

Negotiating Voice and Privacy: Doctoral Students' Perspectives on Participatory Information Systems

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Abstract

This paper presents the results of a Value-Sensitive Design study to develop a participatory information system that supports student progress through a PhD program. We engaged over thirty PhD students and alumni over three iterative design phases comprising semi-structured interviews and participatory design workshops. The study elicited categories for collecting and sharing crowdsourced information and labels for privacy levels. Findings show that the collected information was valuable, particularly critical for new students' decision-making, and provided insights otherwise unavailable. Additional findings revealed privacy concerns over information sharing, how different privacy labels might affect voicing versus silence, as well as the credibility of participatory systems. Privacy concerns emerged to be significantly different among domestic (US) versus international students, which informed our user personas generation. We conclude by providing design recommendations for online systems in higher education that support student voicing.

Keywords: Voicing, Privacy, Value-Sensitive Design, Higher Education, Participatory Information Systems

1. Introduction

Shaping your professional aspirations and navigating the path to an advanced degree can be challenging. In many cases, people gain clarity through sharing experiences and learning from others. Nowhere is this more true than in doctoral education. Answers to questions like, 'How do I navigate the organization?' or 'Where can I go for help?' can only be gleaned from interacting with others. Because many organizational

norms are learned through relationships (Korte, 2009), knowing where to go or who to go to for help can be critical to long-term success.

Many information systems, including Social Networking Sites (e.g., LinkedIn and Facebook), have been utilized to promote student voice on the issues that they feel matter most. Information and relationship building in these online communities provide a platform for feedback and for students to discover critical insights from others' academic experiences that can be instrumental in decision-making processes (Yi, 2022). These participatory information systems may also provide a unique advantage for students in doctoral education due to the perceived authenticity and reliability of peer reviews.

Although such technologies make it easier to share and gather student perspectives, concerns about user privacy have increased. This is particularly true in educational institutions that are governed by the Family Educational Rights and Privacy Act (FERPA) and other student privacy laws. Thus, this case study introduces a Value-Sensitive Design of an information system, with the approach that goes beyond purely functional concerns to include end-users in a discourse on the moral dimensions of the information system we co-designed (Centivany, 2016). Through interviews and workshops with Ph.D. students who are the system's target population, this study examined the benefits and risks of sharing knowledge and experiences. We focused on how students' comfort levels influenced their willingness to voice their perspectives online, reflecting on their educational experiences, and the potential value of this information for current and future students.

2. Literature review

2.1. Group voicing behavior

The concept of voicing behavior has been noted as a discretionary use of voice to provide suggestions, thoughts, or concerns, aimed at improving organizational performance (Morrison et al., 2011). While much research focuses on employee voice, studies also show its role in successful general group dynamics (Mesmer-Magnus and DeChurch, 2009). Importantly, voice has been noted to have significant positive effects on engagement and organizational performance (Kim et al., 2010).

In direct opposition to voicing, silence describes a phenomenon in which individuals withhold their thoughts, suggestions, or opinions that may otherwise be useful (Morrison and Milliken, 2000). Silence and self-silencing (Jack, 1991) have been observed in online deliberation literature in educational contexts as well as a result of internalized social and cultural pressures (Zhao et al., 2025). Other studies indicate that silence may stem from the fear of retaliation, punishment, or simply expressing opinions that are different from the group (Milliken et al., 2003).

Although the voicing corpus has historically been focused on organizations, more recent research has begun to explore student voicing.

2.2. Student voice

Fielding (2001) and Rudduck and Fielding (2006) have defined student voicing as the practice of involving students in decision-making processes within schools, actively engaging them in learning and educational environments. Scholars have noted that facilitating student voice includes providing opportunities for students to express their feedback in an attempt to influence educational practices and policies (Matthews and Dollinger, 2023). To encourage voicing, students must be able to identify and analyze issues regarding their school's performance and their own learning that they believe to be significant (Fielding and Bragg, 2003). Voice can thrive when students have the ability to exert influence over decision-making processes, specifically when they can impact the "analyses of, decisions about, and practices within schools" (Cook-Sather, 2006).

Allowing opportunities for students to express their thoughts and concerns is important for organizational performance and student engagement, but does not guarantee voicing. While US-based educational institutions often strive for an individualistic and democratic approach to the classroom experience

(Elfert, 2023) and eliciting voice, higher education institutions are increasingly more diverse, and cultural values around voicing often differ.

2.3. Cultural values and voicing

Hofstede's Cultural Dimensions provide a nuanced paradigm for examining how cultural values may impact students' willingness to voice, specifically along two dimensions: individualism vs. collectivism and power distance.

Hofstede (2011) defines individualism vs. collectivism as the degree to which individuals in society are integrated into a group. Individualistic cultures prioritize individual goals and personal accomplishments, where close relational ties typically exist only within the immediate family. In collectivist cultures, more emphasis is placed on loyalty, harmony, and group success. Research indicates that individualism vs. collectivism may influence communication behaviors. Gudykunst et al. (1992) found that within collectivist cultures, individuals may suppress open communication, thus limiting an individual's willingness to voice opinions, especially if they perceive they are part of an "out" group.

Power distance (Hofstede, 2011) considers the way individuals in a society accept that power is distributed unevenly. In cultures with a high power distance, there is greater acceptance of hierarchical structures and a larger gap between those in power and those who are not. Low power-distance cultures, on the other hand, put greater emphasis on equality and a smaller differential in power between individuals. Studies have shown that individuals from cultures with high power distance are less sensitive to the presence or absence of voice (Brockner et al., 2001) and that they are less likely to express concerns or suggestions due to power dynamics within the organization (Roomer, 2018).

While evolving digital platforms have the potential to usher in more dynamic ways to address student experiences and elicit their feedback, they also present their own set of rewards and challenges.

2.4. Data Persistence, Anonymity, and Privacy

The nature of digital communication is such that information can be stored and reviewed indefinitely, and while historical information can be helpful, it loses context over time. Scholars have noted that modern digital platforms (e.g., social media) have the potential to encourage and discourage voicing behaviors (Khan et al., 2023). Significantly, Khan et al. (2023) found that the persistence of information on social media platforms can both enable or constrain voice by way of providing

a repository for discussions, but also as a vehicle by which information may receive negative repercussions or misinterpretation over time.

Not only is digital information persistent, but information is often directly connected or traceable to the individual providing the feedback. These digital traces may present barriers to voicing due to privacy concerns. Studies have shown that anonymity can lower social restraint, reduce social and status-based pressures, and encourage individuals to express honest thoughts and emotions without fear of judgment and social repercussions (Christopherson, 2007).

However, while addressing privacy concerns and encouraging open sharing, anonymity has been found to potentially undermine the credibility of the information shared (Rains, 2007). Some crowdsourcing systems scholars propose pseudonymity as a possible solution to protect privacy while maintaining credibility (Xia and McKernan, 2020).

3. Study Background

This Value-Sensitive Design case study aimed to inform the development of an information system to help PhD students progress through different stages of a PhD program and successfully obtain their degree, with a special emphasis on supporting the discovery of students with similar interests and paths. A critical component of this system includes the creation of *user profiles* aimed at capturing academic activities in pursuit of completing the degree requirements (e.g., courses and exams, publications, faculty collaborations, dissertation proposal, and dissertation defense). The timeline of events was shown to be critical for the population for the purpose of progress-tracking towards completion. The system also allows students to leave reflections on their experiences that might help current or future students in decision-making for their academic journey.

3.1. Case and participant background

This study was conducted between fall 2018 and fall 2022 and involved over 30 participants, all of whom were either current students or alumni of an interdisciplinary PhD program. The interdisciplinary program involves four cooperating units in a large research institution, which allows PhD students to choose from over 40 faculty members to collaborate on their dissertation and research either as dissertation supervisors or committee members.

The program includes three stages students must work through in order to complete their degree: i) required coursework, exams, and publishable paper; ii) dissertation proposal; and iii) all-but-dissertation

(ABD) post-proposal stage. Throughout the program, there is a lack of opportunities for students at different stages to interact with one another and exchange information on various aspects of their educational journey. One such critical factor related to student interaction is the opportunity to learn about other students' experiences with faculty, which allows them to understand their supervision styles (Gardasevic, 2020). This information can be significant for students, especially in the dissertation advisor and committee formation stage, considering that one of the most important factor in the retention of PhD students is their relationship with the supervisor (Bair and Haworth, 2004). To address this and other critical issues affecting persistence of PhD students and their educational success, we involved the PhD students in designing a knowledge graph-based information system. This system would aggregate data scattered across multiple Web locations, including co-authorship, dissertation mentorship, and other collaboration networks, alongside crowdsourced information provided by the students themselves (Gardasevic and Gazan, 2023).

The *user profile* mockup that was informed by participants' inputs, is outlined in Fig. 1.

Academic Information

Progress ABD **Time period**

Cohort Year 2018

Position TA for Communication 2020-2022

Service CHI Volunteer 2019

Award Teaching Award 2020/2021

Research Projec/Lab Lava Lab 2023-

Enter Courses Taken + **Semester** **Reflection** **Visibility** (Public, Anonymous, Students only)

Enter Exams Taken +

Personal Information

Hobbies/Interests Swimming, Hiking, Pickaball

Caregiver of 3 YO daughter

Neighbourhood Moiliili, Honolulu

Country of origin Czech Republic

Languages Czech, French

International student Yes

Research Information

Research Area Information Science; HCI

Research Topic Knowledge Graphs; Visual Analytics

Methods Interviews; Participatory desing

Tools Neo4J; NVivo

Domain of Application Higer Education

Enter Publications + **Date**

Dissertation Information **Title** **Chair and Committee Members** **Proposal Date**

Figure 1. User profile prototype and categories

The study presents a rare opportunity to conduct an in-depth analysis of views on voicing and privacy issues with a purposive sample of participants from the target population for whom the system is designed. We aim

to showcase the processes of a Value-Sensitive Design approach and findings from our case study, which may inform the development of other higher education applications incorporating voicing features, as well as broader social media systems.

The **research questions** addressed in this study are as follows:

RQ1: *What are the perceived values and threats of sharing data and experiences in an educational crowdsourced information system?*

RQ2: *What are the design recommendations for supporting voicing and crowdsourced information sharing in higher educational settings?*

4. Methodology and Research Design

This case study engaged participants through interviews and participatory design workshops in order to elicit their perspectives on information sharing and privacy. Data were collected as part of the information system design process, where a community was involved in all stages of the study to inform the functionalities of a knowledge graph-based information system, intended to support the education of PhD students. This paper focuses solely on the findings related to end-users' opinions and sentiments regarding crowdsourced data privacy and sharing, as well as their potential behavior in cases where such a system is implemented.

The case study had three stages: i) requirements gathering stage, ii) design of the graph database, its population and exploration, and iii) evaluation, and each stage was described in detail in pertinent publications (Gardasevic, 2020; Gardasevic and Gazan, 2023; Gardasevic and Lamba, 2024). Due to the longitudinal nature of this study, several generations of PhD students were included, sometimes resulting in non-unique participants. Each of the study stages involved research instruments designed to support the Value-Sensitive Design approach, probing participants to share their perceptions on ethical data collection, privacy labels, information sharing, and access to crowdsourced data. The instruments for the first stage were developed based on a preliminary qualitative and quantitative document analysis (i.e., student-produced documents, program policies, and the program website), combined with our insights as insiders to the program we studied. The development of research instruments for each subsequent study stage leaned on the findings from the previous stages.

4.1. Data collection and analysis

In the first, **requirements gathering phase** of the study, we conducted semi-structured interviews with eight participants (six PhD students and two alumni) to identify current practices in information seeking, information sources, and what may be missing from the current information landscape, including information the population may need to successfully progress throughout the program. The students also performed usability tasks on the program website, using a think-aloud protocol. Each interview was audio recorded, and the usability portion was video-recorded. Interviews were transcribed and analyzed with NVivo. Based on the exploratory coding system, we developed codes to include Value-Sensitive Design aspects. The following codes emerged and were applied to analyze user responses: *data sharing*, *privacy*, and *privacy concerns*.

In the second, **system design phase** of the study, we conducted three asynchronous online workshops with 18, 15, and 10 participants, respectively. The second workshop was the most pertinent to the research questions here posed, and thus is covered in this paper. During the second workshop, we conducted a participatory design workshop to create the *user profile* categories and layout (as shown in Fig. 1), which would serve as a crowdsourced data collection form, capturing students' personal information and degree-related activities (Gardasevic and Gazan, 2023). Considering this information is FERPA protected, it was crucial to have participants outline which information they are voluntarily willing to share, and with whom; therefore, privacy labels were discussed.

The research data consisted of the workshop's recording transcripts, the Google documents produced by the participants, and the researchers' notes. The data was analyzed by applying the same codes as in the first stage of the study.

At the core of the information system design is a **knowledge graph-based database** that aggregates a variety of relevant information points. Based on the findings from the second system design phase of the study, we created a comprehensive survey with *Qualtrics* to collect and then ingest the crowdsourced student data into the graph database next to other, publicly available information on the people in the research setting. We collected 11 inputs from students in different stages of the program and ingested them into the Neo4J graph database. We also included publicly available information, which consists of metadata on over 200 program-affiliated participants, 300 publications, 40 dissertations (including the mentorship

network), lab and project affiliations, together with a highly sophisticated tagging system that detailed the methods and tools used in the research (Gardasevic and Gazan, 2023).

In the third, **evaluation phase**, we conducted eight semi-structured interviews to evaluate the prototype information system, a knowledge graph hosted in the Neo4J graph database and visualized via the Bloom tool (details of this study are available at Gardasevic and Lamba, 2024). This evaluation protocol was specifically designed to include the questions that would elicit responses related to the value and threats of contributing and consuming the user-generated data. Therefore, this final study stage produced most of the relevant results presented in this paper. The workshop and interviews were recorded, transcribed, and analyzed using *Atlas.ti* online software, applying the same code categories listed above.

5. Results

Considering the PhD program used for the case study is a small one and individual identities could be easily inferred based on their direct quotations, at the first stage of the study, we decided to aggregate the reporting of the findings based on the observed characteristics of the participant population belonging to two user personas. On the one hand, we introduce the Domestic (US) student, Brian, who is more comfortable with voicing his opinion on the experiences at different classes and with professors, and is looking for an appropriate faculty member to get information from. On the other hand, we introduce the International student, Petra, who is more hesitant to share her honest thoughts, yet is very dependent on the information she gets from other students, especially international students. For more information on the user personas and their information-seeking styles, please see: <http://bit.ly/3HUWwxg> (Gardasevic, 2020). It is important to note that not all domestic students feel very comfortable sharing private data and vice versa. Groupings were made to better illustrate the point that there is a difference in approach to information gathering depending on student background.

Each study stage includes valuable insights that have implications for the next stage. Therefore, we report on the results for each stage, illustrating the key takeaways that were raised by both domestic and international students.

5.1. Requirements gathering study results

In this stage of the study, we found out that the most valuable procedural information, especially for

international students, was obtained directly from senior peers. When asked about information sharing practices in this community, seven out of eight students thought that peer Ph.D. students were keen to share information. Still, there was a noted lack of opportunities for social interaction where this type of information sharing could take place, even prior to COVID-19, which only exacerbated this issue. Students were confined to getting information via the website or from the program's Facebook group, which included faculty members, students, and alumni. To that, an international student said:

There is a hierarchy problem in the group- we are with the faculty in the group. There needs to be a separation. There needs to be another group without faculty (Gardasevic, 2020).

When asked if they would feel more comfortable sharing information with peers in a faculty-free online space, one student commented:

...It would be lovely. My concern is about the anonymity of it... I would love to be able to share that in a systematic way- everybody can know this- without it being attributed to me (Gardasevic, 2020).

When asked about their willingness to share personal information online, a domestic student said:

I definitely would, but I think I'm also a bad person to ask because I'm very careless about my personal data. My Facebook is open to all.

When we inquired about participants' thoughts on potentially introducing a rating system for courses, professors, and exams, most of the students had reservations. This is not surprising considering the program is relatively small, so they were concerned about potential deanonymization, even in the case of an aggregated rating scenario. Furthermore, three students were strongly opposed to rating the teaching faculty, as they either had negative personal experiences with feedback on platforms such as *RateMyProfessor* or understood that life circumstances may influence a professor's performance in a given semester.

5.2. Design study results

During the second and most relevant of the three workshops conducted, we discussed the database categories, their labels, and layout- with the special emphasis on the *user profile* (Fig. 1), which is essentially a crowdsourced data collection form designed to facilitate the discovery of people in one's surroundings with similar academic, professional, or personal affiliations, having the goal of community building and tacit knowledge exchange.

Furthermore, we engaged in discussions around

Privacy Labels, as the previous study stage revealed concerns about who is privy to the shared experiential knowledge, and whether information can be shared in an anonymous manner.

Lessons from the previous stage of the study informed the knowledge graph database modeling efforts. The most significant implication for the system design was to avoid allowing comments on *professors*, thereby avoiding the toxic ‘social rating’ aspects not approved by this community. The community agreed, however, that free-text comments, or the so-called “reflection” attribute, would be beneficial for the course and exam-taking activities. That way, students were free to reflect on their experience in a given course/exam, with or without mentioning the professor’s role in it.

We negotiated that the course/exam-taking activities, including their free-text *reflections*, would have the following privacy labels: **Public**, **Program Students Only**, **Anonymous**.

5.3. Prototype evaluation results

At this stage of the project, we used the evaluation protocol to go through the personalized exploration of the captured information based on students’ research interests. The following are the key results from the eight sessions.

All of the participants showed interest in reading other students’ reflections and examining their pathways through the program. Four students even considered this feature critical for new and second-year students in terms of decision-making. Considering that this feature sparked considerable interest among interviewees, it served as a good prompt to initiate a discussion on their views regarding data privacy and sharing among their peers. Reflections on the class/exam were seen to be a generally desirable feature, and two students said it was helpful in decision-making, one stating:

[Seeing] overall feedback and having that constructive criticism, it is valuable; and I think there’s value in acknowledging that [something in a class] took place, for those that need to make decisions.

Still, some students noted that teachers’ styles and approaches might change over time, and having a timestamp would be critical. Figure 2 illustrates a potential interface for exploring the experiences of other students in a particular class, which is described with relevant graph categories.

To the question, ‘Would you be willing to share such reflection yourself?’, six out of eight students were interested in whether the faculty would be able to read those comments. There was a notable difference between domestic (US) students, who generally felt

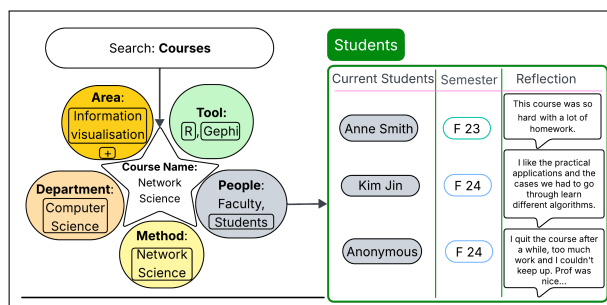


Figure 2. A course exploration interface prototype

more comfortable with freely sharing their data and opinions, and international students. In general, all the students felt more comfortable leaving their comments if there was the possibility to do so anonymously, even though one international student was insistent that this was not enough to protect their identity, as they had more at stake if their critical reflections were to come to the attention of a professor. An international student suggested switching off the ‘reflections’ feature altogether, saying that:

In my culture, people try not to say anything bad about anyone’, and ‘sometimes professors take things too seriously...which may affect one’s mark, etc.. It’s a risk.

Their next suggestion was to use pre-set phrases/keywords instead of allowing free text comments:

That’s because, you can see who says this... whose voice it is... depending on the language they use.

To that, a US student expressed a possible strategy to avoid de-anonymization in their reflections:

Yeah, you just have to be selective about when you type those out, right? Not fresh after the semester, when you’re in a class of four people.

In general, US students were less concerned about this feature and more likely to leave their comments and other data. The words they used when asked about using this feature and contributing data are shown in Table 1.

A domestic student shared their concern about the truthfulness of comments in other, especially more competitive programs, saying:

That could also vary depending on the culture of the program...I could see people...in the biological sciences where they would say- a professor is really good- when they’re not, just to get people to take them.

The insights gained from the graph exploration are considered most informative for new students, as the exploration protocol has made them hopeful about their prospects in the program and aware of the future steps.

Six students in the early program stage found previous students’ times to milestones and degrees a

Table 1. Student Willingness to Share Reflections and Feedback

Willingness to Share	Type of Student	Remarks
Strong yes	D	"I guess I'm not concerned about that. . . . So if I comment on a professor, and they don't like what I say, though, yeah, come and talk to me about it."
Strong yes	D	"I think I will be honest, no, I don't have any concerns." "You want to be tactful, and give just good critical information that are positive and negative because everybody has things to work on."
Mind the wording	D	"I would filter what I would say just naturally."
Mind the wording	I	"Probably I would [leave a reflection], if I had nice things to say or like, neutral things to say, I don't think I would leave if I had negative things to say. Oh, maybe if it's anonymous, maybe."
Worried	I	"If it has my personal name on it—would that influence me to only provide positive feedback versus constructive feedback? ...Some people — it doesn't matter to them. They'll say it or not say it. Right? It's just that I admire those who, in a sense, can do that. I think there's value in knowing, it's just about providing a safe space."

Note: "D" refers to Domestic Students, and "I" refers to International Students.

handy feature to manage expectations, plan for the next steps, and stay motivated. For some, it served as a good reminder of what is expected of them.

6. Discussion

This study contributes to existent knowledge on voicing by examining educational institutions as organizations where such activities imply risk; thus, we provide design recommendations and suggest privacy labels to support crowdsourced information sharing in a safe environment.

One of the most prominent information sources for this population are other students in the program. This is especially the case for international students, who need to learn about administrative procedures related to their status. Considering the lack of opportunities to interact with peers and senior students directly, and the insufficiency of current group communication channels (e.g. the program Facebook group), this study proposes a graph-based system that would allow for the exchange of relevant tacit information. We were sure to respect and incorporate community values, such as: i) avoiding features that would encourage social rating, ii) create user profile form that follows the progress stages of the CIS program, and iii) allow recommendation features based on the self-declared categories of interest and program stage.

6.1. Values and threats of sharing data

Although the findings show that this population is prone to information sharing, it was challenging to get a good sample of crowdsourced information, which speaks to the need to develop and implement engaging system functionalities that would encourage users to

populate and update their profiles.

Student crowdsourced information that shows their program timeline with notable events, such as first publication, dissertation proposal, and other significant milestones, was considered as valuable and otherwise unavailable. This information also served as a motivating factor for driven students who prefer to plan ahead. Considering the graph visualization aspect of the system, students were interested in seeing mentorship network visualizations. They were interested in seeing faculty with whom current students are collaborating, as another point of information relevant to decision making, or a conversation starter where tacit knowledge exchange can happen.

We designed the system to allow free-text reflections only on courses and exams. Some students have utilized this type of feature to leave their reflections on faculty supervision styles, especially if the course was an 'independent study' with a particular faculty. In the evaluation phase, this feature caused the most interest among students, particularly those new to the program, as they obtained insightful information about courses and faculty they were interested to collaborate with. This information was considered influential in their decision-making process.

Results of the evaluation study phase, however, reveal clear differences in the perception of potential threats associated with this approach. In agreement with the cultural dimensions related to collectivist vs. individualistic cultures (Hofstede, 2011), domestic students seem more likely to openly voice their opinions on digital systems on a wide range of topics, while some international students had more moderate opinions, expressing their desire for negative reflections to be anonymized. Still, other international students had

significant issues with this feature. Although the way students value group norms and practices around individual expression vs. group harmony was cited as a reason for this view, power dynamics may also play a role. As Hofstede (2011) points out in his exposition of the differences among groups with high vs. low power distance, cultural values may play a role in how feedback may be received by groups with greater perceived power. Depending on the cultural disposition, students may be more or less worried about faculty retaliation. This is especially relevant considering how international students' legal and employment status can be directly dependent on the relationship with and funding by faculty, and be jeopardized if faculty fail to complete multiple forms promptly or provide necessary recommendations.

Findings related to anonymous reflections on courses, especially those involving teaching faculty, show concern about spreading misinformation. Previous literature aligned with this result identified anonymity as a threat to credibility (Rains, 2007). As participants valued the mentorship network visualization, which allows them to identify peers who can support their decision-making throughout the program, pseudonymity was not a viable solution in our system (Xia and McKernan, 2020). However, supportive peer conversations enabled by network visualization can also reframe and mitigate misinformation. Moreover, only students who appear to have taken a course can comment on it. Such visualizations and constraints facilitate critical credibility clues.

6.2. Advancing system design to promote voicing: Recommendations

Based on our findings and discussion, we recommend the following design processes and features.

6.2.1. Features to support crowdsourced information sharing As previously stated, collecting crowdsourced information to include in the test system was not straightforward, and one of the researchers had to act as an intermediary data entry person in several cases. Considering the complexity of the categories that were gathered, our recommendation is to focus on investigating, then developing the functionalities of the system to ensure the interest of end users and keep them engaged to populate and update their user profiles. Some of these features could include increased recommendation capabilities, visualization of personal networks and progress, timeline and reporting, and even gamification. Ultimately, to encourage voicing, it is

important to convey to end users that their voice and experience matter and can result in systemic change, especially related to issues they perceive as significant (Fielding and Bragg, 2003; Cook-Sather, 2006).

Considering the popularity of the feature to read other students' reflections on courses and exams, and despite perceived threats, this feature should be implemented along with other features, such as a clear timestamp on when the comment was left and who was teaching at that point.

To mitigate potential misinformation, we recommend network visualizations and the constraints on reflection privileges discussed above. An up/down-voting feature for comments can also help curb misinformation. More research is needed to clearly recommend a rating system and assess how it would affect voicing.

Another recommendation to facilitate information sharing and mitigation of misinformation is to integrate with existing educational systems, such as Ellucian, via APIs to automate the transfer of course enrollment data, support the publication of course evaluations, and import publication metadata from platforms like ORCID, Zotero, or other researcher profile services.

6.2.2. Clearly visible privacy labels The biggest concern related to openly voicing their opinions is the uncertainty of which public will be able to access the data. Due to traceability and persistence, sharing information in social media can both enable and silence voices (Khan et al., 2023); therefore, we strongly suggest supporting sharing their data in a manner that is both *anonymized* and attributed publicly or within an educational setting. Allowing for anonymous comments is not only important in the context of this user population, but has wider implications to encouraging honest expression of one's thoughts and emotions while reducing fear of repercussions (Christopherson, 2007). Privacy labels should be clearly visible on the *User Profile* data submission form as well as the end-user interface. Additionally, constraints should be considered when exploring the information as a logged-in user with certain privileges or as a general public user.

Another consideration is to make the system available only to current students, while other stakeholders may get access to anonymized or aggregated data, if needed.

7. Contributions and Limitations

This study contributes to the voicing literature by examining universities as organizations where individuals assume risk if/when they share their

thoughts and opinions (Burris, 2012). Voicing as a student carries not only the risk of repercussions in the academic journey, but also in careers after program completion, should faculty choose to withhold references or other goodwill that may aid in career progression.

This study demonstrated that Value-Sensitive Design of academic information systems can be helpful to support voicing mechanisms that a community is comfortable with. Whether by providing online features that allow for attributed or anonymous sharing, or by supporting the visibility of mentorship relationships within the community to support direct information exchange, the system is countering the silencing dynamics specific to online crowdsourced information systems, and empowering students to navigate their seamless web of mediated communication (Licoppe and Smoreda, 2005) to meet their information needs.

As this is a qualitative case study, the results are not generalizable to any specific population, yet they can be applied to analogous cases. Given our study's small target population, we maintained participants' characterizations fairly generic to avoid re-identification. To capture more perspectives on voicing, a more diverse population needs to be engaged. Finally, this research was done in a specific context, limited to a specific, U.S. based institution, and other cultural perspectives should be investigated to get a more complete picture.

8. Conclusion

Considering the trends in increase of student attrition, and the constant pressure to provide quality content and support systems in higher educational institutions, educational leaders are seeking to leverage student perspectives to enhance the level of their academic experience, increase student engagement and performance, build trust and positive relationships, and differentiate themselves in a saturated market. This paper provides valuable suggestions for the designers of information systems and applications that aim to support student voicing as a feature for trusted information exchange.

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