Jun 25th, 9:00 AM

Visualizing stories of sexual harassment in the academy: Community empowerment through qualitative data

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Citation

Visualizing Stories of Sexual Harassment in the Academy: Community Empowerment through Qualitative Data

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Abstract: This paper presents the design report of an experimental data visualization artwork that deals with sexual harassment in academic environments. The visualization employs a qualitative dataset of stories of abuse and aims at nurturing emotional involvement by creating connections with the people behind the data. In the paper, we outline our theoretical background, considering previous research on anthropomorphic and artistic visualizations. Successively, we disclose our design approach and discuss the visualizations' capability to nurture reflection, stimulate conversations, and empower the community of people fighting against sexual harassment in academia and beyond.

Keywords: sexual harassment; artistic data visualization; prosocial behavior; qualitative data

1. Introduction

Previous research made explicit the interest of the design research community in working on qualitative interfaces to support behavioral change and new forms of understanding. Such artifacts ought to help people in exploring other's thinking, and in understanding their agency with the systems that surrounds them (Lockton et al., 2017, p. 1849). In our work we aim at capturing and communicating through visualization the traumatic experiences of people who faced sexual harassment in academia, and at transferring these experiences and emotions to others, nurturing reflections, and conversations (Figure 1). As described in the

next sections, we align ourselves with the group of activists that want to nurture inner reflections and behavioral change in members of the academic community (see section 2).
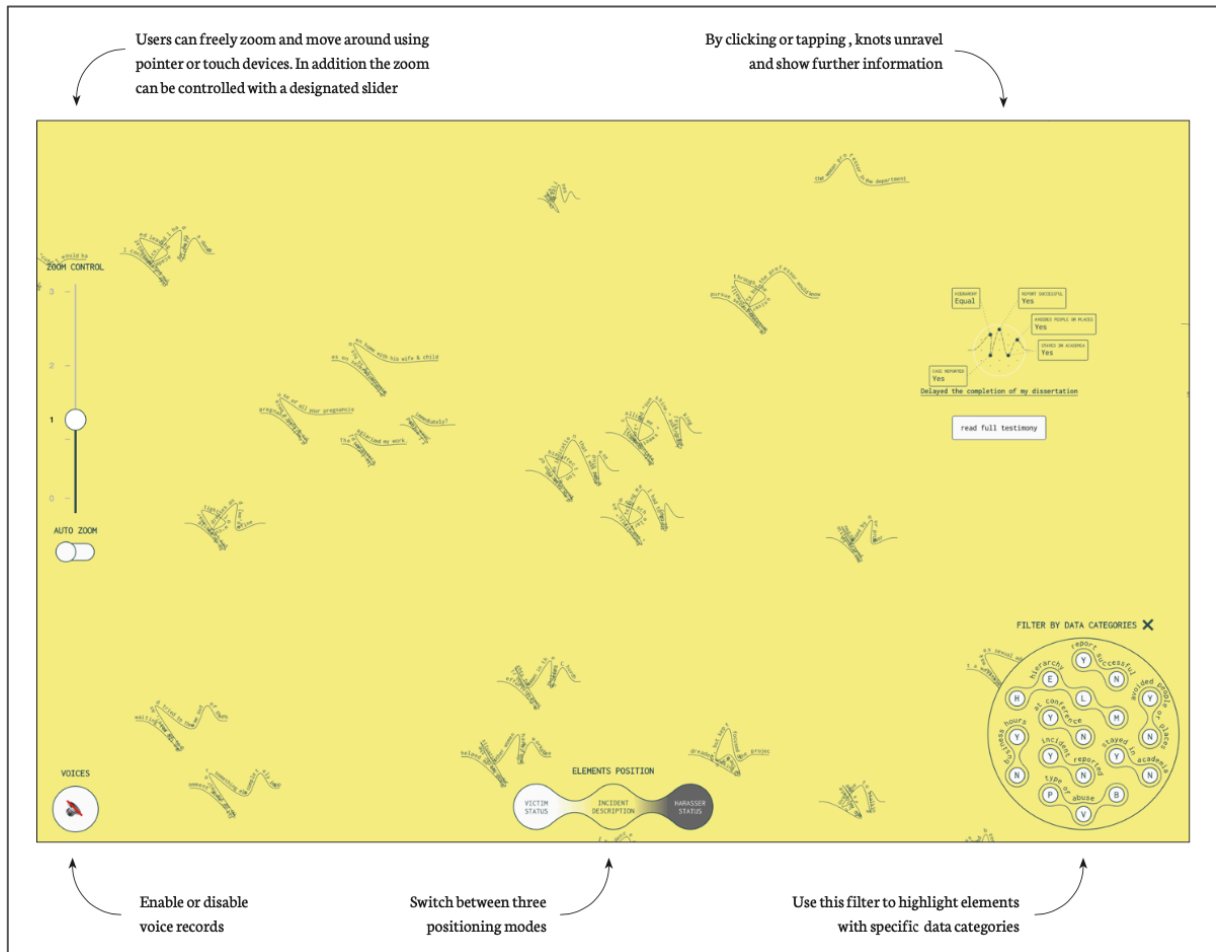

Figure 1   Tied in Knots is a data visualization project aimed at making visible the issue of sexual harassment in academia. The data comes from an anonymous online survey aimed at collecting stories of sexual abuse. We explored different ways of visually representing the dataset while honoring the individual experiences reflected in the data. Access the project at its website: https://tiedinknots.io.

Visualization researchers have recently been invited to reflect upon the ethical dimension of their work and to advocate more for the things they care about (Correll, 2019). By welcoming this invitation, we take the opportunity to bring visibility to the issue of sexual harassment (SH) in academia. At the same time, we employ this case study to inquire about appropriate strategies to design visualizations that deal with sensitive, emotional, and qualitative information, as it is still uncertain how visualization can be used in similar contexts. In this work, we build on previous work on data feminism (D'Ignazio & Klein, 2016, 2020), critical InfoVis (Dörk et al., 2013), digital humanities (Drucker, 2011, 2020), and anthropomorphic visualization (Boy et al., 2017; Ivanov et al., 2019; Morais et al., 2020, 2021).

In section 2 we outline our theoretical background, introducing the issue of sexual harassment and describing previous works that employed visualization in the attempt of raising

empathy and a prosocial behavior. In section 3 we present our methodology, encompassing the definition of goals [G1, G2, G3] and open questions [Q1, Q2], the collection of information to steer the design process, the quantitative and qualitative analysis of data, the design of a custom visual model, and the design of a user interface. Section 4 presents a critical discussion of our results against our initial requirements. In section 5 we present conclusions and indicate further works.

2. Background

2.1 Sexual Harassment in the Academy

Sexual Harassment (SH) is a serious issue with 60% to 75% of women reporting experiences of undesired sexual attention or coercion at workplaces across all sectors (Aguilar & Baek, 2020).

Academia is no exception. SH has a negative impact on individuals' lives and careers and pervasively affects the educational environment. It threatens academia as a place that, ideally, should create a supportive environment, free of individual suppression, and capable of fostering knowledge generation and discussion. Institutions from all around the world have already issued policies to explicitly counteract SH; for instance, we can consider the Title IX federal law in the United States of America[1]. Despite the existence of similar measures, it is hard to counteract the phenomenon, and it is difficult to clearly define its boundaries. Sexual harassment has many faces.

As Amienne explains, it extends beyond rape and overt sexual aggression and constitutes "many complicated and twisted forms of abuse" in which victims are "grappling with the long-term effects of systemic, sexist dysfunction in academe". Incidents reports often fall on deaf ears, because they collide with the so-called "culture of abusers and enablers," namely the fact that perpetrators can benefit from their positions of power and are protected by their social relationships located at a higher academic hierarchy. Therapists and counselors listen to many stories of abuse, which are personal and sensitive; they directly see the effects that bullying, manipulation, and coercion have on victims: loss of self-esteem, depression, and PTSD. As a consequence, many people who have encountered sexual abuse quit their academic path, resulting in damage to themselves and to the institutions which has invested resources in their education (Amienne, 2017).

The work presented in this paper is based on the data collected through an online survey issued by Dr. Kelsky, an anthropologist who provides consulting services on the academic job

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[1] See https://en.wikipedia.org/wiki/Title_IX (Accessed: 30-11-2021) or https://www.justice.gov/crt/title-ix-education-amendments-1972 (Accessed: 28-03-2022)

market and on post-academic careers[2]. Her goal is to raise awareness and foster the conversation about SH and to push interventions to counteract this issue by exposing, in anonymous form, personal stories of people who have experienced abuses (Kelsky, 2017).

01. Describe the incident(s)
«When I was an undergraduate student in my final year in 2005,
I was groped and kissed by a professor while in his office during a private meeting.»

02. What was your status when the incident(s) happened
«I was an undergraduate student in his class»

03. What Was the Status of the Perpetrator(s) (Particularly, relative to you)?
«He was the professor of a class I was taking. He was the thesis supervisor of my roommate.»

04. What Was the Gender of the Harasser?
«Male»

05. What type of institution was it?
«Elite Institution/Ivy League»

06. What Was The Name of the Institution(s)?
«McGill University»

07. Your Field/Discipline
«Communications»

08. Institutional Responses to the Harassment (If Any)
«None. Unreported»

09. Institutional/Career Consequences for the Harasser (If Any)
«N/A»

10. The Impact of the Harassment on Your Career
«I currently work at the University where this harassment took place. I have taken steps to avoid encountering the harasser.»

11. The Impact of the Harassment on Your Mental Health
«Distrust of authority figures. Depression.»

12. The Impact of the Harassment on Your Life Choices/Trajectory
«Unsure.»

13. Other Comments You'd Like to Add [...]
«Thank you so much for doing this. When the #Metoo movement started, I finally told my friends and family about what happened. I am still too afraid to report the harassment at the University, even though I know that this man has most likely continued to harass women in his classes. I felt that no one cared about what happens in the academic environment. I feel it is one of the most patriarchal environments to study and work in.»

Figure 2   The 13 questions that constitutes the survey, accompanied by an answer taken as example. Results are collected through open text fields with a partial exception for questions 03 and 04 where participants can select from a list of options or write a custom answer.

Previous works employed the survey, discussing limitations and valuable aspects. Although it is likely to suffer from a selection bias (participants were probably familiar with Dr. Kelsky and, as a group, they may have similar set of experiences) and doesn't cover all academic

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[2] Find more information about Dr. Kelsky at https://theprofessorisin.com/about-the-professor-2/ (Accessed: 30-11-2021. Archived version: https://archive.md/5P21y)

fields (about half of respondents are from Humanities), it's one of the few responses to a renewed and vigorous call to action aimed at addressing and preventing SH in academy (Aguilar & Baek, 2020). The present survey looks interesting because it employs over 2000 reports (even though anonymously), while studies that examine SH are mostly limited in sample size (Karami et al., 2020). It can be considered a large-scale dataset and, additionally, it is publicly available (Yang & Wang, 2018). We consider this survey a good case study due to the richness of its content and to its open participation: people have invested their time in sharing their stories, confirming the magnitude of the problem and the fact that it is endemic to the hierarchies of the academy.

The survey is structured around 13 open questions that focus on the incident description, involved people, and consequences for victims and perpetrators (Figure 2). As a result, the survey provides access to several personal and emotionally touching stories that are mostly related to incidents that occurred in North American institutions. While reading these stories, we encountered SH incidents that are presented as intentional and unequivocal assaults (physical or verbal), or as episodes of a more elusive nature, in which the attitude and the language of the harasser interact with the background of the person involved. The elusive nature of SH does not make it less dangerous. Instead, it is of paramount importance to reflect on this character of the phenomenon, to educate people in academia (and beyond) to recognize episodes of harassment and identify appropriate countermeasures. The gathered stories, with all their richness and diversity, provide an interesting opportunity for working on this important topic. At the same time, the stories collected as part of this survey present at least two challenges for visualization researchers.

The first challenge entails the fact that it is difficult to treat stories as data for visualization, due to their qualitative and unstructured nature. Visualization works well with data that is structured in categories and quantities and that can be aggregated. However, the SH stories address similar aspects, but in very diverse and personal ways. As we will see in Section 4, the application of text-processing techniques resulted in a loss of the nuanced personal language that makes each story unique and distinct and that is the result of the freedom of expression that people were granted while prompting their testimonies. Transforming the stories and their underlying data into a format that can be visualized is therefore a delicate process.

The second challenge concerns the prominent emotional content of the topic and the stories. There is a strong reference to emotions in the survey invitation ("see that you're not alone" or "sharing your story can be transformative for victims"), in which we learn how SH impacted on the emotional sphere of victims, and, lastly, it becomes clear that taking in these stories is an intense experience for the reader. Considering the emotions of victims and identifying strategies to connect them with the audience was key in this visualization project, but it was unclear if and how visualization can transfer or nurture the emotional aspect of these stories.

2.2 Emotions and Data Visualization

It is widely accepted that emotions play a fundamental role in every form of human activity and particularly in finding solutions to problems: "Emotions, we now know, change the way the human mind solves problems—the emotional system changes how the cognitive system operates" (Norman, 2003, p. 18). At the same time, our minds tend to rationalize and obscure any emotional response related to the reading of data visualizations, applying a process called "post-hoc rationalization". This outcome may be compatible with visualization for technical domains, however in other areas it may be desirable to use forms of visualizations that evoke emotional connections (van Koningsbruggen & Hornecker, 2021). This is the case for visualizations that aim at stimulating prosocial behavior, the intent to benefit other individuals or society as a whole (Twenge et al., 2007), or at nurturing an emotional connection with the people represented in the data shown.

Among different forms of emotions, empathy is the one that appears as the most studied in relation to visualization (Boy et al., 2017; Ivanov et al., 2019; Morais et al., 2020). Previous work has questioned whether visualization is able to convey or increase empathy; visualization should be limited to the communication of information, while supplemental materials such as photos, videos and narrative texts are more appropriate to create emotional connections (Cairo, 2016). Despite this assumption, it is possible to identify cases that employ anthropomorphic visualization techniques (i.e., visualizations that resemble human figures) in an attempt to elicit readers' empathy. Such visualizations are called *anthropographics* (Boy et al., 2017) and are designed to make readers compassionate with the people behind the data represented (Morais et al., 2021).

In their work, Boy et al. identify a design space for anthropographics that is made of four dimensions. They consider unity versus aggregation (class of visualization), the realism and expressiveness of human pictograms (human shape), the use of generic, iconic, or unique labelling (unit labelling), and the organization of elements into grids or organic grouping (unit grouping). However, when comparing anthropographics with more traditional visualization techniques, it has been found that the two types of visualization perform very similarly in the elicitation of empathy and prosocial behavior. In addition, Boy et al. conclude that the narrative is more impactful than the visual means of data presentation (Boy et al., 2017, p. 11).

Morais et al. introduced a more articulated design space (Morais et al., 2020). However, when measuring the efficacy of anthropographics, they found "no clear evidence that if designers employ current anthropographic design strategies this will have a clear and observable impact on people's decisions and behavior" (Morais et al., 2021, p. 17).

Ivanov et al. experimented with anthropomorphizing data elements in immersive three-dimensional spaces and explain that the strategy could be insufficient "especially if those models or characters fail to conform to social norms or suggest a level of complexity or interactivity that the system cannot deliver"(Ivanov et al., 2019, p. 26).

Interestingly, previous work has also considered the use of sound to nurture the involvement of readers. Ivanov et al. call for the use of sound to create more convincing visual landscapes, while Boy et al. explain that sound might also increase affective responses (Boy et al., 2017, p. 11).

One explanation to the fact that anthropographics do not produce the desired results can be linked with the effects of the "psychic numbing." Human sensibility toward the value of lives decreases with the growth of numbers, the magnitude of problems, or the severity of threats (Slovic & Västfjäll, 2015). The mechanism follows the Weber–Fechner law[3], which describes the change of human perception in relation to the intensity of physical stimuli, like sounds and lights. It can be extended to goods and money, and it becomes particularly apparent when considering the value of human lives. People are compassionate towards single or a few individuals, especially toward close ones, but the value of a life decreases when it becomes part of a larger number. As humans, we lose empathy as numbers increase. As the authors put it, nature made us sensitive to the small at the expense of the large; our affective system privileges concrete images and "the here and now."

The most visible consequence of psychic numbing is the lack of action against problematic situations (e.g., famines, climate change). When we grasp the magnitude of problems and we compare it to our little agency in improving things, denial comes into play and prevents us from approaching the singularities and individualities of the problem. Denial is made easier by the fact that the emotional impact is weakened by magnitudes, and we easily look elsewhere.

Slovic and Västfjäll speculate on strategies to mitigate the effects of psychic numbing, considering what is known about the functioning of the human affective system. They suggest changing how we frame the information: instead of reporting "eight hundred thousand killed in the last one hundred days," it might be better to say "one life lost every eleven seconds."

From the prospected research background, we can learn how visualization techniques of anthropographics look intriguing but are apparently difficult to leverage, and how important is to highlight singularities when we want to stimulate readers' action. These aspects have been considered while setting the requirements of our research.

3. Methodology

3.1 Approach, Goals, and Research Questions

During the project we followed an approach that recalls Research through Design (RtD, Frayling, 1993; Stappers & Giaccardi, 2017; Zimmerman et al., 2007) and Action Design Re-

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[3] *https://en.wikipedia.org/wiki/Weber–Fechner_law*

search (Sein et al., 2011). While moving towards our goals, the design activities played a significant role in identifying appropriate solutions, balancing factors, and background theories that at times appeared contradictory. In the absence of prominent theories suitable to address our goals, we exploited iterative cycles of design, implementation, and concurrent evaluation to move towards the final outcomes.

Taking into consideration the sensitivity of the topic of SH, we initiated the process by identifying *design goals* and *research questions*. During the process we often referred to them to keep the team focused in the appropriate direction.

With design goals, we refer to preliminary principles that guided the practical steps of our process. We wanted to produce a visual artwork capable of: [G1] empowering the community of people fighting against SH in academia, [G2] nurture audience's reflection and self-identification with the people behind the data, and [G3] situate our visualization to draw the attention of university administrations, conference organizers and the academic community at large, and initiate conversations.

In addition, the theme and the material of this project led us to consider two wider research questions of greater interest in information visualization. [Q1] How to use visualization to represent data of a predominantly qualitative nature? And [Q2] how to use visualizations to create emotional connections with sensitive topics? These questions nurture reflections on the role and limitations of data visualization and helped us in critically presenting our work as an example to be discussed.

A detailed description of the design process is described in (Elli et al., 2020), and we summarize it as follows: (1) information acquisition, (2) quantitative exploration of data, (3) qualitative open coding, (4) ideation of a visual model, and (5) design of the user interface.

3.2 Information acquisition (step 1)

We prepared the ground for our visualization work by reading a sample of the stories. We started our design process with an approach that might sound unusual to data visualization, but that is common in humanistic research. The reading experience was invaluable because it provided team members with a deeper understanding of the experiences of the victims of SH in academia and the qualitative character of the survey data (Figure 3).

In addition, we informed the process by interviewing the survey author, Dr. Kelsky. We inquired about motivations, expected impacts, and preliminary analysis of the survey data. We learnt that the survey was aimed at creating discussions around the topic of SH in academia and at empowering victims by sharing their stories. Dr. Kelsky described the collected data as varied, touching, and impactful, and explained that it provides information about how the problem can manifest. Although the survey effect is unquantifiable, she believes it removes deniability, in that no disciplines or campuses can safely claim to not have this problem. She mentioned previous experimentations at using visualization techniques, like bars and pie

charts, to summarize topics inside this data. However, she suggested exploring artistic experimentations and qualitative approaches, such as thematic analysis or qualitative open coding, which we were already considering. After the interview, the survey author did not participate in the design process.

description	victim_status	harasser_status	institutional_response	victim_career_impacts
There were rumors (unsubstantiated, just gossip) that my advisor had an affair with one of his female graduate students before I was a student here. An older grad student who supposedly knew of the affair told me I was a "typical _____ student" because I was a woman, conventionally somewhat attractive, and young (22 when I came into my PhD program).	22	Senior grad student, someone who was about to graduate	None; I didn't realize how insulting it was until later	Just self doubt (yay for impostor syndrome!)
When I was in grad school a male faculty member "joked" to a group of three female PhD students (myself included) who had just mentioned how stressed we were about comps, that "all [we] had to do was wear tight, low-cut dresses and [we'd be fine." Several years later a male faculty member stared at my breasts repeatedly, whenever I passed him in the hallway, etc, to the point where I had to sit on the same side of the table as him during meetings so as to not keep catching him doing it when I was on the opposite side	PhD student/Assistant Professor	At least Associate, if not Full at that point	"You don't want to spoil this nice young man's life do you? It was just a joke"	As a PhD student I learned that when senior men want to harass you and make disgusting "jokes" there was nothing I could do about it, and was reminded of that lesson when the U of L faculty association said it could do nothing about the man who was harassing me. It was a powerful lesson about not really belonging in the academy.
A senior colleague made overt sexual comments to me, including describing himself naked and having sex	Assistant Professor	Full Professor	None	The harasser also later plagiarized my work.

Figure 3   Three rows of the dataset showing the thematic richness of the stories. At the same time we can see its inconsistent structure, that it is not suitable for visualization yet.

3.3 Quantitative exploration of data (step 2)

In our process we experimented with common computational text processing approaches to extract structured information from the survey stories and analyze them quantitatively. Our goal was two-fold: (1) to identify patterns in the use of language, and (2) to stress the techniques to learn about their limits in conveying the qualitative nature of stories. The technical aspects of the text processing are summarized in Figure 4, while Figure 5 shows one of the visual artifacts that resulted from our analysis.
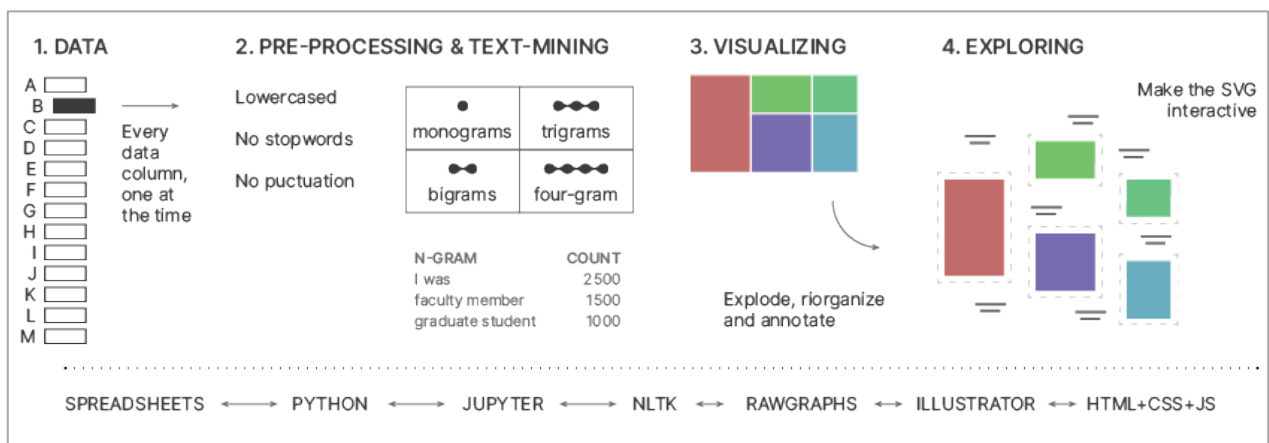

Figure 4   The pipeline of our text-processing. We used NLTK (Loper & Bird, 2002) and RAWGraphs (Mauri et al., 2017) to process and visualize data. We then extensively reworked the outcome by adding annotations and interactions.

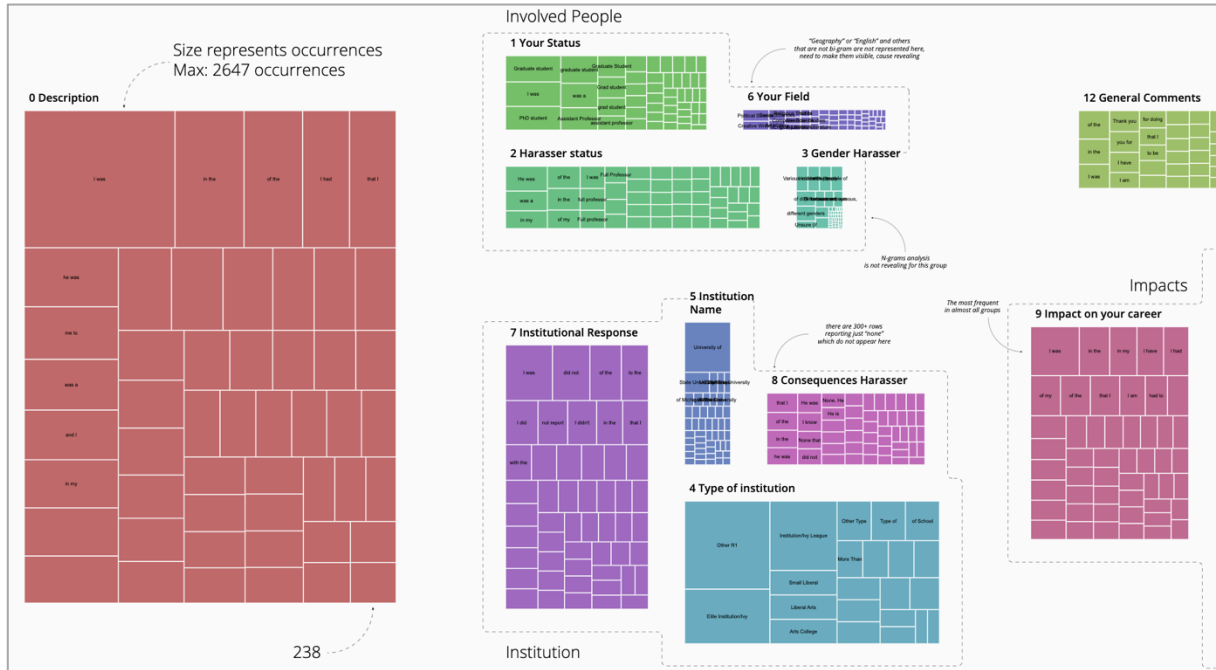*Tommaso Elli, Adam Bradley, Uta Hinrichs, Christopher Collins*

Figure 5   One of the visual artifacts that resulted from the text-processing analysis. We produced many visualization sketches such as this one, to inquire about different possibilities in extracting structured information from the text.

This activity highlighted different aspects of the stories: incidents are mostly narrated in the first person, and perpetrators are usually men in a position of power (higher hierarchy); most abuses are verbal, and the consequences are anxiety, depression, and other mental health disorders; victims often do not report the abuse, but instead they avoid people, places or drop their career altogether.

The above patterns resonated with what we had learnt from step 1 (information acquisition) and contributed to our understanding of the topic. However, we also realized how it appeared inappropriate to address our goals: the process of aggregating recurring phrases led to the removal of contextual information that is, instead, fundamental appropriately interpreting the stories. In other words, the fragmentation that is required by the measurement of the surface features of the texts resulted in weakening the strength of testimonies.

3.4 Qualitative open coding (step 3)

The adoption of qualitative open coding[4] was fostered by the need to mediate between contrasting factors of our work. The process of data visualization requires data with comparable properties. However, the extraction of similar features jeopardizes the emotional content of the stories. Additionally, we aimed at "honoring the voices" of the people behind the survey by preserving singularities and individualities.

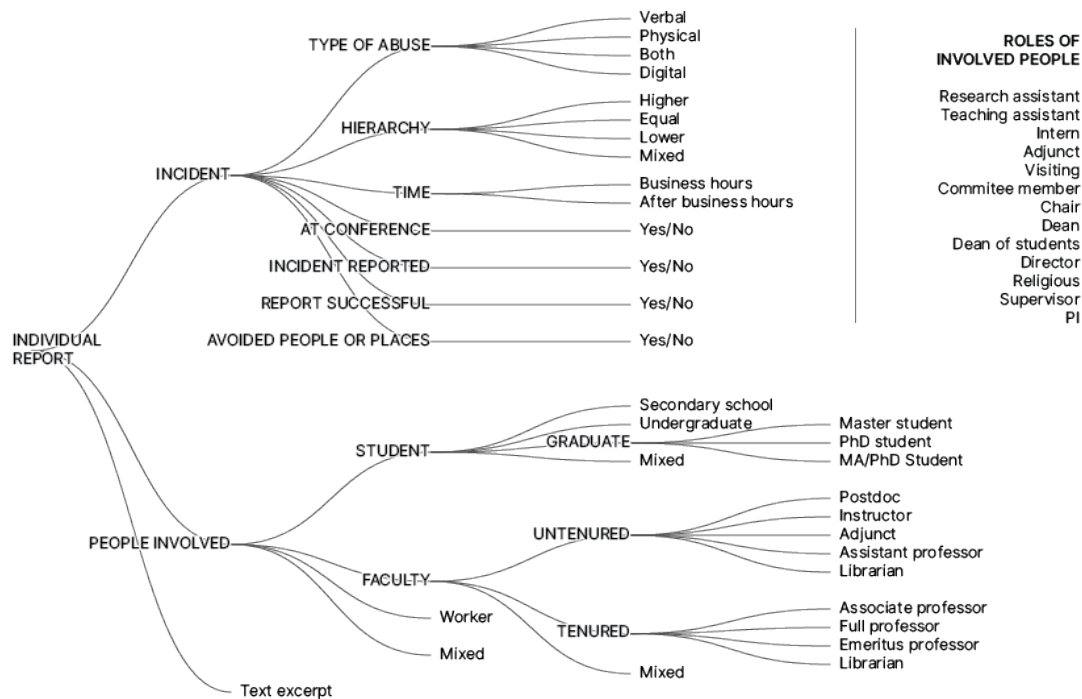[4] https://en.wikipedia.org/wiki/Open_coding (accessed 30-11-2021)

Figure 6   Metadata schema used in open coding. We iteratively formulated the schema while reading the stories and by building on the knowledge acquired through steps 1 and 2.

We deemed it important to have excerpts of the stories, and information about the incident and the people involved (Figure 6). Open coding proved to be a suitable solution to provide a structure to the data which allowed us to focus on such aspects without considering the technical challenges of more sophisticated text processing. Indeed, aspects of our interest are difficult to collect through computational means, partly because of the unstructured nature of the data. The process required, once more, a close reading of the stories, interpreting them according to the model we created (Figure 6). Through the coding, we realized that in many cases, it was not possible to harvest all the information listed in the metadata schema: in some stories a certain theme was not present or was too elusive (e.g., cases in which we had no information about the outcomes of the report); or the report focused on other things (e.g., general consideration about academia). The fact testifies that our reading is only one among many possible variations.

The process represented a time consuming and emotionally intense experience. Therefore, we concentrated on coding a sample that corresponds to the 10% of the stories (i.e. around 200), but the data production could be extended in the future.

3.5 Ideation of the visual model (step 4)
We represented the data using a custom visual model ideated after several iterations (Elli et al., 2020). The model is composed of parametric knots of texts (Figure 7) that are shaped and scattered in the space according to data. Knots created a link with a common colloquial-

ism used in at least one account ("I have a knot in my stomach"), conveying a great rhetorical effect. Knots give shape to uncomfortable feelings, creating a visual connection between testimonies and the feelings they transmit. The phonetic pronunciation of knot is also the same as "not," which appears repeatedly in the stories, discussing that investigations or reparative actions were not undertaken.

For the cases in which it was not possible to assign one or more data values, the knot is drawn by skipping the grid points corresponding to the missing data values. In this way, we can valorize the reports that elude our model and give them an even more unique shape.

Data mapping and control-points grid

Knots are created using a CatmullRom curve interpolation that uses as control-points centers of the enumerated circles of this grid, that represent data values (legend below)

In case certain information is not available, corresponding grid points can be skipped

Artificially added control points to improve stability in curve extremities

Parametric drawing of a knot

Testimony #38

«He hit on me repeatedly, which freaked me out b/c he was much older and had all the power»

Incident description

· Verbal abuse (14)
· Higher hierarchy (18)
· During Business Hours (17)
· Not at a conference (1)
· Incident not reported (5)
· [impossible to evaluate successfulness of report]
· Victim stayed in Academia (4)
· Victim avoided people or places (10)

Final result

Testimony #38

He hit on me repeatedly, which freaked me out b/c he was much older and had all the power

Grid legend

1: At conference, No. 2: Hierarchy, Lower. 3: Hierarchy, Mixed. 4: Stayed in academia, Yes. 5: Incident reported, No. 6: Incident reported, Yes. 7: At conference, Yes. 8: Report successful, Yes. 9: Report successful, No. 10: Avoided people or places, Yes. 11: Avoided people or places, No. 12: Stayed in academia, No. 13: Type of abuse, Both. 14: Type of abuse, Verbal. 15: Type of abuse, Physical. 16: During business hours, No. 17: During buness hours, Yes. 18: Hierarchy, Higher. 19: Hierarchy, Equal.
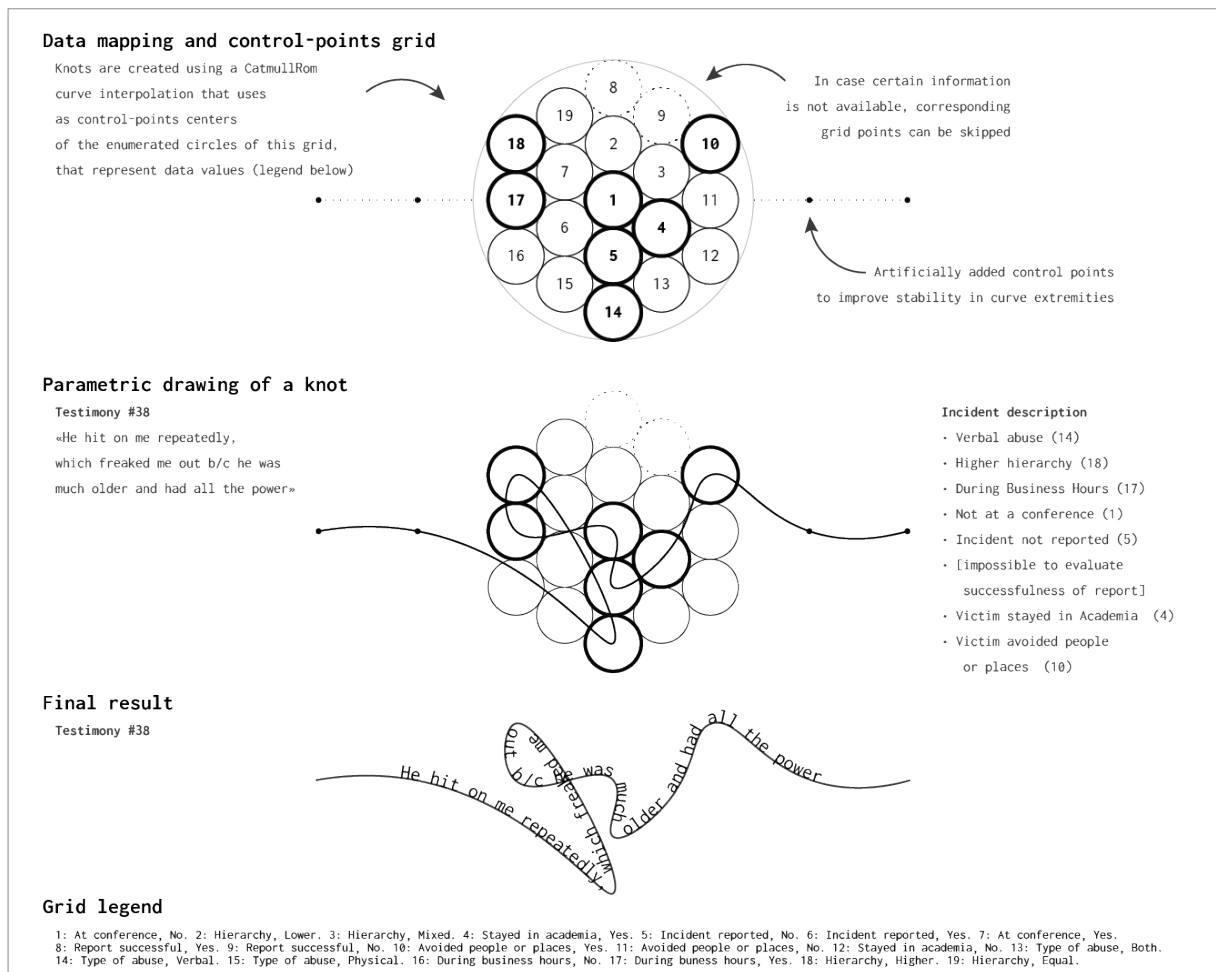
Figure 7 Every knot is drawn by putting the text of the story excerpt on a path. The path is generated using a curve interpolation that follows a hexagonal grid, in which every point corresponds to a specific data value (i.e., physical abuse, verbal abuse, at conference, outside business hours). The positions of points of the grid are manually assigned.

Figure 8   The three alternative positioning modalities: "incidents description" (yellow background) groups knots by similarity of the coded stories, "victim status" (white background) groups knots by similarities in academic role of victims; "harasser status" (dark background) groups knots by academic role of harassers.
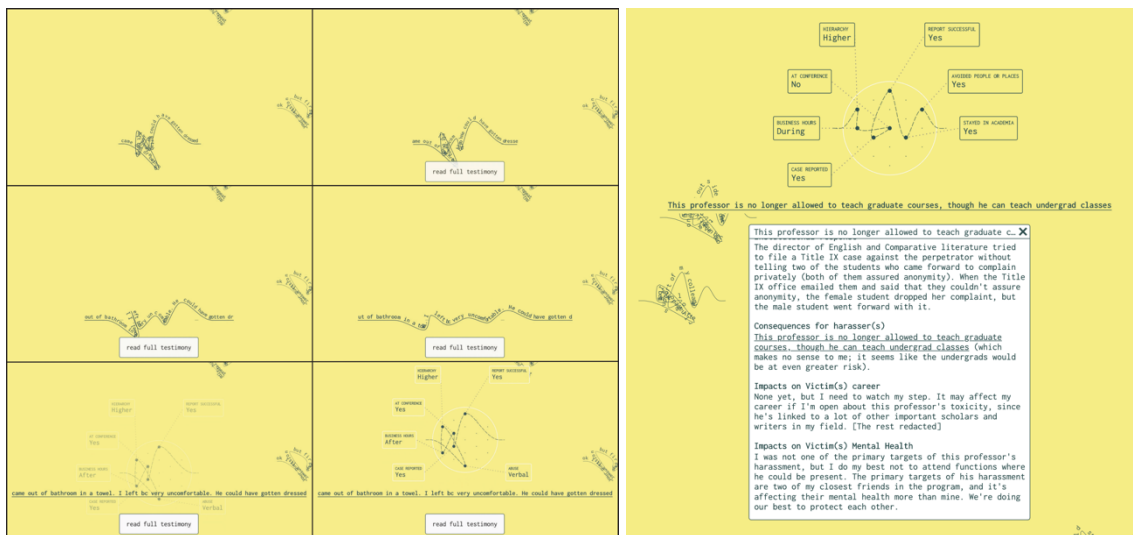

Figure 9   On the left: On click or tap, a knot unravels, revealing the associated data and the story excerpt. The button "read full survey" opens a pop-up card containing the full story.

3.6 Design of the user interface (step 5)

We designed the interface (Figure 1) around the idea of an open-ended space that nurtures contemplation and valorizes the uniqueness of stories. Readers can find their own path through the space, and perform an exploration driven by curiosity and surprise. The experience is made more dramatic and engaging through the use of sound, as recommended by (Boy et al., 2017; Ivanov et al., 2019); specifically, the website reproduces audio recordings of stories excerpts.

Knots are positioned in the space according to three different modalities: incidents similarity, role of victim and role of perpetrator. Readers can switch between the three by using a dedicated group of buttons; coordinates are calculated using a multi-dimensional scaling algorithm (Figure 8).

Readers can filter elements according to incident description, but more importantly, they can zoom and pan around, interact with knots, and unravel them to access the full story behind the data record (Figure 9).

4. Discussions

In this section we discuss our visualization artwork with respect to our initial goals and the questions presented above. In doing so, we build on our reflections, on reactions of colleagues, and on the exposition in a data-art exhibition.

The project was part of VISAP 2020[5], which is a data-art exhibition at one of the most important conferences on data visualization. The exhibition selection is based on a single-blind review process and all reviewers agreed that our visualization respectfully depicts the topic and the stories; reviewers acknowledged our ethical efforts in the treatment of the sensitive information present in the data and no adverse criticism has been received with respect to the work done.

We believe that the visualization meets our initial goals due to the following reasons. The visualization is made publicly accessible as a website[6], and no installations or technical operations are required to explore it. People can access and explore the visualization in seconds; they can do this from their laptop or from installations in a public environment. Our experience in the exhibition indicates that the visualization promotes discussion and offers people the possibility to agree, disagree or comment on the work done. In the case of agreement, the community of people fighting against SH can leverage the visualization to support their cause in front of a public audience, the academic community, or university administrations [G1, G3]. In the case of disagreement, community members have the chance to identify inappropriate aspects, allowing designers to do better in the future. In this sense, the visualization perfectly fits the RtD approach since it realizes a hitherto nonexistent situation to be observed; through observation we are able to collect knowledge capable to inform future actions (Stappers & Giaccardi, 2017). We believe that the opportunity to discuss the way in which the issue of SH is represented is a powerful opportunity for the community [G1].

In the attempt to mitigate the psychic numbing effect, the visualization emphasizes singularities in the wider group of stories. We performed no aggregations and limited our intervention to the selection of specific characteristics of the stories that we wanted to stand out. This approach creates a link with victims' emotions by working in synergy with the metaphor of knots. Indeed, following a strategy commonly used in communication design (Blackwell, 2006), we used metaphor to introduce the audience to the visualization, explaining how certain actions or statements are inappropriate and cause knots in stomachs. By imposing an external semantic structure to the phenomena, the visual metaphor aids readers in perceiving the uncomfortable nature of the stories and helps them to empathize with the victims.

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[5] See https://visap.net/2020/program.html (Accessed 28-03-2022)

[6] See https://tiedinknots.io/ (Accessed 28-03-2022)

Additionally, we invite the audience to further reflect by providing the possibility to organize knots according to victims' and harassers' status. This function allows readers to look for perpetrators or victims with their same academic status, following the *contingency* principle of critical visualization (Dörk et al., 2013). In this way they can realize what people in their same position have done or had to endure, and they can see the effects of certain attitudes, that, even if unconscious or involuntary, are violent and offensive [G2].

The fact that a visualization may intentionally orient readers' reactions, and nurture emotional responses, stands in contrast with the general audience's idea of data visualization as a scientific medium (van Koningsbruggen & Hornecker, 2021). Despite the fact that practitioners use consolidated strategies to imbue their visualization with a sense of objectivity (Kennedy et al., 2016), visualization always embeds interpretive work and is never completely objective nor neutral (Drucker, 2020; Kirk, 2016). When creating visualizations about a debated topic or around sensitive data, we should consider the possibility of explicitly selecting specific perspectives and of taking a stance towards who the visualization empowers. Viégas & Wattenberg reflected that the minimization of the "point of view" might be a misguided practice in visualization (Viégas & Wattenberg, 2007). D'Ignazio & Klein explained how visualization can be used as a tool for oppression (D'Ignazio & Klein, 2020). Peck et al. showed how the perception of data can be deeply personal (Peck et al., 2019). By building on top of these considerations, we identified a specific group of beneficiaries for our work and deliberately gave a specific trajectory to our design process. This process was facilitated by the fact that the qualitative data that we received had no visualizable structure. It was thus possible for us to select the aspects that we wanted to stand out. We argue that this is an opportunity when working with qualitative data: while qualitative data embeds a model given by its creator, it is also so rich that it allows the application of different structuring filters. Such framings are to be carefully elaborated by researchers and applied to the data to make it suitable for visualization [Q1].

Considerations about the visualization genre can be helpful to reflect on how to nurture emotional connections with sensitive topics behind the data. Artistic data visualizations (Viégas & Wattenberg, 2007), indeed, might present an advantage in creating emotional connections, since it is more difficult to form stereotypical images of them. This is possibly one aspect that allows people to empathize with the themes or people represented by a data visualization (van Koningsbruggen & Hornecker, 2021, p. 8). In our work, we represented qualitative data using parametrically generated knots, and used voice recordings to draw readers into the seriousness of the topics, literally acknowledging its many voices. In creating artistic data visualizations, it might be useful to combine and explore languages that are different from the traditional graphical primitives used in visualization. It is possible to employ sonification, illustrations, animations, physicalization, and unusual interactive patterns. The mixture of communication languages can facilitate emotional connections thanks to its effect of defamiliarization, namely the process of slowing down access to the visualization that is concurrent with the stimulation of curiosity [Q2].

The feasibility of the outcomes is determined by the affordances of the system used (Ivanov et al., 2019) and, above all, by the designers' skills, since different individuals can rely on different capabilities. Similarly, the success of a visualization can be recognized as an interplay between the information exposed by the visualization itself and the knowledge of its audience (Carpendale, 2008, p. 20).

Our work experiments with new uses of visualization, therefore a dedicated study would allow us to examine weaknesses and identify improvements. Although the visualization is designed for the audience of academia, which we consider capable of dealing with unconventional visualization examples, it is likely to have limitations with more general audiences. Instead of being task-driven, it is open-ended and does not present a linear narrative. People need to find their path through the stories and lay users may easily get lost or overwhelmed. While this is another form of defamiliarization that can be productive, it risks alienating audiences that are less familiar with visualization or less invested in the presented topic.

5. Conclusions and further works

In this paper we advance and discuss the design of a visualization that aims to bring visibility to the topic of SH in academia and to initiate conversations. Our work starts from highly sensitive qualitative data that represent anonymous testimonies. Through our design process, we inquired about how we can exploit qualitative aspects of this data and create emotional links between victims and the audience, to stimulate reflections and, ultimately, behavior change. Previous research has focused on anthropographics to nurture prosocial behavior, but studies failed to demonstrate the efficacy of this approach. Our work shows a different approach employing qualitative methodologies to inform the design process and structure the data. In our work we focused on the goal of empowering a specific group of beneficiaries and we employed a visual metaphor to orient readers towards the sensitive topic of SH. In future works, we aim to formally inquire about the visualization capabilities of fostering emotional engagement and appropriately represent the people behind the data. The outcome, however, enriches the body of artistic and qualitative approaches to visualization that aim to raise awareness and conversations around sensitive topics.

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