

Chapter 15

Race, Gender, and Sexual Minorities in Physics: Hashtag Activism in Brazil



Katemari Rosa

Abstract The goal of this paper is to discuss academic climate for underrepresented groups in Brazilian physics departments. The conversation stems from looking at hate crimes happening worldwide and asking whether this hateful environment of society at large affect academic institutions. Would sexism, LGBTphobia, and racism be present in physics classrooms? Could hate speech or behavior, somehow, affect physics teaching and learning? Grounded on feminist perspectives, theories of identity, and critical race theory, the paper looks into diversity and physics education by examining the situation of race, gender, and sexual minorities in physics. Specifically, it takes on hashtag activism to analyze the experiences of students from underrepresented groups in science. The site of research is social media and the narratives produced by #MyTeacherSaid in Brazil, which was a hashtag used to reveal aggressive comments professors make to students. Results show that analyzing activism through social media can be helpful for unveiling oppressive environments in academia. Specifically, this study shows there is an oppressive climate for gender, racial, and sexual minorities Brazilian students in STEM. The comments range from subtle but harmful comments loaded with gender and race stereotypes, to open threats to students. Finally, the paper urge for a change within physics education research community to include intersectional approaches that take into account race, gender, and sexuality so that we can better understand the teaching and learning of physics, in addition to provide resources to help making more inclusive STEM environments.

15.1 Introduction

This paper is born out of a provocation made by the 2nd World Conference on Physics Education's theme, namely, "Contemporary science education and challenges in the present society: Perspectives in physics teaching and learning." The conference was held in July 2016, in São Paulo, Brazil. Initially, I was planning to

K. Rosa (✉)
Federal University of Bahia, Bahia, Brazil

center my talk on issues around scientific identity development, specifically, discussing about my work on Black women physicists (Rosa and Mensah 2016). However, a month before the conference, a terrible hate crime happened, the Orlando shooting (Hunt 2016). In that occasion, a man opened fire against partygoers at a club in Orlando, Florida; the place was frequented by local gay community and friends. That same weekend, two homosexual men were found dead and carbonized inside a vehicle in a small town in Bahia, Brazil (Gauthier 2016); they were a chemistry and a physics teacher. Two weeks later, in July 2, a Black homosexual student was found dead with signs of beating and half naked at the Federal University of Rio de Janeiro campus (Martin 2016). Those events were considered hate crimes and, unfortunately, hate crimes seem to be spread all over the globe. In my perspective, these events constitute challenges our society needs to address. In this direction, this paper looks into the connections between science education and hateful academic environment, behavior, and speech.

Grounded on feminist perspectives, theories of identity, and critical race theory, this paper discusses diversity and physics education by examining the situation of race, gender, and sexual minorities in physics. Specifically, it takes on hashtag activism (Gerbaudo 2012) to analyze Brazilian educational institutions climate for underrepresented groups in science. Does this hateful environment of society at large affect academic institutions? Is sexism, LGBTphobia, and racism present in physics classrooms? Could hate speech or behavior, somehow, affect physics teaching and learning? I will use LGBTphobia to express discrimination against lesbians, gays, bisexuals, trans, queers, and other people who identify with nonheterosexual nor binary sexualities (gender nonconforming).

To address these questions, I bring elements of theoretical perspectives that help me making sense of the data analyzed in the paper, focusing on key concepts, such as intersectionality, microaggressions, and identity so that we have a common grammar for this debate. Following, there is a discussion on the role of social media for activism in the present and the presentation of data collected through #MyTeacherSaid movement in Brazil. Then, the paper moves to analyze how these hashtags portray hate behavior and speech of physics teachers and faculty toward race, gender, and sexual minorities. Finally, I suggest resources that can be used to support physics students and faculty creating a healthier climate for underrepresented groups in science.

15.2 Theoretical Perspectives

Black Feminism

The lens through which I look at race, gender, and sexual minorities in physics stems from feminist perspectives, particularly Black feminism (Crenshaw 1989). It is often said feminist movement started with suffragists, when women gathered to fight for the right to vote. It is also common to hear “women” wanted to gain public places, to work outside their houses, and to hold job positions that were just allowed to men.

However, when we look at history, we can ask ourselves who were those “women”? Black women, enslaved or not, had been working outside their homes and in heavy-duty activities for a long time; feminism, or mainstream feminism, is not talking about women of color. Sojourner Truth’s speech “Ain’t I a woman” from 1851 (Stanton et al. 1889) addresses this issue perfectly when she says “That man over there say that women need to be helped into carriages, and lifted over ditches, and to have the best place everywhere. Nobody ever helps me into carriages, or over mud-puddles, or gives me any best place. Ain’t I a woman?”. Historically, mainstream feminism has not been addressing the particularities from women of color, making it necessary for “other women” to think and fight for their rights.

Patricia Collins (2000) argues there are three dimensions of oppression that Black women have been enduring: labor exploitation, public sphere denial, and negative stereotypes. The author shows how Black women’s work have been “ghettoized” to occupations related to “iron, pots, and kettles,” serving to US economy and keeping those women in impoverished conditions. She says, “survival for most African-American women has been such an all-consuming activity that most have had few opportunities to do intellectual work as it has been traditionally defined” (p. 6), contributing to the stratification and segregation.

The second dimension of oppression proposed refers to forbidding Black women to vote, to have equal educational opportunities, and to equitable treatment in the criminal justice system (p. 7). The policy for keeping Black women from literacy during slavery and then later providing underfunded segregated schools and currently not providing quality education for inner city and rural people has been fundamental to keep Black women outside the political public sphere.

Finally, Collins’ third dimension of oppression talks about how US society creates, disseminates, and perpetuates an image of Black women as hypersexualized, servers, welfare mothers, kitchen helpers, angry women, and other negative stereotypes. A culture that holds these images tends to dehumanize Black women, denying us a full participation in the society. Because racism and sexism became normalized within US culture, these intertwined proposed dimensions work effectively to maintain a system of oppression faced by Black women.

A departure from mainstream feminism to Black feminism places the centrality of knowledge on the lived experiences of Black women, making it a source for understanding systems of oppression that combine race, gender, and socioeconomic status. This notion of analyzing combined oppressions is known as intersectionality (Crenshaw 1993). Therefore, this framework can be helpful to look at the intersections of race, gender, and sexuality and how they can constitute a system of oppression within physics education.

Identity

The discussion through the concept of identity, in this work, is framed by ideas of practice, performance, and recognition. Identity here is understood as fluid, dependent on contexts and on how one behaves within a context (Lave and Wenger 1998).

This notion is coherent with Judith Butler's work on gender identity, in which the author argues gender is a performativity act, that is, a set of behaviors, discourse, body movements, outfits, etc., chosen to perform a desired role, consciously or not (1990).

Specifically, for the case of science, Heidi Carlone and Angela Johnson offer a framework that analyzes scientific identity formation (2007). Grounded on the experience of underrepresented minorities (URM) in science, the authors argue scientific identity is the interplay of other identities plus performance, competence, and recognition as a scientist. Therefore, to be a scientist, one has to enact social performances relevant to scientific practices, such as using tools, has to have knowledge and understanding of science content, and needs to be recognized by others as a "science person."

Through social interactions, we learn how women are supposed to behave, how we have to move, how to sit, or what we can speak. Black people learn "what type" of people we are, how to dress, and what tone to use; we also learn how a scientist is supposed to behave or look like. Therefore, for URM to be scientists, they need to engage in scientific practices and activities, perform like scientists (e.g., speaking, dressing, behaving), and be recognized as scientists – and all of those need to conciliate with all their other identities.

Critical Race Theory

The other framework used throughout this paper is critical race theory (CRT), which is a movement born out of the legal scholarship in the 1970s as a racially focused critique from Black scholars within the critical movement (Rosa and Mensah 2016). For the purpose of this paper, I will focus on two concepts present in CRT: counterstories and microaggressions.

The legal scholarship has a tradition of using storytelling to present cases; it is the fundamental form of communication in that field. The legal system tends to tell stories of (and for) dominant people. However, there are other stories to be told, the stories of silenced, marginalized, and oppressed groups. Richard Delgado calls these non-dominant narratives counterstories (1989). Counterstories do more than merely providing another perspective; they confront dominant narratives.

Chester Pierce, Jean Carew, Diane Pierce-Gonzalez, and Deborah Wills discuss the psychological effects of television on people of color and define microaggressions as the "subtle, stunning, often automatic, and non-verbal exchanges which are 'put downs' of blacks by offenders" (1977, p. 65). In his studies, Chester Pierce concluded that television would send subtle and harmful racist messages on a daily basis, constantly attacking people of color (1978). These insidious racist attacks serve to perpetuate negative stereotypes and to make people of color to learn "their place."

Although CRT focuses on race when discussing microaggressions, this concept can be extended to other forms of oppression such as class, gender, sexuality, nationality, religion, and body ability. For example, the "simple" fact of not having

other female students in a physics department sends to a woman the message that the department is not her place to be; it is a male space. Similarly, at an academic environment, jokes or conversations focused on heteronormative practices or able-bodied people can constitute a microaggression for sexual minorities or people with disabilities, respectively.

Hashtag Activism

In contemporary society, the Internet has been playing an important role in our lives; online social networks have revolutionized the way we interact with one another; it has even changed the way activists have been organizing themselves. An online social platform that has been largely used by activists is Twitter. Twitter is an online social network where people can broadcast messages of 140 characters or less to a small group of friends, to a person's followers, or to the entire world. When using Twitter, and other platforms, a person can add a hashtag symbol (#) to a word, phrase, or sentence and make that message searchable by the said word, phrase, or sentence. This creates a database of all messages in the world tagged by that specific hashtag. Hashtags work like call numbers in a library system, making it easy to retrieve information if you use the right tag.

The use of hashtags in social media can produce a conversation that transcends geographical boundaries and strengthens the power of broadcasted messages. When used as a form of social critique, the conversations through hashtags can create a narrative that tells the story of a specific episode or movement. As Guobin Yang exemplifies, we have already several cases of hashtag activism, like #BlackLivesMatter, #JeNeSuisPasCharlie, #IcantBreathe, #BringBackOurGirls, #StopGamerGate, #WhyIStayed, #OccupyEverywhere, #ThisIsACoup, and #MuslimsAreNotTerrorist (2016, p. 14).

Women of color are also gaining narrative agency in hashtag activism. Yang considers "narrative agency in hashtag activism as the capacity to create stories on social media by using hashtags in a way that is collective and recognized by the public" (p. 14). One example of feminism hashtag is seen in Susan Berridge and Laura Portwood-Stacer's work, when they discuss the support of women activists to violence against women in Delhi, India (2015). They show how feminists use hashtags #BoardtheBus, #StopStreetHarassment, and the #EverydaySexism project to show their support. The authors stress the potential of feminist hashtags to expose the transnational pervasiveness of gendered violence. In 2015, the journal *Feminist Media Studies* issued a special divided in three editions on feminist hashtags. Although hashtag activism keeps growing strong, it seems science educators have not yet grasped the importance of this phenomenon.

An important feature of a platform such as Twitter, especially for marginalized groups, is that it provides a space for building and sharing counternarratives and "reimagining group identities" (Bonilla and Rosa 2015). Yarimar Bonilla and Jonathan Rosa argue a hashtag can become a field site. In this paper, we use the

counterstories provided by #MyTeacherSaid as a site for analyzing Brazilian academic environment for STEM students, particularly in physics.

15.3 Data Collection

The *locus* of the study is the Internet and two of its social networks, Twitter and Facebook. The object of my analysis is the narrative created by #MyProfessorSaid. I am calling #MyProfessorSaid as a collective of hashtags related to comments made by teachers and faculty and revealed online by students in Brazil. In order to capture the conversation created by #MyProfessorSaid, I have searched Twitter, Facebook, and Google for the following hashtags: #meuprofessordisse, #minhaprofeadoradisse, #meuprofessorsecreto, #minhaprofessorasecreta, #esseehmeuprofessor, #esseémeuprofessor, #essaehminhaprofessora, and #essaéminhaprofessora. Currently, Google's search algorithm can retrieve hashtags from various platforms, which makes my searching approach redundant, but I wanted to be sure to search directly at Twitter and Facebook.

These hashtags translate from Portuguese as “my professor said” (#meuprofessordisse, #minhaprofeadoradisse), “my secret professor” (#meuprofessorsecreto, #minhaprofessorasecreta), and “this is my professor” (#esseehmeuprofessor, #esseémeuprofessor, #essaehminhaprofessora, #essaéminhaprofessora). Because Portuguese has a gendered grammar, there is a male and a female version for each hashtag. In addition, the verb “is” can be written with accent (é) or without accent (eh), which explains four hashtags just to express “this is my professor.” In Portuguese, the word “professor” can be the same for teacher, faculty, and professor. Considering the analyzed hashtags which make reference to university faculty, and that the vast majority of faculty in physics departments in Brazil is tenured, I use “professor” – both words are spelt the same in Portuguese and in English.

In addition to comments on social media, I have collected images online representing an unfolding of the same conversation #MyProfessorSaid. I have also taken pictures of posters on the wall of university campuses when I found a continuation of this conversation. A snowball approach was used since, after a while, several comments would bring the same messages I had already collected.

Race, Gender, and Sexuality: Climate in Brazilian Universities

In an article by Andrew Jacobs on July 5, 2016, *The New York Times* says “Brazil is confronting an epidemic of anti-gay violence: Despite a storied image as a tolerant, open society, Brazil is, by some counts, the world’s deadliest place for sexual minorities.”

Looking at Brazilian news outlets, it was not hard to quickly find these headlines:

- “After racist and homophobic protest, University of Brasília condemns offensives and will investigate the case,” publishes Yara Aquino, from Agência Brasil, on June 20, 2016.
- “Assassination of Black and gay student in Rio shows intolerance at the university—Diego Vieira was found dead with signs of beaten and half naked on UFRJ campus,” brings El País Brasil, on a piece by Maria Martin, published on July 7, 2016.
- “Homosexual teachers are murdered and their bodies incinerated in Bahia,” writes Jorge Gauthier for Correio 24 horas, on June 14, 2016.

These headlines can give a sense of current climate for racial, gender, and sexual minorities at Brazilian universities.

Hashtag Activism in Brazilian STEM Courses

#meuprofessor disse at USP Universidade de São Paulo (USP) is the largest university in Brazil, located in the country’s most populated state; it is home of our oldest physics research and teaching institution. In 2016, the Institute of Physics at USP (IFUSP) entered the world of a trending topic by hashtag feminism, *#meuprofessor disse* (*#myprofessorsaid*). This hashtag made public things said by teachers, faculty, and professors in various schools and academic settings. When IFUSP students entered the conversation, they revealed an environment of sexism, elitism, and homophobia in the country’s largest physics department.

The online protest gained IFUSP physical walls, and posters were printed displaying the hashtag contents. Below are pictures of some of the messages posted on the walls.

In Fig. 15.1, it is possible to see some comments were hashtagged to indicate whether the comment was made by a male professor (“professor”) or a female professor (“professora”). In this sample, comments made by female faculty expressed, specifically, forms of oppression based on race, “Do you want Black colleagues that know nothing,” and class, “I am not going to change my classes to poor students who live in the slums.”

There were variations in the hashtags, at USP and elsewhere, including *#meuprofessor disse* (my professor said), *#essemeuprofessor* or *#esseémeuprofessor* (this is my professor), *#meuprofessorsecreto* (my secret professor), *#minhaprofessor disse* (my female professor said), and *#umdiretordisse* (a dean said). Although hashtags varied, the conversation was the same, microaggressions toward women, people of color, sexual minorities, and low-income students.

#meuprofessorsecreto at UFES One feature of hashtag activism is its ability to cross geographical boundaries. At the Federal University of Espírito Santo (UFES), students also brought a narrative exposing an aggressive academic environment. Figure 15.2 shows those messages on a board; a large poster says “professor, harassment is a crime.”



Fig. 15.1 A sample of wall posters at University of São Paulo displaying comments made by Institute of Physics’ professors to their students—#meuprofessorsecreto

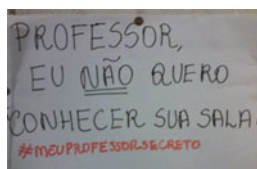
Similar to USP, online activism gained physical walls at UFES. In another hand, unlike USP, where #meuprofessordisse was specifically from Institute of Physics, messages at UFES’ board show the broader environment of that institution. Students’ narratives through hashtags reveal harassment, objectification of women, and overall sexism (Fig. 15.3).

#meuprofessorsecreto at IFG Online activism, as wall posts show, unfolds offline. Stemming from #meuprofessorsecreto, students from Instituto Federal de Educação Ciência e Tecnologia de Goiás (IFG), an institution targeted to technology careers, wrote an open letter (Open letter 2016) asking for support regarding the abuse they have suffered at school. On the letter second paragraph, students expose sexual harassment perpetrated by IFG’s faculty:

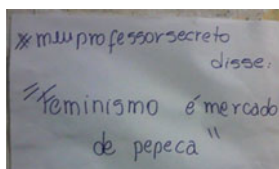
For over 2 years we have been suffering from various abuses, there is a faculty we cannot name who is using his power to harass female students. He has even said: “If any female student would go out with him, he would pass all other students.” (Open letter 2016)



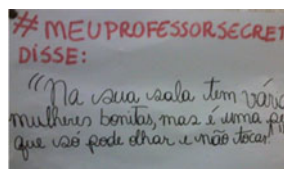
Fig. 15.2 A board at the Federal University of Espírito Santo displays several sentences said by institution’s faculty and denounced by students through #meuprofessorsecreto



Professor, I do not want to visit your office.



Feminism is a [female genitalia slang] market



In your classroom, there are many pretty women, but it is unfortunate one can one look at and not touch them.

Fig. 15.3 Comments made by faculty at UFES, #meuprofessorsecreto

On the fourth paragraph, students add LGBTphobia, racism, and religion persecution as part of the academic climate at IFG:

Several students were victims of racism, LGBTphobia, prejudice, sexual harassment, and religion intolerance. It got to the point the faculty asked: “If the student got late for being at senzala.” [...] over 30 complaints were made against this faculty. (Open letter 2016)

Senzala is the place where enslaved people were kept captive during slavery times in Brazil.

IFG students, like students from other institutions, use hashtags in various platforms to reveal microaggressions, to reach out to other students and society at large. Figure 15.4 shows a public Facebook post using #meuprofessorsecreto; in that



Fig. 15.4 Facebook post using #meuprofessorsecreto reveals faculty’s aggressive and sexually charged comment. Translation: “mysecretprofessor Asks if those who stretch their ear are also willing to stretch other things

post, a student shares a sexually charged comment made by a faculty suggesting the use of ear stretchers, a type of body piercing jewelry, may be a sign of willingness to “stretch” other parts of the body. It is important to remember those comments are made by faculty to students at academic environments.

#esseémeuprofessor at UFRGS Motivated by #meuprofessordisse, physics students from the “Girls in Science” project at the Federal University of Rio Grande do Sul (UFRGS) collected comments heard by physics students across the country; they used an online anonymous survey. This group also brought hashtags to another dimension, producing images displaying what the faculty say to students in Brazil and sharing them through social media (Fig. 15.5). Here, hashtag activism was, somehow, institutionalized as the narratives were created through a federally funded project that aimed to foster the participation of young women in STEM fields.

Comments made by faculty in physics programs show sexism, homophobia, and abuse of power. When a faculty says they “thought women would not be able to do this activity,” they explicitly doubt women’s capacity in comparison to men. By doing so, they help mine their self-efficacy, which is an important factor for career choice and performance in science (Häussler and Hoffmann 2002).

Sexism, Racism, and Homophobia: Challenges in the Present Society

Considering what hashtag activism shows to be happening at universities, I believe it is fair to say hateful environment of society at large affects academic institutions. It would be naïve to think university spaces as safe heavens disconnected from the outside world. Even though a lot of what is discussed in academia stays within its walls, when it comes to peoples’ behaviors and practices, it is impossible to dissociate faculty, students, and employees from their lives off campus. At least in this way, physics departments are not isolated from the rest of the world.

Women face, worldwide, the fear of being raped, just for being women. This hateful and extreme violence against women is still a problem in our society. When a physics professor says to a student “You are still going to be raped,” this professor is perpetuating the misogyny we deal with on a daily basis. When this happens in a



I thought women would not be able to do this activity



You are girls, you are slower. If you didn't understand, I'm not going to explain it to you.



Women only get into college to find a husband



Turing is the mother of computer science



Depending on me, you won't graduate
*threat after a going out invitation



I need two Master students, an intelligent guy and a pretty girl to carry my books and to serve me coffee

Fig. 15.5 Images created to social media distribution displaying comments made by STEM faculty across the country

classroom, a place where we are supposed to feel safe, it can affect our ability to learn science content. This violence in a physics classroom can also interfere in a student's self-image toward becoming a scientist. How can a woman, surrounded by male colleagues and faculty, walk around and interact with all those men when she listens from one of them that she is going to be raped, one of the most severe violence a person can suffer?

#MyProfessorSaid shows us there are professors in Brazil who have been explicitly saying “physics is for men.” This is not a subtle message; this is a clear message to any woman in a physics department that they do not belong there. Moreover, professors help perpetuating the image of women as people who exist to be pretty for the male gaze and who lack intellectual capacity. By saying “you are as beautiful as stupid” or “I will give you an easier exam because you are a woman,” professors reinforce those ideas. If a woman wants to be in physics, the only path she is allowed to take is to be a high school teacher, which is thought to be easier and less of a career; according to what a secret professor said, “a physics teaching degree is for

women who fail in a physics research degree.” These secret professors bring to the classroom, in comments that may sound harmless, gender-negative stereotypes, “you are a woman; you should know how to cook,” and career prejudice.

Physics professors exposed in #MyProfessorSaid send messages that constitute a public sphere denial form of oppression; they say to women not only where “their place” is but send a constant reminder that physics *is not* where they should be. These statements help keeping women out of public conversations about science, technology, and policies that involve this type of knowledge. Although women can now vote, they cannot fully participate in political decisions where scientific knowledge is required. Even when the discussion is about reproductive rights of women, the conversation, supposedly based on science, is led by men.

The stories brought by #MyProfessorSaid counter a dominant discourse that women do not like physics, that they are overly sensitive to “innocent jokes,” and that students in the same classroom are given equal educational opportunities.

The vast majority of hashtags found use “professor” indistinctively of gender; however, there were a few that are explicitly marked as “professora,” indicating the comment is made by a woman. When we look at those comments, the intersections of race and class become evident as privilege of White middle-class or upper middle-class women is exposed through racist and elitist remarks. Black and low-income students encounter a hostile environment in physics departments, according to the stories told by #MyProfessorSaid. The image of Black people as being low achievers and having less intellectual capacities is used to justify oppression in the form of racism. When a female professor asks physics students if they “want Black colleagues that know nothing” sharing that same space with them, she is saying non-Black students are more intelligent and deserve to be in that classroom, while a Black student should not be allowed entering that space. Moreover, she is influencing students to be against the presence of Black colleagues in physics; she is multiplying the chances a Black student will enter a racist environment when going into physics.

Brazilian physics students reveal how our physics departments are a site for all sorts of oppression. They show us that depending where one come from, geographically, they will not be seen as part of that community. At least one student has listened they “need to study more because of where [they] were born,” suggesting people from certain parts of the country are less capable of following a physics course and disseminating oppression in the form of negative geographical stereotypes. The very fact a professor thinks that of their students may hinder students’ learning in the classroom. There are even students who are advised to give up of physics and change careers, “If I were you, I would change major.” Recognition from instructors is one factor in measuring one’s self-efficacy in physics (Sawtelle et al. 2012); the less a student feels their teacher recognizes their ability to do physics, the less the said student will believe they can do physics.

Even common human respect of others’ pain, as in the moment a family member passes away, seems to be forgotten in some Brazilian physics departments. Through #MyProfessorSaid, a student reports their professor’s reaction when hearing about the death of the student’s grandmother: “Did your grandma die? Bring me the death

certificate; you will fail anyway.” If this cold human being is the image one associates with being a physicist, maybe one will not want to be identified with this.

Continuing with the analysis of Brazilian physics departments through #MyProfessorSaid, we can see a lack of comments addressing sexual minorities. That can be read as a result of the severe underrepresentation of sexual minorities in physics. Brazil is a hostile country for LGBT+ population: it is “the deadliest country for sexual minorities” (Jacobs 2016). Because sexual minorities are not necessarily visible minorities, it is not a surprise to see or identify fewer of us in physics departments. That lack of visibility is not a constraint for professors to make homophobic remarks, though.

In the form of a homophobic joke, a professor said “Turing is the mother of computer science,” making reference to Alan Turing a scientist who is known to be gay. This is a clear situation of microaggression to homosexual students; by making fun of a notable scientist’s sexuality, this professor can send the message that no matter how brilliant a student is or how big their contribution to science is, they are going to be mocked for their nonnormative sexual orientation, they are going to be reminded they do not socially perform like a scientist should.

A homosexual physics student who walks around the Federal University of Rio de Janeiro campus may find a wall painting where it reads “Death to gays at UFRJ.” These open threats help keeping sexual minorities in ghettoized occupations, not being fully participants in our society. For the few sexual minorities who enter STEM courses, some practical academic situations can be discouraging. A STEM undergraduate student reveal through social media the hurdles he faces just to submit a paper abstract into an online system (Fig. 15.6), he says:

Great things about being trans in the academy: I’m here with my abstract ready to submit to the system but I haven’t done it yet because no one has answered my emails about being allowed to use my real name in the system.

This hostile environment sexual minority people experience in academia is not a Brazilian phenomenon; it happens around the world. Diana Bilimoria and Abigail Stewart discuss the academic climate for LGBT+ faculty in science and engineering in the United States and show a negative climate can have career consequences such as “explicit exclusions from opportunities” (2009, p. 96). Louise Mayor, in a *Physics World* in-depth report, exposed intolerance toward sexual minorities at CERN particle-physics laboratory in Switzerland (2016). One year before that, the

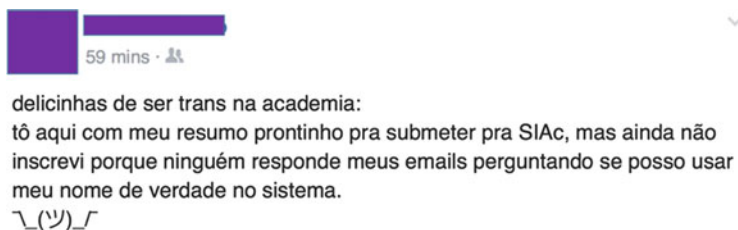


Fig. 15.6 A trans student uses social media to share his struggle to submit an abstract

American Physical Society (APS) ad hoc committee on LGBT issues (C-LGBT) produced *LGBT Climate in Physics*, a report that reviews the status of LGBT physicists to assess the barriers to full inclusion within the physics community around the world.

APS report revealed there is a degree of discrimination felt by sexual minorities, where gender-nonconforming people are more uncomfortable at their university departments and workplace and LGBT men face the least discomfort, followed by LGBT women. This was also reported for observing and experiencing harassment (Atherton et al. 2016). These data show the intersections of gender and sexuality make LGBT+ women experience oppression more than LGBT+ men. The situation is worst for gender-nonconforming people. These findings are along with Shayle Matsuda's work when discussing the hurdles faced by trans researchers in science (2015). In 2013, *Out in Science, Technology, Engineering, and Mathematics* conducted the first *Queer in STEM* survey (Out in science 2016). It was an in-depth look at the experiences of sexual minority professionals working in STEM fields. The survey was answered by more than 1400 people in a worldwide research, with larger participation of people from the United States and Canada. At the time, the *Queer in STEM* revealed more than 40% of sexual minorities in STEM have not disclosed their sexual identity to colleagues, coworkers, or students, even if they are totally "out of the closet" at home. Another finding was that STEM environments with more even representation of men and women and with colleagues and employers that openly support sexual minorities help people being more likely to be open about their identities. A second edition of this survey was conducted in December 2016, and its results are not out by the time of this publication. Overall, when it comes to sexual minorities in STEM fields, we still lack of research, particularly those looking at LGBT+ students' experiences. In this direction, analyzing hashtag activism is a powerful tool to access students' perspectives.

Finally, it is interesting to note a particular feature of hashtag activism in Brazil, its mix and merging of online and offline activism, particularly by writing post or printing what was first posted online. It looks like the timeline goes as a movement emerging online, connecting people from different locations, and then a counterstory is developed, and local communities bring the conversation back to include, expose, and face the perpetrators of the aggressions. This story timeline strengthens the narrative and protects the identity of students who revealed the comments in the first place. When hashtags come back to local institution on their walls, there is a greater level of anonymity.

15.4 Conclusions and Recommendations

Implications

The discussion brought in this paper has implications for the Physics Education Research (PER) community, for our school and academic practices, and for physics classrooms. It is important to PER people to start thinking about how race, gender, and sexuality may play a role in our research; these social constructs and identities

need to be taken into account when studies are designed. By assuming students', faculty's, and teachers' identities do not affect the results of our studies might actually hinder the quality of our research. In addition, PER need to incorporate qualitative approaches and methodologies that allow for individual characteristics often lost in traditional quantitative approaches and to be aware of new sites of research such as social media.

Educators may have access to up-to-date PER and to learn all about innovative teaching strategies, but if none of these address the (not so micro) aggressions women, people of color, and sexual minorities face in physics departments, these resources will not be effective. We need to promote inclusive practices for racial, gender, and sexual minorities in our school, college, and universities. It is urgent that we work to accommodate name changes in publications or online submission systems, for example. Promoting the creation of interest/support groups for racial, gender, and sexual minorities is also something that can be done in science education community.

Changes can start even when selecting materials (e.g., textbooks) to work; it is important to look for materials that do not reinforce racial, gender, and sexual stereotypes. People need to (re)think in which way language, comments, and jokes made in class are promoting prejudice, racism, sexism, and/or LGBTphobia. Finally, we have to discuss the participation of racial, gender, and sexual minorities in physics. The following are selected resources that can help addressing some of these implications.

Selected Resources

- *National Organization of Gay and Lesbian Scientists and Technical Professionals* (NOGLSTP), a professional society that educates and advocates for lesbian, gay, bisexual, transgender, and queer students and professionals in science, technology, engineering, and mathematics. They produced a material “Queer scientists of historical note” that can be helpful for the classroom. In addition, they have a scholarship program for people who identify as LGBT+ <http://www.noglstp.org>.
- *LGBT Climate in Physics* report reviews the status of LGBT physicists to assess the barriers to full inclusion within the physics community. The document is available online at <http://www.aps.org/programs/lgbt/upload/LGBTClimateInPhysicsReport.pdf>.
- *LGBT+ physicists* is a website for and from LGBT+ and allies in physics, <http://lgbtphysicists.org>.
- *The American Physical Society page on LGBT Physicists*, <http://www.aps.org/programs/lgbt>.
- *American Institute of Physics Teaching Guides on Women and Minorities in the Physical Sciences* are valuable resources for the classroom, with full lesson plans available, <https://www.aip.org/history-programs/physics-history/teaching-guides-women-minorities>.

- *Out in Science, Technology, Engineering, and Mathematics* (oSTEM) is a support network which has been holding conferences targeted to LGBT+ people in STEM, <http://www.ostem.org>.
- *Prisma* is a recently formed group that aims to promote activities and discussions in order to transform the Federal University of Minas Gerais' Instituto de Ciências Exatas (ICEEx) into a safe and welcoming environment for LGBT community, <http://www.facebook.com/Prisma-603587806483371>.
- *Negras e negros nas ciências* is a Brazilian community for and of Black people in science and others interested in supporting people of color in STEM, <http://www.facebook.com/groups/negrasenegrosnasciencias>.

15.5 Final Remarks

The analysis of a new era of activism through social media can be helpful for unveiling oppressive environments in academia. Specifically, this study shows the oppressive climate for gender, racial, and sexual minority Brazilian students in STEM.

The intersection of race, gender, and sexual orientation hinders the social integration of Black women and sexual minorities in academia and exposes the racism, elitism, and LGBTphobia among students and faculty in Brazilian STEM departments. There are no possibilities to shift the racialized gender experiences Black women face to solely gender experiences. Similarly, we cannot isolate sexual minorities' experiences in STEM without looking at the intersections of race and gender.

The performance expected by the scientific community for those entering STEM fields is the one that mimics this predominantly White, male, and heterosexual environment. Black women and sexual minorities embody precisely the opposite. These groups might face more obstacles to achieve the recognition component of scientific identity – recognizing oneself and being recognized by others.

Experiences of surprised looks from colleagues and teachers, differential treatment, and being outnumbered in a classroom send to young women, people of color, and sexual minorities the message they are out of place. Adding to this is an absence of representation of racial, gender, and sexual minority scientists in the media, textbooks, and lesson plans. Collectively, these microaggressions create an environment that teaches underrepresented minority youth that they do not belong in science and are not welcomed to pursue careers in STEM. As I have said in previous work, microaggressions at educational settings are a powerful tool to enculturate students in a stratified society and its systems of power and knowledge (Rosa 2013). Physics departments and school administrators need to address racist, sexist, and homophobic comment and behaviors. It is baffling the “secret professors” in this analysis did not face legal consequences for their acts.

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Katemari Rosa is a Professor of Physics at the Federal University of Bahia, in Brazil. She identifies as a Black Latina bisexual woman. She works primarily with preservice physics teachers and is committed to the teaching of science for social justice. Her research focuses on the intersections of gender, race, and ethnicity in physics education. She is a member of the Brazilian Physics Society and the American Association of Physics Teachers.