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ABSTRACT

This article examines the structuring of algorithmic rank systems in the Brazilian webcam industry. The article questions the criteria behind those automated systems and their impacts on the working conditions of performers. The research comprises a four-year digital ethnography (from 2016 to 2020) of Brazil's two major webcamming platforms, Camera Hot and Camera Prive. Fifteen in-depth interviews were conducted with cisgender women performers. The results reveal that rankings rely on axes of difference, centrally gender, race and age, foregrounding young white cisgender women. The unequal distribution of visibility affects the work conditions of the performers who do not fit platforms' patterns, pressing them to negotiate with ranking criteria to succeed on camming. As the Brazilian camming business promotes the homogenization of services and prices, ranking stratifications hamper performers' opportunities to engage and thrive on platforms. The research argues that inequalities imposed by rankings are already seen in the Brazilian sex trades.

Introduction

The advancement of digitalization has radically changed the global erotic industry, affecting how erotic and sex services are performed and managed (Bernstein 2007; Sanders et al. 2018). The erotic webcam industry is a by-product of this process, which emerged internationally around 1996, promoting transactions in which performers live-stream erotic shows to a participative audience (Bleakley 2014; Jones 2020). Webcamming constituted an innovation to the erotic industries because of its interactive, audiovisual nature (Bleakley 2014) and its 'direct-to-consumer' model (Velthuis and van Doorn 2020, 168). This fast-growing industry generates more than US$2 billion in profit (Pezzutto 2018) and gathers about 12,500 active performers and 240,000 users (Velthuis and van Doorn 2020). The best-known camming platforms, Chaturbate and Live Jasmin, are among the most popular websites globally (Stegeman 2021), ranking in 49th and 83rd position, respectively (Alexa 2021a, 2021b).

In Brazil, the erotic webcam is a domestic industry that started developing from 2002 onwards (Silva 2014; Caminhas 2020). This trade was initially managed by small and

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amateur national camming studios that recruited models to perform via Skype. Studios lost ground when national websites emerged, providing a unique space where consumers could search for and interact with performers and watch cam shows (Silva 2014). YYZ Studios is the only studio still operating, but with only a few performers in their catalogue. Until 2010, there were five Brazilian camming websites, namely LoveCam, BelasdaWeb, WebcamSexy, DreamCam and Atrevidas. LoveCam became a camming platform named Camera Hot (CH) in 2010, after being incorporated by the Dark Media Group, a Brazilian tech business aimed at streaming solutions. In 2013, Camera Prive (CP) was launched, using the same platform model as CH. Promptly, platforms took over the business and centralized the traffic of performers and users through their platform infrastructure (Caminhas 2020). The other four websites closed as their performers migrated to the platforms. Nowadays, CP is the largest platform in the country, with around 90 million visitors monthly, 8 million registered users and 4000 active performers. It is the 45th most accessed platform in Brazil and the sixth in the adult entertainment category in the country (Similar Web Analytics 2021a). CH is smaller, with about 20 million visitors monthly, 3 million registered users and 800 active performers. It occupies 2609th position in the Brazilian traffic rank and is 660th in the adult entertainment category (Similar Web Analytics 2021a). Through these platforms, Brazilian webcamming has become an expensive service that generates US$2–3 million revenue annually and revolves around a cisgender women workforce from the south and southeast of Brazil, the wealthiest regions of the country (Machado and Alvim 2019).

The entry of the erotic industries into the digital economy resulted in 'sexual datafication' (Saunders 2020, 63), responsible for promoting a constant categorization of erotic production and consumption and converting the supply and demand for online eroticism into data to be gathered by the erotic platforms (Saunders 2020). Data collection and processing from users and porn workers unfold into a 'rationale of ordering' (2020, 58) that arranges the platforms' content visually and structurally, ranking it. Webcamming platforms engage in datafication, introducing data collection and algorithmic management to regulate the traffic of users and performers and to organize their interfaces (Velthuis and van Doorn 2020). The Brazilian platforms also use data management from users and performers to arrange their content to make their businesses competitive in the national market.

The gathering and processing of data generate rankings that organize performers' thumbnails within webcamming platforms (Velthuis and van Doorn 2020), creating signposts that bring a sense of order and method, facilitating navigation through numerous options (Keilty 2018; Saunders 2020). Algorithmic ranks thus operate as ordering devices that arrange spots within platforms, corresponding to 'a technological apparatus by which content is delivered' (Keilty 2017, 271). In contrast to the supposed neutrality of categories, rankings promote display schemes based on hierarchies, foregrounding certain types of people and content (van der Nagel 2013). As Angela Jones (2020) notes, camming platforms, like other porn platforms, engender rankings stratified by axes of difference such as gender, race, age and able-bodiedness. This stratification pushes certain performers to deal with algorithmic bias, playing the system to ensure visibility within platforms (van Doorn and Velthuis 2018). As a result, rankings establish unequal working conditions, pressing workers marked by axes of difference to make greater efforts to thrive on camming platforms. In Brazil, where only two platforms control the

trade, performers are even more dependent on negotiating with rankings to gain visibility and ensure traffic in their rooms.

Despite the growing interest in the role of algorithmic rankings on webcamming, there is still a scarcity of research on the issue (Jones 2020). Specific details about how rankings work on camming platforms are yet to be understood. Obstacles in obtaining data about algorithmic processing in the erotic business hamper investigations into rankings. Due to market competition strategies and attempts to bypass manipulative behaviour towards the algorithmic system, platforms impose secrecy on their data collection and processing (van Doorn and Velthuis 2018). Brazilian platforms are also secretive about their algorithmic rankings. As the CP management team informed me via email, 'the management opt not to disclose confidential and strategic business information, as well as business strategies'.

Aiming to contribute to the knowledge about webcamming rankings, this article analyzes the structuring of rank systems on Brazil's two major webcamming platforms in line with their business models. The article questions how rankings function within the platforms and impact on work conditions in the camming industry. Results show that platforms' rankings rely on axes of difference to define a performer's position on the homepages. Gender, race and age are crucial, as rankings foreground young white cisgender women, positioning them as the primary workforce of Brazilian camming. The unequal distribution of visibility poses obstacles to performers who do not fit platforms' patterns, hampering their chance to succeed in the trade. As Brazilian camming is founded on standard services and prices, rankings have an even higher impact on performers' working conditions since the only way to stand out on the platforms is through rankings and not through specific services. The study relates the construction of algorithmic rankings with the local context, revealing that rankings are thus responsible for automating (Eubanks 2018) stratifications present in the Brazilian sex trades (Piscitelli 2007), reinforcing inequalities that exist in Brazilian society more broadly.

Methodology

This research[1] draws on digital ethnography to gather qualitative data about Brazilian webcamming platforms' ranking systems and is centred on non-participant observation of CH and CP from 2016 to 2020. Ethnography is a fecund method that makes rankings traceable via navigation through platforms' infrastructures (Kitchin 2017; Christin 2020) since ethnographers act as 'algorithm enactors' (Seaver 2017), activating algorithmic systems when observing and engaging in the field. Non-participant observation was chosen due to the platforms' terms of use, which forbid interactions other than paying for live-streaming shows and ban users who infringe this rule. Additionally, this research followed María Díaz-Benítez's (2009) methodological approach to non-participant observation as a core method for accessing and engaging in the Brazilian erotic industry. Díaz-Benítez (2009) chose non-participant observation to research the major porn producer in Brazil, aiming to avoid disturbing the field dynamics. She considers that reducing her presence by staying in the corners of the set and preventing talking directly about the research proved fundamental to engage in the field and gather qualitative data, allowing her to interact gradually with porn workers without causing embarrassment.

The ethnographic protocols were designed as follows. In the first six months, I accessed both platforms daily to understand their structure and organization. The data collected were systematized in the fieldwork notebook and screenshot files, stored in an encrypted folder accessed only by the researcher. Screenshots recorded images of platforms' infrastructures, particularly their interfaces, tabs and profiles. Personal information such as performers' names and locations was omitted, and performers' images were blurred in screenshots. The investigation of rankings started in October and November 2019. I observed platforms daily for two months to capture regularities in rankings. Thereafter, I monitored rankings every six months until the end of the research, so in May and June 2020 and November and December 2020, to check whether rankings were changed or updated. Brazilian platforms often improve their infrastructure and systems every six months, changing some central functioning in order to facilitate navigation. To verify the data reliability, I monitored platforms' rankings during January 2021. I also followed platforms' profiles on Twitter to keep up to date with information about the latest improvements to their infrastructures and ranking systems.

Ethnographic data about rankings were collected manually. The data set comprises three categories. The first relates to the way in which the rows of thumbnails are organized, capturing the criteria behind the ways the rows are updated on the platform, such as the time interval and the order to change the position of thumbnails and rows. I also gathered data about which performers on the CH and CP platforms frequently get the top rows and the presence of black and transgender performers between them. The second way in which the data set was analyzed is the gendered tab system. The third is the metrics, checking how they affect the placement of performers' thumbnails in the rows. I took notes of the key metrics on each platform, the conditions to accrue them and the performers who often accrue higher metrics.

Along with the ethnography, I performed 15 in-depth interviews with webcam performers, seeking to apprehend their perception about working on camming platforms and dealing with ranking systems. Interviews were a crucial method to complement the data from non-participant observation, as they allowed for understanding of how algorithmic rankings are perceived in the everyday practices of people in the field (Kitchin 2017; Seaver 2017). Interviewees were selected by snowball sampling (Atkinson and Flint 2001), and interviews were conducted via Skype, respecting participants' preferences. No interviewee was remunerated. All participants signed an Informed Consent Form agreeing to participate in the investigation, and pseudonyms substituted their names. I contacted platforms' representatives for interviews, but they refused to participate. Twitter was a central research tool for the interviews. As the Brazilian camming platforms do not allow personal messaging in their chats, Twitter was the place where I was able to connect and exchange private messages with performers. On Twitter, I scheduled all interviews and kept in touch with participants during the four years of the research. There, I also kept up to date with performers' opinions about working on the platforms through their tweets and exchanging direct messages.

Interviews were conducted in 2017 and 2018 only with cisgender women. In this period, transgender people and cisgender men started working on camming, and they were just a few in the field, making it difficult to contact them for interviews. Almost no transgender performers had profiles on Twitter, the space where I was able to invite performers for interviews. Nowadays, it is still challenging to localize transgender

performers outside the platforms, hampering the conditions for accessing them for interviews. Despite that, future research on the experience of transgender people with rankings is needed. The 15 participants were between the ages of 20 and 47 years, with a predominance of women between 20 and 25 years old, and most of them had no previous experience in commercial sex except for one interviewee who also works as an escort. Thirteen of them were white and only two were black, and the average length of working in the webcamming industry was one to five years. The questions were about performers' trajectories in the Brazilian camming, formulated around three thematic axes: their entry into the industry, including the motivations for pursuing a career in webcamming and advantages and disadvantages of the work; the labour within platforms, comprising the routines, the main public and the performative and platform requirements; and ranking stratification and bias. These themes summarize workers' perceptions about the interplay between rankings and working conditions, embracing the impacts of stratification by axes of difference on the opportunities within Brazilian camming. All interviews were recorded, transcribed verbatim and analyzed by open textual coding.

Algorithmic rankings and labour precarity

Algorithms work from parameters that select certain outcomes (Gillespie 2014) and normalize certain ways of ordering content (Willson 2016). They 'search, collate, sort, categorise, group, match, analyse, profile, model, simulate, visualise and regulate people, processes and places' (Kitchin 2017, 18). As 'sociotechnical assemblages' (Kitchin 2017, 16), algorithms are related to everyday practices and situated in a sociocultural context (Willson 2016).

As several authors have noted (Rosenblat and Stark 2016; Wood et al. 2018; Purcell and Brook 2020), algorithmic processing has been employed in a whole range of platform-based businesses to manage and coordinate products, services and workers. This phenomenon also touches markets based on immaterial labour, like content production (Bucher 2012; Bishop 2019; Petre, Duffy, and Hund 2019) and porn production (Keilty 2017; Saunders 2020), including the adult webcam industry (van Doorn and Velthuis 2018; Jones 2020; Velthuis and van Doorn 2020).

In the adult webcam industry, algorithmic processing acts as a 'market device' (van Doorn and Velthuis 2018, 182) that coordinates the competition between platforms for market hegemony and between performers for visibility. Algorithms directly impact working conditions as they manage the placement of workers within platforms, altering their chances to be seen and thus earn income (Velthuis and van Doorn 2020). The rationale behind the systematization of performers' thumbnails in rows, columns and tabs creates hierarchical 'modes of display' (Keilty 2017, 271) with which performers must work to secure chances of performing a show. Algorithms thus participate in the 'modulation of visibility' (Rieder, Matamoros-Fernández and Coromina 2018, 52), which establishes what content and which people will have prominence, determining their value as commodities. Bishop (2019) contends that algorithmic visibility pushes workers to administer their placement within platforms with the aim of improving their work opportunities and income. The need for engagement and negotiation with ranking parameters exposes workers to 'algorithmic precarity' (Duffy 2020, 2), making them subjected to platforms' standards and decisions, adding another layer of instability and dependence on platform-managed labour (Petre, Duffy and Hund 2019).

In Brazilian webcamming, algorithmic rankings are built upon a business model based on standard services and prices, centralizing platforms' affordances and resources over workers' traits. CH and CP are premium platforms that offer a combination of group and private chats charged per minute. Whereas CH predetermines the prices of chats, CP establishes a minimum amount from which performers determine their rates. Despite this difference, prices charged are alike: R$1.50 (US$0.27) per minute of the group chat, R$2.40 (US$0.43) of the private chat and R$2.85 (US$0.51) of the exclusive chat. Both platforms charge a maintenance fee of 50% of all performers' sales, withdrawing a significant amount of performers' earnings. Since performers are paid for 'pieces of work' (Mathews 2017, 167), fee charges pressure more workers to go online even more often, expanding their working hours and efforts.

Standard chats available for standard prices hamper performers' working conditions in that users can get a similar show with any performers paying the same amount. Angelica, a 27-year-old white performer, affirms that performers must understand how to 'handle' the chat system if they 'want to stand out in the crowd'. She explains that 'it is not profitable to undress in the group chat unless the room is bustling, so I keep users in there paying for a long time'; otherwise, 'it is better to be available for chatting and wait until someone invites me to the private or exclusive chat'. Angelica understands that to get users and make money, she needs to cope with the restricted chat systems, trying to amplify her visibility and thus her chances of performing in the private and exclusive chats where the minute rate is higher. Manuela, a 47-year-old white performer, says that performers 'cannot be fussy about chats. I am not fussy at all because the number of models increases every day, and it is getting harder to be found on the platform'; as 'chats are standard, users can choose anyone'. Nicole, a 20-year-old white performer, adds that 'platforms let us be free to choose our performances, but the chats are preset anyway, so it is hard to stand out between so many others'. Manuela and Nicole also point to the need for constantly managing their time and presence on the platforms to get private and exclusive chats. In these conditions, performers recognize they need to engage further with visibility parameters, considering their placement within platforms as the core element to have work and earn income. Visibility, gained or lost through algorithms, is at stake to guarantee better work conditions or to deepen precarity for Brazilian webcammers.

Performers' availability is central to CH and CP businesses, because it is key to their rankings. Performers available for chatting receive a bright green stripe on their thumbnails highlighting them, signalling for users that they are free. The platforms foreground available performers to create a sense of multiple options for users – employing a similar strategy of porn platforms to denote abundance (Keilty 2018), pushing performers to go online as much as they can. Anelise, a 22-year-old white performer, explains that 'you have to invest in camming; besides new content, you need to go online, be available. I see many models complaining about having few users, but I ask: are you investing?'. Eliane, a 35-year-old white performer, recognizes that 'you lose your audience if you stray too far. The more you are seen on the platform, if you are there every day, the more prominent you become'. However, 'if you pop in and out, there will be that potential client that will not even remember you'. For the performers, being available means achieving high sales potential, as users will see and remember them, which is central to keep working on camming. As Angelica poses, 'it is profitable to go online and be

available because this way you are not stuck within the platform, you are in movement and in evidence'. Performers face an urgency to go online to boost traffic in their rooms, calling users' attention as soon as they access the platform. Users' traffic is not only crucial because of earnings but also because of their evaluations that inform the platforms' metrics.

Besides availability, two other elements inform platforms' rankings: filters and refresh mechanisms, and metrics. Filters and the automatic refreshing of thumbnails move the performers' positions within the platforms, revealing how platforms organize content. By activating such mechanisms, it is possible to observe which thumbnails go up and down in the rows and in what order. This movement reveals to what extent platforms allow thumbnails to change from their initial position, guaranteeing some visibility to the thumbnails in the bottom rows. CH maintains fixed rows and thumbnails; it has only two filters to order performers – standard ordering, provided by the platform's algorithm, and new models first. CH is thus a static platform, where thumbnails rarely change their initial placement. Availability is paramount in this case, as the platform computes the length of time performers spend online to rank them. As Eliane explains, CH privileges performers who 'fully engage' with camming, revealing that 'wide availability' is a precondition to succeed on the platform. On CP, the homepage is refreshed every 30 seconds, changing the position of thumbnails within the rows. The platform informs in its blog that this mechanism 'ensure(s) everyone has equal exposure, changing which performers users see first' (Camera Prive 2019). This logic presumes that the last rows might become the first ones. However, refreshment affects only the position of available performers, excluding those in chat, and it is turned off as soon as users start navigating. So, the tendency is for the best spots to stay with the same performers positioned there from the beginning. Additionally, thumbnail movement occurs within the same row or between adjacent rows, making it difficult for the bottom rows to become the first ones. Hence, thumbnails tend to maintain their initial position on both platforms, a position established by algorithms. It pressures performers to deal with algorithmic criteria in order to get the necessary visibility to ensure work.

Like international platforms that base their rankings on 'CamScore' (van Doorn and Velthuis 2018; Jones 2020), the Brazilian platforms' rankings rely on metrics about a performer's number of followers and reviews. On CH, the main metric is users' reviews, which score from one to five stars. The number of positive reviews is crucial to position a performer on the homepage: the more stars performers have, the more prominent they become. CP, in turn, counts on a series of metrics. The number of followers and reviews is accompanied by stamps that reveal performers' achievements on the platform. The platform assigns stamps in three different situations. First, when performers reach 100, 1000, 3000 and 4000 followers. Second, when they accrue 50, 200 and 500 crushes, which describe users who paid for more than 30 minutes of show. Third, when they complete one, two or three or more years active on the platform. Performers who get the best spots on CP have the higher metrics: the first row of thumbnails usually displays performers with between 1000 and 4000 followers, privileging those who accrue 4000 followers, known as the 'Popstars'. Performers with 100 or fewer reviews and 1000 or fewer followers are usually in the bottom rows. Metrics operate so that popular performers always get the best spots within CP, which guarantees more users and more shows and, consequently, higher metrics. It reinforces the precarity of those

performers with lower metrics, who must deal with the metrics' bias to get users and secure work. As a result, metrics add a considerable workload to lesser-known performers, making it difficult for them to stay working on CP.

As Fernanda, a 26-year-old white performer, explains, performers must pay attention to their metrics, trying to accrue the highest metrics they can. According to her, paying attention to metrics also means being available and committed to the platform. Lucia, a 20-year-old black performer, reveals how availability and metrics go hand in hand:

> I am not very active on the platform, and I have no routine to go online, and because of that I do not have many followers, fans and likes. I depend on my regular customers to keep my performances going.

Denise, a 24-year-old white performer, confirms that the lack of routine on the platform hampered her room traffic and her metrics: 'When I started, I went online regularly and tried many time bands. But then, I could not keep doing this, I could not force myself to go online, and I saw my traffic slow down'. Performers feel the pressure to remain active on the platform to guarantee some income, acknowledging the interplay between metrics, room traffic and financial success in the camming industry. Thirteen interviewees set routines and financial goals to avoid losing traffic and metrics. Fernanda says that performers determine 'advantageous periods for going online' when they believe platforms have more traffic. If 'they notice a drop in movement', they try other periods until they get traffic to their rooms and amplify their metrics. Overall, performers with a pre-set routine affirm to stay connected around eight to nine hours a day to the platforms to guarantee a satisfactory income. Performers' routines reveal the constant and hard effort they must make to ensure metrics and some visibility.

CP has yet another business strategy that informs its rankings: the 'exclusivity system'. This system implies that performers who become exclusive work solely on CP, obtaining three main benefits: prominence on the homepage, unlimited cash withdrawal from their account on the platform, and participation in promotions and rewards. As the platform announces, 'exclusive models secure the deserved prominence and become ambassadors for our community'. Exclusivity has been responsible for expanding CP's operations, centralizing performers and users within the platforms and thus contributing to making it the biggest and most popular platform in Brazil.

Exclusivity has proved a success, as it represents a new form of working on webcamming, providing a stable career for performers. According to Fernanda, exclusivity guarantees that 'you are not at risk of getting close and blowing it completely' since the system 'allows high traffic of users in our rooms, making us very well-attended'. Fernanda considers that 'exclusivity is a good deal because it definitely improves my working conditions because prominence is key in this business'. She also emphasizes that this system is supposed to be open to everyone, as performers just need to contact the support team and state their interest in becoming exclusive, as Carolina, a 36-year-old white performer, did. Another possibility is that the support team invites performers to engage in exclusivity, as happened to Anelise and Lucia. To Lucia, exclusivity 'facilitates my work as I do not have a routine. So, I prefer being exclusive because it boosts my chances to be seen and, of course, my earning opportunities'. Although performers agree that exclusivity alone does not provide the needed visibility, it certainly is an additional tool that performers

can use to try to succeed in camming. Without exclusivity, it is harder to perform private and exclusive shows, which are the most profitable ones.

Exclusive performers occupy the best spots on CP, even with the refreshment system on. They get the first rows of thumbnails and are highlighted with a yellow stripe that says 'exclusive'. To find non-exclusive performers, users have to scroll down – which causes a significant drop in traffic, as Fernanda explained. Exclusivity also affects the ranking in other ways. For example, non-exclusive performers accrue lower metrics and have less traffic in their rooms – reinforcing their low prominence on the platform. Notably, non-exclusive performers charge less in all chat modalities, establishing prices around R$0.10 or R$0.20 (US$0.019 or US$0.037) cheaper than exclusive performers, trying to get users with competitive prices. However, non-exclusive performers are displayed on the homepage according to prices charged: those who charge the standard price of the platform come first.

Of CP performers, only Manuela was not exclusive. However, shortly after the interview, she engaged in exclusivity. She notes that sometimes her room has little traffic, and she needs to try out different periods to go online to get some users:

> there are days I stay longer and other days I stay less, and if I try out the afternoon, and it is not good, I go online at night and so on. I always search for periods when I can get more users.

As Manuela does not have a routine on the platform and she is not exclusive, camming 'is not very lucrative for me. Camming does not provide satisfactory income yet.' Her narrative differs from exclusive performers who see camming as a profitable and stable business. Her case highlights the weight of exclusivity on camming work, since without exclusivity, performers face low visibility, traffic and income, and so are incapable of 'making a living' within the platform.

It should be noted that exclusivity predominates among transgender women and men and cisgender men, relatively new performers in the Brazilian webcamming industry. Almost all of those performers engage in the system because CP is the first platform to accept cisgender men (since 2013), transgender women (since 2015) and transgender men (since 2018). CH is focused on cisgender women and has recently accepted transgender women (since 2018). Although exclusivity could benefit transgender performers and cisgender male performers by increasing their visibility, it exerted the opposite effect since most of them became exclusive, and therefore none of them could take advantage of the system to stand out. CP has bet on the diversity of performers to expand the business as explained in their blog: 'our platform has always given room for performers of diverse profiles. It is no wonder that CP is the only platform to feature four categories that celebrate diversity: girls, guys, transgirls and transguys' (Camera Prive 2019). Since most transgender performers and cisgender men engage in exclusivity, the system loses its potential to foreground some of them. If everyone is exclusive, exclusivity is no longer a parameter to differentiate the performers. As CP's tabs are gender-specific, performers displayed on transgirls', transboys' and guys' tabs cannot count on exclusivity to achieve prominence. So, those performers must rely on availability and metrics. This condition highlights CP's strategy to homogenize services and performers in order to draw users' attention to the platform itself, which aims to be the reference to the camming service in Brazil.

Rankings based on exclusivity thus replicate the winner-takes-all mechanism described by Velthuis and van Doorn (2020), foregrounding performers who already have high visibility and room traffic on the platforms – most of whom remain cisgender women. Despite most transgender performers and cisgender men engaging in exclusivity, they do not benefit from higher visibility within the platform because cisgender women are also exclusive and accrue higher metrics than the other performers, getting the best spots. In addition, cisgender women are the majority of performers, dominating the camming industry. Platforms' business priorities are central to defining algorithmic management and positioning performers and content according to their presumed earning potential (Bishop 2019). On CP, the business strategy and algorithmic management merge into the exclusivity system, which deepens the unequal conditions to access and work on webcamming.

Axes of difference in algorithmic rankings

Algorithmic rankings also engender processes of stratification (Willson 2016; Rieder, Matamoros-Fernández and Coromina 2018), where axes of difference play a central role (van der Nagel 2013; Eubanks 2018). Since algorithms prioritize some variables from which they establish categories, algorithms frequently reinforce sociocultural stratification and unevenly position people marked by axes of difference (Noble 2018). By providing discriminatory outcomes, algorithms strengthen and deepen already existing inequalities. Thus, algorithms automate stratifications, generating unjust and discriminatory settings (Eubanks 2018).

Camming platforms employ algorithmic management to foreground thin, white, young, cisgender, able-bodied performers (Jones 2015, 2020), narrowing the work opportunities of those who do not fit this pattern. In Brazil, camming platforms replicate hierarchies already seen in the national sex trade. Sex labour in Brazil has been historically divided into low and high modalities of services (Silva and Blanchette 2009). Black and working-class cisgender women (Piscitelli 2007) together with transgender women are commonly positioned on the low modalities (Pelúcio 2005; Gea, Barreto and Moreira 2019), known as 'programas'. Due to criminalization and marginalization, trans people commonly only have access to highly precarious and informal labour, among which street prostitution is the most accessible option (Ferreira 2018). Ninety per cent of Brazilian transgender women are engaged in street prostitution, and most of them are vulnerable to being exploited by a third party, like pimps and brothel owners (Ferreira 2018). Racial disparities also constitute sex trades (Brooks 2010; Porter and Bonilla 2010), particularly in Brazil, where racialized bodies are the most common in prostitution, an industry related to the colonial inheritance of slavery and the expansion of favelas (slums) after slavery abolition, processes that most affected black Brazilians (Simões et al. 2020). In addition, black people are outnumbered in online-based sex services that demand technological equipment, an internet connection and broadband, which are unevenly distributed in the country. Middle and upper-class citizens, predominantly white, have more access to the internet and technology equipment, whereas lower-class citizens, mostly black, lack access. The 2019 Continuous National Household Sample Survey – Information and Communication Technology (Pnad TIC) (Brazilian Institute of Geography and Statistics 2019) reveals that one in four Brazilians does not have access to the internet (46 million Brazilians). From them, 63% of white citizens have access to the internet compared

to 55% of black citizens. Age is another crucial element in the Brazilian sex trades, as data about prostitution show that most people working in this service are young. Priscila Aquino et al. (2008) conducted research in Fortaleza, a city of reference for prostitution in Brazil, and their results suggest that most of the prostitutes are between 21 and 30 years old, representing 48.1% of the total. Only 22.2% of the prostitutes are aged 41 years or older. Among men, 35 years of age is a threshold. Diane Helene (2012) corroborates these data, revealing that active prostitutes tend to be young; the older women turn into pimps and brothel owners. Léticia Barreto and Mirian Grossi (2012) add that women above 50 or 60 years old continue working in prostitution if they are from lower classes – most of whom are black people. In the 'luxury' sex services like webcamming, young cisgender women are central, being most of the workforce (Lopes 2021).

On platforms' rankings, axes of difference play a crucial role. Gender, race and age are central variables that coordinate the placement of camming performers. On CH and CP, gender division materializes in the tabs' organization. CH orders cisgender and transgender women in five tabs: 'All performers', 'Favourites',[2] 'Girls' for cisgender women, 'Transex' for transgender women and 'Couples'. CH's ranking foregrounds cisgender women. The organization of tabs proves it: on the 'All performers' tab, the first one on the homepage, cisgender women's thumbnails come first and then the transgender women's thumbnails. The second tab on the homepage is for cisgender women and only the third is for transgender women. The 'Couple' tab is the last one and is mainly aimed at cisgender women performing with a cisgender man. As CH is a static platform, cisgender women tend to keep their privileged position. Furthermore, tabs with cisgender women tend to be most populated and with more active performers. Overall, the 'Girls' tab counts 24 online performers per day, whereas the 'Transex' tab counts only eight. It makes all the difference in the 'All performers' tab where transgender women are just a few at the end of the rows. Finally, when activating the two filters available on CH, cisgender women come first, occupying at least six of the most visible rows.

CP divides gender into four tabs, privileging cisgender women. The 'Girls' tab, which is the platform homepage, is for cisgender women and has the largest number of active and online performers. The second tab is 'Transgirls', with the second largest number of active and online performers. Comparing the first two rows, for an average of 36 rows occupied by 216 cisgender women, there are only six rows for 36 transgender women. The third tab, named 'Guys', is for cisgender men and the fourth and last tab, 'Transguys', is for transgender men. Men are the smallest portion of performers: there is an average of three or four rows of online men, which equates to 18–24 out of around 300 online performers on the platform in total.

On both platforms, gender stratification is seen in metrics as well. The tab division reflects the metric mechanism, foregrounding performers who accrue more followers and reviews and have more user traffic in their rooms. Performers with around 4000 followers and outstanding reviews of five stars are most likely to be cisgender women. Transgender women come second: they have 1000–3000 followers, and most of them obtain five-star reviews. On CP, cisgender and transgender men have lower metrics in general: 100 or fewer reviews and 100–1000 followers maximum. Such a situation is no surprise since the Brazilian sex trade is overly reliant on cisgender women, especially in the expensive sex services, such as luxury escorts, pink book models and call girls (Araújo and Silva 2017; Lopes 2021). As Silva (2014) demonstrates, webcamming is associated with indoor and luxury sex services, where cisgender women are the core workforce.

Along with gender, age influences rankings since the young body is valued as an asset that platforms want to spotlight. In camming, young bodies inscribe exclusiveness and attractiveness to the business (Lopes 2021). Older performers consider they face challenges to keep working in camming, pointing to their placement within the platforms as an obstacle. Carolina explains that 'when I started performing, I presented myself as a 28-year-old girl', and nowadays 'my online persona is sometimes 25, sometimes 20, 20 is better'. To her, users and platforms prefer young women. She considers that 'I will have to leave camming when I turn forty because I will not keep faking my age until there'. Carolina's narrative thus points to an age threshold to working in camming. When performers are not able to impersonate a young person, they are compelled to quit performing. Eliane considers she has little time left to perform because her body 'discloses' her age. As she puts it, 'I will keep performing as long as my body allows it, as long as I have many users'. For both performers, the older performers are and the older they look, the harder it is to attract users' attention and traffic to their rooms. Manuela adds that age impacts performers' placement within the platforms. She explains that 'we worry a lot, we stay there for hours, and no one comes into the room, and sometimes I think that there is something wrong with me', but then 'I search for young performers, and their rooms are busy, they go much more to private chats. Maybe it is because they are on the platform's homepages'. The influence of age on rankings affects the quantity and the quality of performers' work, constraining labourers to spend much time online without performing and generating income. Camming is even more precarious as a performer gets older, as rankings reliant on age downgrade older performers and end up expelling them from the trade.

Young performers recognize the centrality of age in Brazilian camming. Anelise emphasized the issue: 'I know that there will come a time when I will not be able to continue performing. When I turn forty or thirty-five, I will have to take it easy and find another thing to do' but 'I am only 22, and I still have plenty of time'. To her, from age 35 years onwards, 'the traffic in your room slows down a lot because I know people prefer young girls and platforms do too'. Anelise points to a spontaneous preference for young performers; however, she also recognizes a deliberate choice of platforms to foreground young people. Beatriz, a 19-year-old white performer, also intends to leave camming when she turns 35 years. In her opinion, platforms consider young women do better in the first thumbnails' rows, foregrounding them. She affirms that 'I would quit performing because of age' since 'you are better positioned on the homepage if you are young because the platform prefers to give young people greater exposure so users can find them easily'. Hence, 'the platform establishes an order to display the performers, and I think young people are more prominent overall. Now I am young, but I will have to work more to secure my income in the future'. Beatriz shows how platforms choose performers according to their preferences, electing who is suitable for being on the platforms' homepages. Performers considered unable to match platforms' preferences will consequently be downgraded on rankings.

Race is another central element that informs rankings. Jones notes racial inequalities are embedded in international camming platforms, ascribing 'low sexual capital' (2020, 202) to black performers, and thwarting their opportunities to thrive in this trade. On the Brazilian platforms, racial disparities comprise the scarce presence of black and brown-skinned performers. Indigenous people are absent from camming as they are

absent from other sex trades, mostly seen in data about sexual exploitation and trafficking in Brazil (Palacios 2020). Black performers are just a few: 68 self-identified black models on CP and 13 on CH. These performers use hashtags or add keywords to their profiles such as *negra*, *negro*, *preta*, *preto*, *pretinha*, *pretinho*, *mulato*, *mulata*, *pretão*, *negão*, *neguinha*[3] and black, aiming to facilitate users to find them through their racial identification. Thus, only a few performers are interested in linking their profiles with their racialized bodies, considering it advantageous and desirable in commercial terms.

Along with the low number of black performers, they are placed on the worst spots within Brazilian platforms, like on international platforms (Jones 2015). Black performers are rarely allocated to the first four rows, and mainly to the cisgender women tab. On the transgender women tab, it is easier to find black performers; they are in prominent spots, even in the first two rows. Nonetheless, compared to white transgender women, they are outnumbered. There are barely black performers on men's tabs, particularly on the transgender men tab. Monitoring the platforms, I noticed black performers are placed from the sixth row onwards, except on the transgender women tabs. On CP, an average of 249 performers remains available every day, occupying 41 rows. Of the total, only 13 are black. Overall, white performers are placed first in all access to the platform; exclusive black performers rarely achieve prominence, being positioned after exclusive white performers. On CH, an average of 23 performers are online every day, occupying about five or six rows. Of them, only one is black. Even in the transgender tab, black performers are scarce. Black models get the fourth row onwards; however, with the new model filter on, they appear in the first two rows, revealing that they are newcomers to CH.

Black performers detect racialization on camming platforms through their position on the thumbnails' rows and the consequent low traffic in their rooms. As Gisele and Lucia explain, low traffic and dependence on regular users are common among black performers in Brazil. Gisele, a 19-year-old black performer, delves into this issue, affirming that 'sometimes I realise my room has no movement, no user is searching for my room' and 'I question if there is something wrong with me or my room'. But 'if my image is always down there, it affects my numbers because users will not scroll down to find me'. Gisele recognizes she is constantly placed in hidden spots due to platforms' preferences for a particular profile of performers, commonly white performers. Although she does not explicitly mention her race, she affirms that 'white people are always on the top'. To her, 'I think I went around this issue, especially after I started to go online and be available every day'. Gisele strives to manage her time online to overcome low visibility, implementing a routine that might provide high traffic. Since traffic generates revenue, Gisele's income relies on her efforts to dodge race stratification by being constantly available on the platform. Unlike Gisele, Lucia does not go online frequently, relying on her regular users. She declares that her room has little movement overall due to her position on the homepage. In her words, 'I have no routine, that is why I do not have many followers and reviews' and 'I am always down there, which makes it even harder to find me'. Lucia adds the impact of race stratification on her metrics, revealing the obstacles imposed on black performers to be foregrounded by algorithms. The fact that black performers are commonly on the last rows, dealing with invisibility, has consequences for accruing metrics, reinforcing their positions on the worst spots. Rankings are designed to reinforce black performers placement 'down there', taking them out of platforms' homepages.

Contrary to black performers' narratives, white performers emphasize the prosperity of their rooms. Fernanda affirms that her room is always busy and 'users always say I am very popular and sought after. It is because I am active and available, and my numbers are really good'. Additionally, 'all the reviews I received are positive, I have lots of followers, and I usually have certain visibility within the platform'. To Fernanda, 'the display of my image on thumbnails is a huge advantage, and users do not have to scroll down to find me'. Fernanda echoes the viewpoint of the other white interviewees, who believe they are well positioned among the thumbnails and are visible to users. Angelica affirms that platforms want white, thin, young performers to be on their homepages. She considers she corresponds to the platforms' beauty patterns:

> I match a beauty pattern. I am blond, tall, beautiful woman, a natural woman. So I correspond to a pattern, understand? Even though there is no pattern on the virtual, I know I have more visibility because of my appearance.

As Angelica suggests, she embodies the axes of difference foregrounded on the platforms, thriving in webcamming because she fits into the platforms' preferences. Hence, race stratification is crucial to evaluate the uneven working conditions in camming once it promotes white performers and suppresses black ones.

Conclusion

This research discusses the politics of algorithmic rankings in the Brazilian webcam industry, arguing that they encompass axes of difference to organize platforms' homepages. The argument points to automation and reinforcement of inequalities through algorithms (Eubanks 2018), revealing that rankings determine what differences will be turned into inequalities in camming businesses. From a contextual analysis of the field, the article points to an interplay between algorithmic management and sociocultural reality, understanding algorithms as an assemblage of everyday practice (Willson 2016). The findings also stress the impacts of the camming business model and algorithmic rankings on the work conditions of webcam performers, showing how these elements hamper performers' opportunities for success and push them to deal with algorithmic management to gain the needed visibility (van Doorn and Velthuis 2018; Duffy 2020).

The results are in line with other research about the role of platforms and algorithms in amplifying the precarity of webcamming work (van Doorn and Velthuis 2018; Jones 2020; Velthuis and van Doorn 2020). Nevertheless, they advance the comprehension of certain aspects of precariousness that are still understudied. First and foremost, the findings reveal how inequalities materialize and operate within the technologies that coordinate the adult webcam industry, showcasing the centrality of axes of difference in the stratification of the workforce and the unstable working conditions of camming. Secondly, they show that the bias embedded in rankings is established locally, relying on specific sociocultural discrimination seen in other branches of local sex markets. Therefore, this research draws attention to the need for further investigation of rankings and the reinforcement of inequalities within the platform-based erotic trade, examining other local realities and assemblages of axes of difference.

Notes

1. The research was submitted to the National Research Ethics Commission (CONEP) through Plataforma Brasil, authorized in February 2017 (CAAE number 59900016.0.0000.5404).
2. In Portuguese, the word 'favourite' undergoes gender inflexion, and CH employs the female inflexion in its tab (*favoritas*).
3. In English, all of these words correspond to black. In Portuguese, there are inflexions of gender, which was considered in the search.

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No potential conflict of interest was reported by the author.

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