

How Algorithm Designers Relate Algorithmic Transparency and Opacity.

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ABSTRACT,

Algorithm designers have to make decisions regarding which information to disclose and which information to withhold. Algorithmic transparency and the lack thereof is crucial to understanding the decision-making process of algorithms. This is particularly important for online labour platforms where algorithms play an integral role. This paper explores the ways in which the people who design the algorithms balance algorithmic transparency and opacity through the different stages of the algorithmic decision-making process; input, processing or transformation and output. It explores who ultimately makes these decisions, the designers, management or other stakeholders and the reasons why.

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Keywords

Algorithmic transparency, opacity, online labour platforms, algorithms, designers

1. INTRODUCTION

This thesis is about decisions that software designers make regarding the transparency and opacity of algorithms.

Online or digital labour platforms are defined as “digital networks that use technology, such as software algorithms and data analytics, to connect workers with clients, manage work assignments and transactions, and monitor work performance” (EU Science Hub, 2023). The workers who utilise these platforms, often referred to as freelance workers, are bound by these inner workings or algorithms. These algorithms at the heart of said platforms play the role of algorithm management defined as “large-scale collection and use of data on a platform to develop and improve learning algorithms that carry out coordination and control functions traditionally performed by managers” (Möhlmann, Zalmanson, Henfridsson, & Gregory, 2021, p. 3).

This topic is relevant because the adoption of machine learning is becoming more and more commonplace particularly as it facilitates online labour platforms. As algorithms are continuing to be tasked with making key decisions, it is imperative to understand the people behind them and the decisions they make to better critique, assess and subsequently improve them.

Algorithmic transparency is defined as “the disclosure of information about algorithms to enable monitoring, checking, criticism or intervention by interested parties” (Diakopoulos & Koliska 2017) as cited in (Bitzer, Wiener, & W Alec, 2023, p. 5). This information could include data as input, software code as transformation and output as the decision made by the algorithm (Bitzer, Wiener, & W Alec, 2023). In essence, it entails that “the factors that influence the decision of an algorithmic system should be visible to the people employing or affected by the outcomes of the algorithmic system” (Diakopoulos & Koliska 2017) as cited in (Kossow, Windwehr, & Jenkins, 2021, p. 10). Algorithmic transparency can occur in different forms at varying points in the algorithm decision-making process, this study will focus primarily on the design and developmental stages where, for instance, measures intended to ensure quality are instilled (Felzmann, Fosch-Villaronga, Lutz, & Tamò Larrioux, 2020).

Algorithmic opacity can be approached as technical, the focus here, “rooted in the specific material features and design of emerging algorithmic systems” as well as organizational. This entails “how algorithms may reinforce the opacity of broader organizational choices” (Jarrahi, Newlands, Lee, Kinder, & Sutherland, 2021, p. 8).

As a part of the control role played by algorithms on online labour platforms, the platforms may limit the information available to the freelance worker. Thus, the question of transparency and opacity can be examined from the point of viewpoint of freelance workers. If the algorithm is designed

in a way that offers too much transparency, then there is a potential for manipulation by the end users – freelance workers, often referred to as gaming (Wang, Huang, Jasin, & Singh, 2020).

As designers design with the user in mind, they often grapple with the opacity that algorithms by nature necessitate (Casey, Farhangi, & Vogl, 2019). Additionally, these online platforms are, like any business, trying to make a profit. If the algorithm is too opaque, then the freelance workers might be put off due to the overly secretive nature of the design. Their ability to understand and therefore adequately engage with the platform is jeopardized. On the other hand, an algorithm that is too transparent could divulge otherwise sensitive information, and compromise efforts to actively protect the underlying models that the algorithms are based on; as a “trade secret” and integral part of their business model (Wang, Huang, Jasin, & Singh, 2020). In addition to the non-disclosure of the software code, which data is being collected, how data is being processed as well as how the output is being translated into a decision and which decisions are being made form part of the aforementioned organizational decision-making with regards to opacity.

When it comes to either gaming or earning a profit, freelance workers sometimes face uncertainty regarding the inner workings of their corresponding platform. This relates to transparency, where the freelance worker does not understand how important decisions such as those to do with matching and compensation are made. Which aspects of the algorithm decision-making process to make transparent through disclosure and which to make opaque through non-disclosure gives rise to tensions between transparency and opacity. Studies including (Möhlmann, Zalmanson, Henfridsson, & Gregory, 2021) have been done on the effects of transparency and opacity of algorithms from the perspective of freelance workers, but to find out the origins of the transparency and opacity tug-of-war we have to look at the designers.

A balance is necessary because as online labour platforms expand, so do the questions surrounding their inner workings (Park & Ryoo, 2023). The goal of this research is to identify the balance that algorithm designers have to strike in an attempt to provide the much-needed and sometimes neglected transparency within their designs. Particularly, in the case of online labour platforms and the freelance workers they facilitate. In doing so, with a study of how algorithm designers make the decisions they do, answer the question;

In what ways do algorithm designers strike a balance between transparency and opacity?

2. THEORETICAL FRAMEWORK

The main theories explored will focus on algorithmic transparency in the design and developmental stages, as well as algorithmic opacity and potential for gaming.

Online labour platforms employ algorithms to perform roles such as monitoring and controlling freelance workers (Möhlmann, Zalmanson, Henfridsson, & Gregory, 2021). As algorithms become more ingrained in the online labour platform field, their complex nature and subsequent lack of understanding from the end user, in this case, freelance worker, continues to give rise to questions regarding transparency. “Workers, though, who are faced with algorithmic management processes within their workplace, as of now have little recourse to detect, comprehensibly understand or work around desirable outcomes,” (Jarrahi, Newlands, Lee, Kinder, & Sutherland, 2021, p. 10). On one side are the companies that guard their proprietary algorithms as trade secrets and the designers of the algorithms, and on the other are freelance workers seeking to better understand the reasoning behind decisions that greatly impact their lives (Wang, Huang, Jasin, & Singh, 2020).

Laws and regulations such as the European Union’s General Data Protection Regulation (GDPR) have sprung up to aid in the quest for explainability (Wang et al., 2022). The “right to explanation” dictates that in the process of automated decision-making that involves personal data, the organization, in this case, the online labour platform is obligated to provide transparency. This is done in an attempt to make the decision-making process more visible to stakeholders such as freelance workers and increase accountability of the output of the algorithm (Casey, Farhangi, & Vogl, 2019). “Discussions surrounding algorithmic accountability frequently refer to the transparency of algorithms, how organizations practically engage with opaque algorithms, and how to develop a sense of trustworthiness among organizational stakeholders,” (Buhmann, Paßmann, & Fieseler, 2020) as cited in (Jarrahi, Newlands, Lee, Kinder, & Sutherland, 2021).

There are arguments on both sides as to whether algorithm designers should increase the transparency of their algorithms as well as whether the online labour platforms should be more forthcoming with how the algorithm works.

Several papers (Felzmann, Fosch-Villaronga, Lutz, & Tamò Larrieux, 2020), provide transparency frameworks and principles for algorithm design. Transparency processes occur in stages; the design of AI systems, information on data processing and analysis, and accountability. The first stage is where the three principles in the algorithm development phase are outlined, namely; proactivity of including transparency from the outset of the design process, integration of transparency in the decision-making processes and audience focus relating to in this case the freelance

workers at the receiving end of the algorithmic output (Felzmann, Fosch-Villaronga, Lutz, & Tamò Larrieux, 2020).

Transparency can also be viewed from two ends of a spectrum, as an action or as a perception. Action refers to providing information about an algorithm to users and interested parties while conversely, perception refers to the information received about an algorithm and how this information is observed by the aforementioned (Bitzer, Wiener, & W Alec, 2023). As this study focuses on the algorithm designers and their decisions, transparency as an action will be used to support the quest to determine the transparency-opacity balance.

Where do the algorithm designers draw the line? At what point do they decide that the level of transparency applied is sufficient, for the proper functioning of the online labour platform?

Algorithmic transparency is often observed along opacity, with their relationship sometimes viewed as a push and pull, and can be regarded as different sides of the same coin. In this study, a lack of transparency can be viewed as opacity. More transparency, however, does not always equal less opacity, as it depends on the type of opacity in question. Algorithmic opacity from a technical perspective could be examined as an intentional as well as unintentional design element adopted by the algorithm designers. The unintentional aspect is the “black-box” nature of machine-learning-reliant algorithms and how their inner working and outputs are not always explainable to humans. The intentional aspect is the online labour platform withholding information that could affect their competitive advantage and profit-making capacity (Kossow, Windwehr, & Jenkins, 2021). Additionally, it could relate to the perception of transparency as depending on the ‘observer or recipient’ of the transparency. The designers could make visible or transparent certain aspects of the algorithmic decision-making process like the training data used as input; however, the freelance worker may not be able to interpret it. It is transparent from the designers’ perspective but not from the end users’ (freelance workers’) point of view if they are unable to comprehend and interpret it (Bitzer, Wiener, & W Alec, 2023).

Algorithmic opacity can also serve another purpose. One of the consequences of opacity, particularly on online labour platforms is the presence of information asymmetry between the freelance workers and the designers of the algorithm. Evidence of the transparency-opacity tensions. This benefits the online labour platform by preventing freelance workers from being able to unionize (Jarrahi, Newlands, Lee, Kinder, & Sutherland, 2021). As a result, the freelance workers sometimes retaliate by gaming or corrupting the algorithm in their favour as previously mentioned (Kossow, Windwehr, & Jenkins, 2021). Goodhart’s Law “when a

measure becomes a target, it ceases to be a good measure” (Goodhart, 1989) as cited in (Wang, Huang, Jasin, & Singh, 2020, p. 3) can be used to argue for opacity, citing that more transparency increases the likelihood of the algorithm being corrupted.

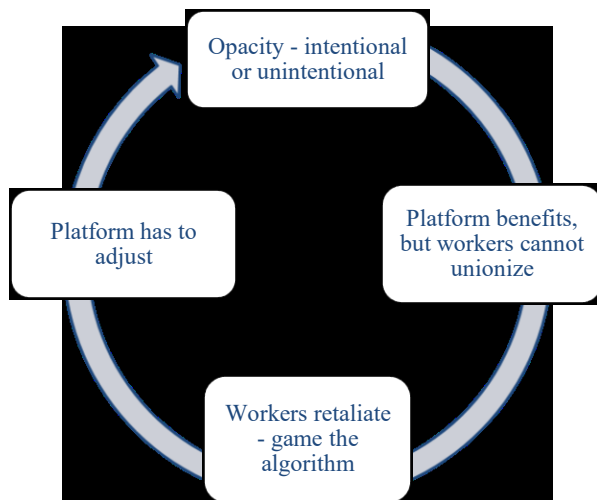


Figure 1. Opacity effect cycle

The tensions between opacity and transparency, therefore, revolve around too much transparency (too little opacity) having the consequence of giving away competitive advantage by disclosing the inner workings of the algorithmic decision-making process as well as potential gaming by users. The consequence of gaming by users is illustrated in Figure 1. Additionally, too little transparency (too much opacity) has the consequence of potential gaming from users.

The literature suggests a relationship between transparency and opacity, discussing overcoming opacity by increasing transparency but noting that “transparency still needs the active engagement of workers to uncover the information...algorithmic opacity is not overcome without struggle, effort and risk,” (Jarrahi, Newlands, Lee, Kinder, & Sutherland, 2021, p. 9). It is in examining this relationship, that the notion of algorithm designers striking a balance originates.

Which decisions do algorithm designers make when drawing the line between opacity that benefits the online labour platform and opacity that has detrimental effects on the bottom line? At what point do they decide that the level of opacity applied is sufficient, for the proper functioning of the online labour platform?

The practical relevance of this study lies in the notion that one of the purposes that algorithmic transparency serves is that of holding the online labour platform and subsequently the algorithm designers accountable for the algorithms’

output or result (Kossow, Windwehr, & Jenkins, 2021). (Bitzer, Wiener, & W Alec, 2023) specifies that algorithmic transparency is the disclosing of information about algorithms along three phases, namely, input data, data processing and output/decision-making. By detailing the ways transparency and opacity are adopted and the balance struck in each phase, this study aims to add to the research that explores the particular role algorithm designers play. The academic relevance is the specific exploration of the decisions that algorithm designers make as it pertains to online labour platforms.

3. METHODOLOGY

3.1 Design and Data Collection

The research question this study aims to answer is in what ways algorithm designers strike a balance between transparency and opacity. To ascertain this, information regarding the decision-making processes of algorithm designers has to be collected. This requires adopting a qualitative research

method, namely interviews with the algorithm designers. The designers will be the respondents of the interview. The interviews will aim to collect information regarding the adoption of transparency frameworks and principles, the adoption of the GDPR’s “right to explanation”, technical opacity from an intentional standpoint and how all these factors relate with each other to arrive at a balance. Additionally, the interviews will allow information to be collected and will ascertain who makes the decision regarding the transparency-opacity balance, the algorithm designers themselves, their managers or other stakeholders.

The company chosen for the interview is Matching Company X, which is not an online labour platform, however, it does the fundamental job of matching supply and demand for labour. This company matches vacancies with job seekers, or candidates operating in the Human Resource domain and adopting a B2B model. It is free to use for job-seeking candidates and charged to recruiters. This includes companies that want to find the right position for their current employees within their own company or have vacancies they would rather fill internally via an internal marketplace. Additionally, Matching Company X creates matching systems for companies and workflow systems after the matching has occurred. The interviewees were the Research Director and the AI engineer who focuses on models, data architecture and algorithm design. Being proficient in machine learning and software engineering, the two interviewees could offer insight into the field of algorithm design as well as how transparency and opacity are adopted on their platform.

The following interview guideline contains questions relating to transparency and opacity as well as more general questions to gather foundational information about the company.

Theoretical Concept	Definition	Relevant Question
Algorithmic transparency (as the opposite of opacity)	Disclosure of information about algorithms (i.e. data, software code and output/decision-making) to enable monitoring, checking, criticism or intervention by interested parties (Bitzer, Wiener, & W Alec, 2023).	<ol style="list-style-type: none"> 1. How do you define algorithmic transparency? 2. Which information about these algorithms do you disclose and with whom? Why? In what way? Who decides on this? 3. Which information about these algorithms do you not disclose? Why? Who decides on this? Is this intentional? <p>Follow-up questions:</p> <ul style="list-style-type: none"> • Which information about the data that is used as input into the algorithm(s) do you (not) disclose and with whom? Why? In what way? • Which information about the logic and modelling of how the algorithm(s) transforms data into output/decisions do you (not) disclose and with whom? Why? In what way? • Which information about the decisions informed by these algorithms is (not) disclosed and with whom? Why? In what way? • How do you ensure that your algorithm design is adhering to the GDPR's "right to explanation" provision?
Tensions	Contradictions between opacity and transparency	<ol style="list-style-type: none"> 1. In what cases do you need to strike a balance between sharing and not sharing information about the algorithm(s)? Why? Examples? What happens if you do not strike a balance? 2. In what ways do you (attempt) to achieve this balance? 3. In what cases does sharing or not sharing information about algorithms have downsides/unwanted consequences? 4. In what way do you (attempt) to limit these downsides? <p>Follow-up question:</p> <ul style="list-style-type: none"> • In what ways do you design the algorithm to discourage or avoid gaming by users?

Table 1. Interview Questions

Interview Guideline

- Greetings
- Request permission to record
- Introduction/background
- Who are the users of your platform?
- What industry does your organization operate in?
- What is the business model? What is the value proposition/service that your platform offers (to these users)? In what way does your organization generate revenue?
- What is the size of your organization in terms of employees and revenue?
- What is your educational background and what is your prior job experience?
- How long have been working at the organization?
- What are your main tasks and responsibilities?
- In your work as a [software developer, designer, or manager of a team of designers], what can you decide on yourself and what is being decided for you?
- What other individuals within and outside the organization do you work together with / do you depend on?
- For which main decisions or features of your platform are algorithms used?

3.2 Data Analysis

The analysis of the data collected from the interview was done using a coding system. Firstly, through deductive coding, the transparency phase metrics, i.e. input data, software code/data processing and output/decision-making were used as codes for the interview transcript. Secondly, through inductive coding, after a thorough review of the transcript, additional codes were identified as pertaining to a lack of transparency or opacity, namely; the particular software code used during the data processing phase, the understandability of the output it produced and the proprietary nature of the algorithm itself.

3.3 Findings

When it comes to striking a balance between transparency and opacity, algorithm designers can be said to consider six aspects, namely; the input data, the software code, the data processing, the output/decision, understandability and the proprietary facets of the entire design process. Transparency was defined along the lines of providing clarity about the general outcome, ensuring it is understandable and explainable:

“It’s basically openness and clarity of the algorithms enabling stakeholders to understand how they are working, the reason behind what they are doing and why it is showing

such results...stakeholders being the research team, product owners, product managers, our companies, recruiters and other users.” AI Engineer

As previously mentioned, opacity was taken as the opposite, meaning a lack of transparency.

3.3.1 How the Matching of Matching Company X Works

For Matching Company X, the input data mainly consists of the characteristics; skills, work experience, ambition and preferences put into the candidate’s profiles which are then used to train the model. Additionally, the candidate can select which aspect they value more if it is skills or work experience or ambition. They are also presented with a pool of skills from which they can select the most applicable:

“Suggestions for when a user is filling in this profile...we do that to make it easier for the user to complete this profile. So you could say that there is a decision process on and showing what skills we offer to the user” Research Director.

The output given by the algorithms adopted by Matching Company X is suitable recommendations for the users (recruiter and candidate) as well as skills suggestions that the candidate can include in their profile. When a match is made i.e. a recommendation, there is a score attached:

“...translated to the score, but at least you can get an overview of what information was important to make a match and what we find very important...” Research Director.

The algorithms involved in Matching Company X are focused on natural programming language which is used to match the candidate’s profile to the vacancy, provide suggestions to the candidate based on their profile as well as provide an opportunity for offering feedback to the platform. Once the candidate has filled in their profile, the aim is to parse as many features from it as possible. An important aspect of data processing is the creation of a digital twin for the profiles and the vacancies. This is done to normalize the language used by both parties, for example, the same skill might be described differently by either the candidate or the recruiter. A knowledge structure referred to as a taxonomy, which contains all the jobs/vacancies in the database and all the skills, is used to do this as well as match the profiles to the vacancies based on the aforementioned characteristics:

“And then we map it onto our knowledge structure, which we have a taxonomy of all the jobs, for example, that we know all the skills that we know and we use that as a basis for our matching” Research Director.

They also use additional codes to train the model. In the initial stages of data processing, a separate algorithm removes personal information such as gender, age, race, ethnicity etc. to make the focus the skills and experience etc.:

“But most of the models I’ve built so far, we follow this, we remove all the personal information name, gender, date of birth, email, phone numbers, anything which reflects their national identity” AI Engineer.

The specific calculations made to get the best reflection of the candidate are not shown on the platform. They are hidden, for two main reasons. Firstly, the matching taxonomy is a proprietary structure created by Matching Company X i.e. their intellectual property that they would like to keep exclusive to their platform:

“...our intellectual property which is for example the taxonomy we don’t share that publicly because we spent years to build that structure” Research Director.

Secondly is the understandability of the calculations which are very technical and clearer to people with an AI engineering background than to the average user of the platform. Additionally, said calculations would serve to clutter the platform interface without providing any helpful information to the user:

“Basically, the algorithm, we don’t want to clutter our platform interface, which also has to be taken care of. So if we start showing the algorithms, and even in the shadowing, then still, they won’t be able to understand because most of the things which we can’t show, because it’s more proprietary to the company” AI Engineer.

These decisions regarding transparency and opacity, that is, which information to disclose and which not to, are not made by the algorithm designers / AI engineers themselves but rather by the managers of the teams:

“It is decided in a discussion with the rest of the management team, so the CEO and CFO...in general it’s more management than the designers themselves” Research Director.

3.3.2 Transparency-Opacity Balance

According to the literature (Bitzer, Wiener, & W Alec, 2023), algorithmic transparency is defined as the disclosing of information about algorithms (i.e. data, software code/data processing and output/decision-making) to enable interested parties to monitor, check, criticise or intervene. I can therefore examine the application or adoption of transparency from each specific aspect of this definition; monitoring, checking, criticism and intervention. Furthermore, the results provide evidence of the balance

between transparency and opacity by showing that for each of the aforementioned aspects, decisions are made regarding both.

Beginning with the input data, the profiles as well as the accompanying skills, work experience, ambition and preferences are visible. The candidates select the skills themselves, it is not done for them. The conscious decision to keep the human in the loop by suggesting skills and then letting them pick rather than picking skills for them based on their work experience is one of the ways transparency is adopted. Additionally, which facet of the profile the match is based on is made visible. Keeping track of whether the skills suggestions were taken or ignored is a way to monitor and check for algorithmic transparency as per the definition. This user feedback is to improve the model for all users, making the algorithm subject to criticism and intervention.

For the input data as well as the other phases, deliberate efforts are made to incorporate transparency by ensuring the matches are based solely on the skills, work experience, ambition and preferences in the profile. However, some aspects are kept opaque for various reasons. Here we see the first attempt at striking a balance between transparency and opacity. The gender, age, race, religion, optional profile picture and other contact details are stripped and subsequently not visible to recruiters.

This is in line with the aforementioned goal of making the recruiting process more transparent, beginning in the first phase which is the input data.

Secondly, the output/decision given by the algorithm. Here transparency is visible by the way the match between the candidate and vacancy is displayed. The specific characteristics that were used to make a particular match included scores for specific categories (e.g. skills) as well as which character influenced the scores and in which way. They are also working to include sub-scores for each characteristic. The role of transparency here is to provide information that makes sense to the recipient; candidate or recruiter. Additionally, this transparency prevents recruiters from making decisions that are not based on the CV information. This makes it clear why a specific candidate was chosen (reducing the chances of bias and discrimination). It also serves as a deterrent for gaming which in this instance would be recruiters making personal hiring decisions rather than relying on the provided matches. This fits into the monitoring part of the algorithmic transparency definition. On the other hand, opacity regarding the output is evidenced by the decision not to show the reason why a recruiter didn't choose a specific candidate despite matches being made.

For the code or algorithm used during the data processing phase, we find the highest level of opacity. The algorithm that makes the matches, the taxonomy, as well as the creation of the digital twin is not made visible on the platform. We do however see the balance in action again as transparency is still incorporated here. Personal information is removed to

make explicitly clear that the matching is based on the characteristics such as skills etc. The calculation made during the matching process is also not made visible, due to the proprietary nature of the algorithm as well as the low understandability, as previously mentioned. Upon request though, an explanation as to why a certain match was made can be offered (usually sought by recruiters rather than candidates). The monitoring part of the algorithmic transparency definition features here, disclosing particular information regarding the algorithmic output when necessary. Additionally, providing evidence of adherence to the GRPR "right to explanation".

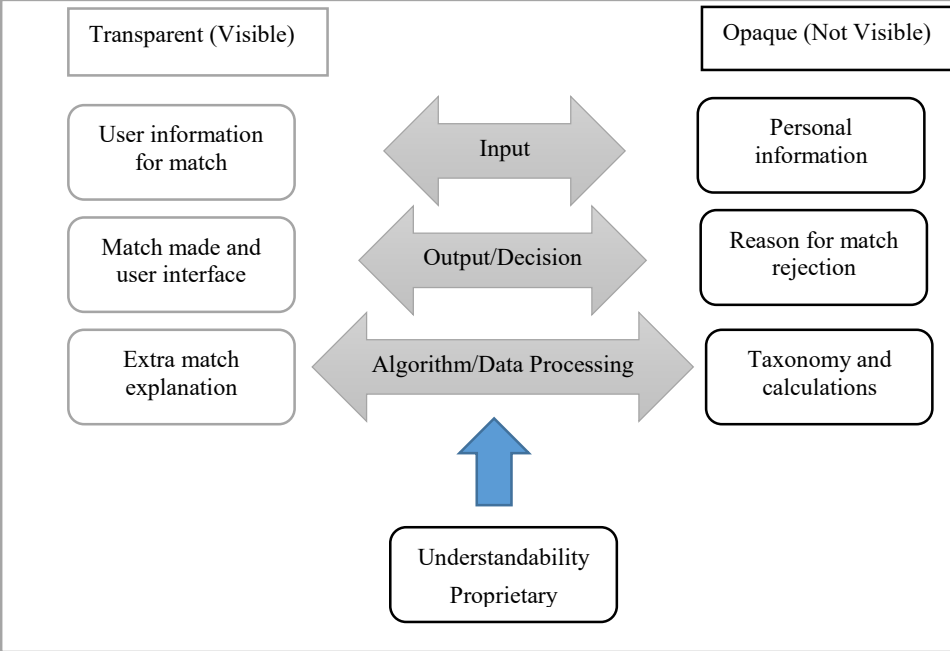


Figure 2. Transparency-Opacity Balance

4. DISCUSSION

Certain expectations from the literature regarding transparency, opacity and how they relate were supported by the findings. Firstly, according to the transparency principles (Felzmann, Fosch-Villaronga, Lutz, & Tamò Larrieux, 2020), transparency is proactively adopted in the design phase at the outset of the design process. This can be taken to mean that the algorithm designers should first and foremost have the intention of making transparency a part of their designs which could be evidenced by having transparency principles. Matching Company X does not have such principles, however, the Research Director expressed that they were trying to make the recruitment process more transparent. By making working toward increasing transparency in the labour market, part of their goal, Matching Company X displays intentionality.

Secondly, when it comes to opacity, the findings support the notion of intentional opacity as the withholding or non-disclosure of particular facets of the algorithm design that are regarded as proprietary (Kossov, Windwehr, & Jenkins, 2021). Their matching taxonomy is not shared with the users of the platform or disclosed anywhere because it is their

intellectual property and forms part of their competitive advantage.

Thirdly, the notion of the knowledgeability of the users being a reason not to make part of the algorithm decision-making process visible (Bitzer, Wiener, & W Alec, 2023), was supported by the findings. This is evidenced by Matching Company X not disclosing to the platform users the calculations they use during the data processing/matching phase as the level of understandability is low.

The main expectation that was not met was that the algorithm designers strive to balance transparency and opacity in their designs. To what extent does Matching Company X strike said balance? The answer, based on the findings is that it does not explicitly do so. This is because, aside from their matching taxonomy, there is no other aspect of the algorithm decision-making process that Matching Company X makes deliberately opaque. This is to say that their main focus is on transparency, adopting it and increasing it. However, whether or not they would need to strike a balance between transparency and opacity in the first place is determined by which type of platform they are. Matching Company X is not an online labour platform and therefore their users are not freelance workers. For this reason, Matching Company X does not purposefully keep hidden the majority of the match-making process in order for the algorithm to perform the role of algorithmic management (the users are not freelance workers). Additionally, gaming as a result of too much transparency (one of the transparency-opacity tensions) does not feature at Matching Company X. Their algorithms perform the explicit function of matchmaking. The way that Matching Company X deals with the other consequence of the transparency-opacity tension, which is giving away their competitive advantage, is by keeping their matching taxonomy hidden. They mitigate this though, by offering the additional explanation for the matches, upon request, to the users

Being that their main focus is transparency, two main reasons influence their decision not to be transparent. These are the previously mentioned proprietary nature of their matching taxonomy and the understandability of the calculations by the users if they were made visible.

It is worth noting that the question of accountability (Felzmann, Fosch-Villaronga, Lutz, & Tamò Larrieux, 2020), brings into focus a criticism of Matching Company X's attempts at transparency. They do not authenticate whether or not the candidate has the skills or the work experience and use this unverified information to make their matches. This compromises some of their attempts at transparency and shows that they incorporate some aspects of the algorithmic transparency definition and not others, particularly the checking part. This would require them to check the algorithm output-related information, according to the definition of algorithmic transparency.

4.1 Theoretical Implications

Studies on algorithmic transparency, its definition, its variations, its adoption and the lack of it (taken to be opacity) have been conducted in recent years and they posit that in the discussions surrounding algorithms, transparency is an integral part (Bitzer, Wiener, & W Alec, 2023). This paper explores the ways that transparency and opacity are approached and adopted in each part of the algorithmic decision-making process. From the input, through the transformation and finally to the output. When decisions are made to integrate transparency in one phase, for example, the input, conscious or sub-conscious decisions are made to withhold certain aspects of it (opacity). Figure 2 shows the duality between transparency and opacity for the different phases that were present in the data collected. This helps with the understanding that transparency and opacity exist alongside each other. In the instance of Matching Company X, the intention was not explicitly to balance transparency and opacity but to ensure both were adopted for their benefit as well as that of their users.

4.2 Practical Implications

Practically, this model can be used to suggest that the incorporation of transparency in the algorithm decision-making process should be viewed along specific steps. These are the three general ones; input, data processing and output as well as the ones specific to each company. Algorithm designers can view this as an intentional process that keeps all interested parties in mind. Research on online labour platforms and their uses of algorithm management (Möhlmann, Zalmanson, Henfridsson, & Gregory, 2021), suggest that a balance between algorithmic matching and control needs to be achieved moving forward. This study follows along those lines by positing that a balance between algorithmic transparency and opacity is also crucial. Transparency and opacity are two very important features of algorithms and both have significant consequences when adopted in the proper manner and proportion.

4.3 Limitations

During the course of the research, some limitations arose. Firstly, the time constraints resulted in a few logistical problems. The main one was inadequate time to secure interviews with the three to four companies that were initially planned for. Aside from Matching Company X who responded in the latter weeks, the other companies did not respond (in time) resulting in limited data collection. This resulted in the analysis, discussion and conclusion being largely based on two interviews from one company. This provided insight, however, it was not enough to draw more accurate conclusions. It also affected the length of this paper as I was only reflecting on one data source and not several. I could not compare different companies and the decisions that respective designers made and therefore developed a model that was more specific than initially planned.

Secondly, regarding the company itself, Matching Company X, some of the transparency adoption was theoretical. This meant that they had not had certain instances happen yet that would require it. An example of this is the idea of holding

recruiters accountable if they opted not to select their top matches and go with less suitable candidates based on their CV information. In this scenario, Matching Company X would request an explanation from the recruiter in an attempt to make the matching process and results more transparent. However, because this had not occurred yet I could only interpret the opacity aspect (not making the reason for a rejection despite a match visible to the candidate) and not the intention of transparency in the form of an explanation from the recruiter.

Additionally, because Matching Company X does not have online labour workers, I was not able to assess the impacts of opacity when it comes to gaming the algorithm as theorized. The only possible gaming that would occur would be recruiters rejecting matched applicants or on the other hand, further back in the process, candidates putting false information into their profile to get matches. This could be including skills they did not have or embellishing their work experience, which could result in inappropriate matches as Matching Company X did not verify the profiles for authenticity.

Furthermore, another limitation was the additional data collected. First was the interview with the CEO of another online platform – Daycare Company. This platform facilitates the matching of parents with babysitters for their children. The babysitter candidates fill in a profile and input their information, then they enter a pool from which the parents can select suitable applicants. While the parents pay to use the platform, it is free for the babysitters. I did not conduct this interview but had access to the data collected which was very limited. The nature of the company and the data collected posed a challenge. Daycare Company did not employ any algorithms that could be evaluated based on transparency and opacity except their face recognition and document identification algorithms. As far as transparency and opacity, the only usable information was that, unlike Matching Company X, a profile picture was mandatory for the profiles and made visible to the parents. However, they did hide the gender of the babysitting applicant despite the profile pictures more or less revealing this information.

The second limitation regarding the data collected was the reliability of the secondary data. I combed through several forums visited by freelance workers from Uber and Upwork to find relevant information regarding transparency and opacity from their perspective. This was done as a way to validate whether the information about the algorithm disclosed or withheld by the algorithm designers matched what was experienced by the freelance workers. Despite my best efforts to find sufficient data that could provide clear conclusions, I was not able to find anything substantial. The information from the users was inconsistent and filters on the forums for the term transparency yielded varying definitions and experiences. It was not enough to include in the data analysis and lost relevance when it came to answering the research question.

Finally, to make this a well-rounded study that fully examines the transparency-opacity balance, it should have included the act of transparency as well as the perception. Granted it focused on transparency as an act done by the algorithm designers, the way the transparency is perceived and interpreted by users and interested parties is equally

important. This goes back to the criticism part of the algorithmic transparency definition. Without looking at how the end user receives this transparency, this study does not consider its full definition. Users or other interested parties cannot adequately criticise the information disclosed about the algorithm if they do not fully understand it. This requires further study.

5. Conclusion and Future Research

This study aimed to explore the ways in which algorithm designers strike a balance between transparency and opacity. Depending on the type of platform, whether it is a traditional online labour platform or a more general matching-based company, the findings convey three main ways. The first way is by beginning with the intention to be transparent.

“What we try to do is actually make the labour market more transparent as our opinion is that it is currently very ‘untransparent’” Research Director.

Part of the mission at Matching Company X is to make the labour market more transparent. This means that algorithm designers are proactive in adopting transparency in the initial stages of the designs of their algorithms. In doing so they determine which aspect of the algorithm decision-making process will be disclosed or made visible and subsequently which aspect will be made opaque. In general, having transparency principles and guidelines helps the algorithm designers to solidify this intentionality and proactivity in the initial design stages.

The second way is the emphasis on the three phases of the algorithmic decision-making process. By categorising each part of the aforementioned process into the input, the data processing and the output phase, the algorithm designers establish what should and should not be disclosed. Transparency and opacity are therefore adopted at each phase.

The third way is having clear reasons why a particular aspect of the process is made visible or hidden. Furthermore, to whom it is made visible or hidden and the subsequent consequences for the different stakeholders including the platform itself, users and other interested parties.

The idea is not an explicit balance but rather an examination of how much algorithmic transparency is adopted via disclosure and how much opacity is adopted via non-disclosure. It emerged that these two elements can relate in a push-and-pull manner. In the simplest of terms, neither of them exists in a vacuum, transparency here means opacity there. For transparency, even though it seems like a choice made by the designers, in some ways a bare minimum level is required for the functioning of the online platform. Conversely, opacity or a lack of transparency is entirely a choice not necessarily for the designers but for the management and the online platform company as a whole.

Further research could expand on the study by taking up the aforementioned limitations such as having a large set of data to draw more accurate and widely applicable conclusions. The relationship and balance of algorithmic transparency and opacity in online labour platforms has yet to be explicitly explored and this study hopes to offer an interest in this area and motivate further studies.

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