, First, the positive impacts can be increased transparency which can empower users to make informed decisions, thus challenging AI decisions, besides explainable AI can help identify and mitigate biases that will lead eventually to fairer outcomes. Whereas, the negative impact might be a digital literacy divide where only some users can fully understand and use it for their leverage which will end up creating a new form of privilege. Intersectionality theory helps to make visible some experiences when people might have overlooked some aspects of their identity focusing only on one of them, thus the theory encourages a deeper and more thorough understanding of how various forms of inequality might overlap and affect people. The Regulation EU AI act from 2021 additionally recognized the importance of ensuring equal access to AI technologies, mitigating the digital divide and potential discrimination based on geographical location which can lead to unequal treatment or access to services for all society. The paper "Impact of AI systems" points out the need for AI systems to respect fundamental rights such as human dignity, transparency, and the same access to technology based on the geophysical location, if those will not be respected, the effect of discrimination and privilege will not stop soon.

The following part that will be analyzed is the Digital Divide and its mention in the EU AI acts, from the Results section, there has been a clear interpretation of the outcomes and the influence it has over AI uses. The Digital Divide refers to the unequal distribution of access and usage of digital technologies such as the internet and electronic devices (Ingram, 2021). The most common reason is the location and geopolitical situation, one example of that is "In particular, data sets should take into account, to the extent required by their intended purpose, the features, characteristics or elements that are particular to the specific geographical, contextual, behavioral or functional setting in which the AI system is intended to be used." (European Parliament, EU AI act 2019-2024, section p.67). While holding access to technology is an essential factor, the divide can be increased by the gaps in digital skills and literacy across different demographic groups. As an example, individuals from disadvantaged backgrounds, older people or those with limited educational opportunities may lack the necessary skills to effectively navigate and utilize digital resources (Creation, 2022). As the theory of the Digital Divide points out digital literacy and quality of access, and the AI_and_Education act (p.36) mentions it: ("Take institutional actions to enhance AI literacy across all sectors of society: Provide basic AI education to all citizens, educating them on thinking critically and responsibly about their choices, rights and privileges in the context of AI and its impact on their day-to-day lives"), it can be proven that acts include at some level the explanation and interpretation of the theory. All this will lead to a more informed and equitable society where individuals can make better decisions about AI implications and benefit from its advancement.

The third paper. "Impact of AI systems", indicates the importance of digital transformation and sustainability, likewise integrating new technologies, such as AI and the Internet of Things can contribute to narrowing the gap by providing access to resources and information (Creation, 2022). Given the results in the section above, the interpretation according to the theory used has a very high compatibility, which concludes that the theory is appropriate for the proposed research question. To follow up, the digital divide can be lowered by establishing transparency obligations to ensure explainability of each action and traceability if there is the need, correspondingly to prohibit certain unacceptable AI practices (Cancro, 2016). Given the results, the acts accentuate the seriousness of data governance and management practices that promote transparency about the original purpose of the data collected. In the end, society will be affected positively by knowing the intended use of the gathered data. For instance, the statement "Prevention, transparency and accountability measures should be consolidated by member states in a comprehensive Action Plan on AI and Equality that can inform the broader public of ongoing initiatives and guide concrete stakeholder efforts" (Study on the impact of artificial intelligence systems. p. 84) encourages member states to introduce mechanisms for transparency and to facilitate access to information, particularly for minority groups and protected populations. As the theory highlights, some documents suggest that having access to technology is insufficient if the individuals lack the skills to use it effectively, which makes the divide even bigger, in that case quality and speed can decrease or significantly increase the opportunities. Overall, there is a need for improved digital literacy for a more prosperous society as the effect of its lack will increase inequality, decrease productivity, social exclusion and slow economic growth. Analyzing the results, one of the outcomes is that transparency is a widely seen problem in our days with AI, giving all the information away about how AI works will make more competitors appear on the market and fewer customers willing to use only one system. On the other hand, one of the papers mentions that a small number of international technology companies and countries dominate the development of AI tech, potentially increasing existing unfair treatment and limiting access for marginalized communities and developing countries.

8. Conclusion & Limitations

Conclusion

The analysis of the selected EU AI acts and policy papers have provided valuable insights into the potential risks and opportunities associated with the AI integration of technology focusing on the context of discrimination, privilege, society and the digital divide. The findings highlight the EU's efforts to promote transparency, accountability, fairness and equal access to AI systems for everyone, while at the same time acknowledging the challenges posed by discrimination and privilege.

One of the main conclusions drawn from this research is the recognition of AI's potential to perpetuate and exacerbate existing societal inequalities if not properly regulated and monitored. Analyzing the official papers from the EU focusing

on AI use, regulations and also in the education sector, it can be concluded that most of the risks are included in the papers but there is always much more space to improve the outcomes, therefore, the EU AI Acts are continuously improving and each regulation needs to be updated as the innovation of technology never stops and it has been increasing exponentially in the last few years. As an outcome, the acts emphasize the importance of fundamental rights such as dignity, data privacy, and equal access to technology, regardless of factors like gender, age, or geographical location, The Digital Divide and Intersectionality theories have been proven valuable for understanding how various forms of inequality can overlap and create challenges for marginalized groups. All of the selected acts have reasonable amounts of information for this paper to be reliable as they accentuate the need for comprehensive action plans to inform the broader public about ongoing changes and improvements in AI systems. From the acts/documents about AI and Education and the results of its analysis, it can be concluded that without effective policy interventions, the usage of AI in sectors like education may boost existing learning inequalities, further widening the digital divide and limiting opportunities for marginalized communities and developing countries. While the analyzed EU Acts and policy papers acknowledge the potential risks and opportunities, the results have shown that there is a need for continuous monitoring, evaluation and adaptation of these policies frequently as the innovation in the last years has raised noticeably. Withal, the findings of this research indicate that European Union legislation effectively addresses issues related to AI integration. For this specific territory (EU territory), the information found is generally reliable, however, there is a necessity for greater details and more frequent updates to ensure that emerging problems and innovations requiring regulation are adequately covered.

Limitations

The scope of analysis can be a visible problem. While the research is focused on EU AI policy papers, it does not talk individually about each member state, nonetheless there is a paper focusing on The Netherlands, there could still appear discrepancies between other countries' national laws. Rapidly evolving technology may expose the findings of this research to becoming outdated as new technologies emerge and accordingly new policies and rules appear. Continuous monitoring and updating of the analysis will be necessary to ensure its relevance and applicability. Availability of data can be a limitation as the researcher did not have access to some private and confidential information besides the official documents available publicly. Nevertheless, there may be additional internal policies and guidelines that were not accessible potentially limiting the comprehensiveness of the analysis. As well, there should be mentioned theoretical limitations, as this research was primarily using only two big theories, other theoretical perspectives or models may offer additional insights or alternative interpretations. One problem can be generalizing, as the research focused specifically on the EU context and the findings may not be directly applicable or generalizable to other regions or countries that have different socio-economic and cultural environments. Another limitation could be the research's biased interpretation, as this paper was written by one person and the context analysis was conducted in an objective manner, the conclusions might be biased as only one person selected specific documents to be taken into account for analysis. Besides, for this research different keywords could have been selected that would have changed the whole outcome. On top of that, the way of estimating results might have been different, as context analysis was just one way of assessing the observations of the policy acts.

9. References:

1. Afzal, A., Khan, S., Daud, S., Ahmad, Z., & Butt, A. (2023). Addressing the Digital Divide: Access and Use of Technology in Education. Journal of Social Sciences Review, 3(2), 883–895. https://doi.org/10.54183/jssr.v3i2.326
2. AI and Education: Guidance for Policy-Makers. (2024, June 4). GCED Clearinghouse. https://gcedclearinghouse.org/resources/ai-and-education-guidance-policy-makers
3. Amnesty International/Access Now (2018), "The Toronto declaration: protecting the rights to equality and non-discrimination in machine learning systems", available at: www.accessnow.org/cms/assets/uploads/2018/08/The-Toronto-Declaration_ENG_08-2018.pdf
4. Boettger R. K and Palmer L. A, "Quantitative Content Analysis: Its Use in Technical Communication," in IEEE Transactions on Professional Communication, vol. 53, no. 4, pp. 346-357, Dec. 2010, doi: 10.1109/TPC.2010.2077450
5. Cancro, P. (2016). The Dark(ish) Side of Digitization: Information Equity and the Digital Divide. ˜the œSerials Librarian/˜the œSerials Librarian, 71(1), 57–62. https://doi.org/10.1080/0361526x.2016.1157424
6. Castells, M. (2010). The Rise of the Network Society: The Information Age: Economy, Society, and Culture. Wiley-Blackwell.
7. Creation, S. (2022, January 5). Digital Literacy: Post Covid Urgency - Samsara Creation - Medium.https://creationsamsara.medium.com/digital-literacy-post-covid-urgency-da3166bdd 6c0
8. Crenshaw, K. (1991). Mapping the Margins: Intersectionality, Identity Politics, and Violence against Women of Color. Stanford Law Review, 43(6), 1241–1299. https://doi.org/10.2307/1229039
9. Cukurova, M., Miao, X., & Brooker, R. (2023, April 3). Adoption of Artificial Intelligence in schools: Unveiling factors influencing teachers engagement. arXiv.org. https://arxiv.org/abs/2304.00903
10. Debreceny, RS (2013), Research on IT governance, risk, and value: Challenges and opportunities. Journal of Information Systems. 2013;27(1):129–135. doi: 10.2308/isys-10339.
11. Dewan, S. and Frederick, J.R. (2005), "The digital divide: current and future research directions", Journal of the Association for Information Systems, Vol. 6 No. 12, pp. 298-336.
12. Di Francescomarino, C. and Maggi, F.M. (2020), "Preface to the Special Issue on Artificial Intelligence for Business Process Management 2018", Journal on Data Semantics, doi: 10.1007/s13740-020-00111-w.
13. Elliott, V. (2018). Thinking about the Coding Process in Qualitative Data Analysis. The Qualitative Report, 23(11), 2850-2861. https://doi.org/10.46743/2160-3715/2018.3560
14. Ethics guidelines for trustworthy AI. (2019, April 8). Shaping Europe's Digital Future. https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai

15. European Parliament P9_TA(2024)0138 Artificial Intelligence Act European Parliament Legislative Resolution of 13 March 2024 on the Proposal for a Regulation of the European Parliament and of the Council on Laying down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts (COM(2021)0206 -C9-0146/2021 -2021/0106(COD)) (Ordinary Legislative Procedure: First Reading). 2019.
16. Floridi, L., & Cowls, J. (2019). A Unified Framework of Five Principles for AI in Society. Harvard Data Science Review, 1(1).
17. Gao, J., & Wang, D. (2023, April 17). Quantifying the Benefit of Artificial Intelligence for Scientific Research. arXiv.org. https://arxiv.org/abs/2304.10578
18. Gillani, N., Eynon, R., Chiabaut, C., & Finkel, K. (2022, December 31). Unpacking the “Black box” of AI in education. arXiv.org. https://arxiv.org/abs/2301.01602
19. Gurrib, F. K. &. D. S. C. &. I. (2023). New era of Artificial intelligence in Education: Towards a sustainable Multifaceted Revolution. ideas.repec.org. https://ideas.repec.org/a/gam/jsusta/v15y2023i16p12451-d1218419.html
20. Ingram, G. (2021, June 2). Bridging the global digital divide: A platform to advance digital development in low- and middle-income countries. Brookings. https://www.brookings.edu/articles/bridging-the-global-digital-divide-a-platform-to-advance-digital-development-in-low-and-middle-income-countries/
21. Jesson, J., & Lacey, F. (2006). How to do (or not to do) a critical literature review. Pharmacy Education, 6(2), 139–148
22. Jogie, M.R. (2021), "Critical Race Theory and Higher Education Research: In the Shadow of Bricolage", Huisman, J. and Tight, M. (Ed.) Theory and Method in Higher Education Research (Theory and Method in Higher Education Research, Vol. 7), Emerald Publishing Limited, Leeds, pp. 21-37. https://doi.org/10.1108/S2056-375220210000007002
23. Kleinheksel, A., Rockich-Winston, N., Tawfik, H., & Wyatt, T. R. (2020). Demystifying Content Analysis. American Journal of Pharmaceutical Education, 84(1), 7113. https://doi.org/10.5688/ajpe7113
24. Krippendorff, K. (2004). Content analysis: An introduction to its methodology. Thousand Oaks, CA: Sage
25. Kuckartz, U. (2019). Qualitative Text Analysis: A Systematic Approach. In ICME-13 monographs (pp. 181–197). https://doi.org/10.1007/978-3-030-15636-7_8
26. Lee, J., Davari, H., Singh, J. and Pandhare, V. (2018), “Industrial Artificial Intelligence for industry 4.0-based manufacturing systems”, Manufacturing Letters, Vol. 18, pp. 20-23.
27. Lockyer, L., Heathcote, E., & Dawson, S. (2013). Informing pedagogical action: Aligning learning analytics with learning design. American Behavioral Scientist, 57(10), 1439-1459.
28. Lynch, M. (2019). The Hidden Costs of Automated Thinking. Communications of the ACM, 62(11), 24-26.
29. Mabuza, L. H., Govender, I., Ogunbanjo, G. A., & Mash, B. (2014). African Primary Care Research: Qualitative data analysis and writing results. African Journal of Primary Health Care & Family Medicine, 6(1). https://doi.org/10.4102/phcfm.v6i1.640
30. McClean, C., & Surani, A. (2023, November 30). AI is deepening the digital divide. https://www.informationweek.com/machine-learning-ai/ai-is-deepening-the-digital-divide#clo se-modal
31. Naughtin, C., & Bentley, S. V. (2024). The ‘digital divide’ is already hurting people’s quality of life. Will AI make it better or worse? The Conversation. https://theconversation.com/the-digital-divide-is-already-hurting-peoples-quality-of-life-will-ai-make-it-better-or-worse-222987
32. Neuendorf, K. (2017). The content analysis guidebook. SAGE Publications, Inc, https://doi.org/10.4135/9781071802878
33. Novelli, C., Casolari, F., Rotolo, A., Taddeo, M., & Floridi, L. (2023). Taking AI risks seriously: a new assessment model for the AI Act. AI & SOCIETY, 1-5.
34. Ojha, S., Narendra, A., Mohapatra, S., & Misra, I. (2023, January 11). From Robots to Books: An Introduction to Smart Applications of AI in Education (AIED). arXiv.org. https://arxiv.org/abs/2301.10026
35. O’Neil, C. (2016), Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy, Crown Publishers.
36. Pick, J.B. and Nishida, T. (2015), “Digital divides in the world and its regions: a spatial and multivariate analysis of technological utilization”, Technological Forecasting and Social Change, Vol. 91, pp. 1-17.
37. Pwc (2019), “Sizing the prize: exploiting the AI Revolution, What's the real value of AI for your business and how can you capitalise?”, PwC's Global Artificial Intelligence Study, available:https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html
38. REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL. (2021). European Commission. Retrieved May 30, 2024, from https://eur-lex.europa.eu/resource.html?uri=cellar:e0649735-a372-11eb-9585-01aa75ed71a1.0001.02/DOC_1&format=PDF
39. Ryan, M., & Stahl, B. C. (2020). Artificial intelligence ethics guidelines for developers and users: clarifying their content and normative implications. Journal of Information, Communication and Ethics in Society, 19(1), 61-86. https://www.emerald.com/insight/content/doi/10.1108/JICES-12-2019-0138/full/html
40. Siemens, G., & Gasevic, D. (2017). Personalized learning: Enabling student voice and choice through technology. EDUCAUSE Review.
41. Sikdar, S. (2018), “Artificial intelligence, its impact on innovation, and the Google effect”, Clean Technologies and Environmental Policy, Vol. 20 No. 1, pp. 1-2, doi: 10.1007/s10098-017-1478-y.
42. Smuha, N. A. (2021). Beyond the individual: governing AI’s societal harm. Internet Policy Review, 10(3).
43. Study on the impact of artificial intelligence systems, their potential for promoting equality, including gender equality, and the risks they may cause in relation to non-discrimination. (n.d.). Council of Europe Publishing. https://edoc.coe.int/en/artificial-intelligence/11649-stu

dy-on-the-impact-of-artificial-intelligence-systems-their-potential-for-promoting-equality-including-gender-equality-and-the-risks-they-may-cause-in-relation-to-non-discrimination.html
44. Sutton, J., & Austin, Z. (2015). Qualitative research: data collection, analysis, and management. Canadian Journal of Hospital Pharmacy/¯the œCanadian Journal of Hospital Pharmacy, 68(3). https://doi.org/10.4212/cjhp.v68i3.1456
45. Van den Broek, E., Sergeeva, A., & Huysman, M. (2021). When the machine meets the expert: an ethnography of developing AI for hiring. MIS Quarterly, 45(3), 1557–1580. 10.25300/misq/2021/16559.
46. White, M.D., & Marsh, E.E. (2006). Content Analysis: A Flexible Methodology. Library Trends 55(1), 22-45. https://doi.org/10.1353/lib.2006.0053.
47. Willems, J. (n.d.). The Netherlands ARTIFICIAL INTELLIGENCE. Legal500. https://www.legal500.com/guides/chapter/the-netherlands-artificial-intelligence/?export-pdf#:~:text=There%20are%20currently%20no%20laws,economic%20opportunities%20offered%20by%20AI
48. Zhang, W. (2014). Ten simple rules for writing research papers. PLOS Computational Biology/PLoS Computational Biology, 10(1), e1003453. https://doi.org/10.1371/journal.pcbi.1003453
49. Zuiderveen Borgesius, F. J. (2018). Discrimination, artificial intelligence, and algorithmic decision making [Study]. Council of Europe, Directorate General of Democracy. https://rm.coe.int/discrimination-artificial-intelligence-and-algorithmic-decision-making/1680 925d73

10. Appendix

Appendix A

Subject	Keywords	Examples
Discrimination	Racial bias	
	Gender bias	
	Cultural discrimination	
	Age discrimination	
	Unfair treatment	
Privilege	Inequality of resources	
	Access to technology	
	Geophysical location	
Digital Divide	Technology integration	
	Transparency	
Societal risks	Society	
	Risks society	
	Opportunities	
	Data privacy/security	

Appendix B

List of relevant keywords

1. EU AI policy
2. Societal risks
3. Opportunities
4. Discrimination
5. Privilege
6. Educational system
7. Societal Norms
8. Adaptation
9. Interdisciplinary
10. Digital Divide
11. Intersectionality
12. Technology integration
13. Transparency
14. Racial bias
15. Gender bias
16. Cultural discrimination
17. Age discrimination
18. Geophysical location
19. Unfair treatment
20. Inequality of resources
21. Access to technology
22. Data privacy/security

Appendix C

Excel sheets cited in the Reference section

Coding scheme final.ods

Sheet 1 - Artificial Intelligence Act (European Parliament 2019-2024)

Sheet 2 - Regulation of the European Parliament and of the Council

Sheet 3 - Study on the impact of artificial intelligence systems, their potential for promoting equality, including gender equality, and the risks they may cause in relation to non-discrimination

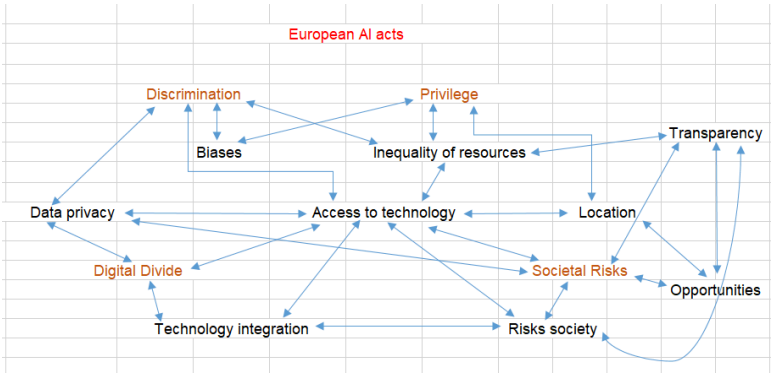
Sheet 4 - AI and Education: Guidance for Policy-Makers.

Sheet 5 - The Netherlands ARTIFICIAL INTELLIGENCE.

Sheet 6 - Table results/ data structure

Appendix D

Table of the interconnection between key notions considered in this paper



Appendix E

Table of results from the articles considered

	Keywords	Article	Article 2	Article 3	Article 4	Article 5
Discrimination	Racial bias	X	X	X	X	(general discrimination)
	Gender bias	X	X	X	X	
	Cultural discrimination	X	X	X	X	X
	Age discrimination	X	X		X	
	Unfair treatment	X	X	X	X	
Privilledge	Inequality of resources	X	X	X	X	
	Access to technology	X		X	X	X
	Geophysical location	X	X			
Digital/Divid	Technology integration	X	X	X	X	X
	Transparency	X	X	X	X	X
	Digital Divide				X	
Society	Society	X	X	X	X	X
	Risks society	X	X	X	X	X
	Opportunities	X	X	X	X	X
	Data privacy/security	X	X	X	X	X

Appendix F

Table of criteria used to select and exclude the chosen papers

Table for selecting the acts		
Criteria	Inclusion	Exclusion
Relevance to AI	The act explicitly mentions AI technologies, their use, development, or regulation.	The act does not specifically mention AI or its applications.
Focus on Discrimination	The act includes measures or guidelines to prevent AI-driven discrimination or bias.	The act does not address issues of discrimination or bias related to AI.
Focus on Priviledge	The act discusses at some level the potential for AI to create social privileges.	The act does not consider that much impact of AI on social or economic privilege. If it does not explain it extensively, then it will not be analyzed
Risk Assessment	The act includes information for assessing risks associated with AI deployment (e.g., privacy, security, ethical risks) whicn can help draw conclusions.	The act lacks any mention of risk assessment or guidelines specific to AI. Or it has too less information about the subject.
Opportunities	The act highlights the potential benefits and opportunities AI can bring to society, or it can be formed conclusion from similar keywords used in the paper.	The act does not discuss the opportunities or positive impacts of AI. If some conclusions can be made but there is no reliable backgroud reference then the document will not be
Digital Divide	The act includes measures to address the digital divide, ensuring equitable access to AI technologies and digital resources. Used only if it has reliable citations and	It is not mandatory for the act to include this subject as it is not spoken about a lot, thus some papers will be accepted without having DD. The act does not consider the DD mention.
Ethical and Legal Guidelines	The act provides clear legal and ethical guidelines for the development and use of AI, including human rights	The act lacks detailed legal and ethical guidelines related to AI.
Official provenience	Only used if it has proper citations, official authors, date, place and public access.	If there is not a proof of its provenience, not citated, no author, the paper will not be used
The dimensions (page numbers, authors, subject included)	If the paper includes more than 3 of the necesasry crtieria it will be used for the reseach.	If the act includes only 1 or 2 of the subjects, it will not be used as it is necessary to look at more criterias to form conclusions.