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Information seeking and sharing among doctoral peers: A model of influencing factors

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Abstract

Peers are an essential part of any community. In doctoral studies, they can alleviate the challenges associated with pursuing a doctorate by providing information that supports academic progress. While prior research has examined peer interactions in structured environments, less is known about their behavior in unstructured settings. A particular gap in the literature concerns the rationale behind choosing peers as sources of information in these contexts. This study addressed that gap by exploring information seeking and sharing among peers in unstructured environments. Using a qualitative approach, it identified several influential factors related to the environment (e.g. access, resource availability) and the student involved (e.g. trust, convenience, desire to help, perceived competence, sense of obligation or giving back). These led to the creation of the Doctoral Peer Information Behavior (DPIB) model. The findings further highlight the importance of peers in doctoral education. Institutions are encouraged to create opportunities for peer interaction, while students may benefit from becoming aware of their own information behavior and intentionally planning such interactions.

Keywords

information seeking, information sharing, information behavior, doctoral peers, doctoral education

Introduction and problem statement

Obtaining a doctorate degree is not easy and students face several challenges including isolation, motivation, managing relationship with their supervisor(s), and acquiring certain expertise (Pyhältö et al., 2012; Sverdlik et al., 2018). These challenges are exasperated among Social Sciences and Humanities students that have an attrition rate of about 50%, where students are often working independently in isolation (Hockey, 1994; Jones, 2013; Lovitts and Nelson, 2000). Family, friends, and peers, however, are an essential part of the journey that help doctoral students cope and proceed through doctoral education (Dickerson et al., 2014). Being in the same situation and confronting similar obstacles, peers are especially important as they provide support that help students proceed through their programs (Devenish et al., 2009; Meschitti, 2019). Peers are also valuable sources of information (George et al., 2006). They may be encountered in structured or unstructured environments. Structured environments (sometimes referred to as formal) are often those that are planned, organized, and have an outcome. Examples may include workshops or peer support groups. Unstructured environments (sometimes referred to as informal), on the other hand, are spontaneous with no prior planning or organization. Such environments can simply be a shared office space (Flores-Scott and Nerad, 2012).

Studies on structured environments show that the information exchanged in these environments can improve academic and non-academic skills (e.g. Hall and Liva, 2021; Meschitti, 2019; Stracke, 2010). Unstructured environments, on the other hand, have primarily been examined in terms of the peer support, with limited research on the information exchange (Hadjioannou et al., 2007). This paper delves deeper into the information behavior of doctoral peers in unstructured environments and specifically addresses the factors that can impact engagement in information seeking and sharing. It answers the following question:

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RQ: What factors influence information seeking and sharing among doctoral peers in unstructured environments?

Literature review

Doctoral peers

Peers are 'other people in a similar situation to each other' (Boud and Lee, 2005: 9). 'Situation' is context-dependent and can vary. In the context of education, peers share the same purpose of being student learners, where neither assumes the role of a teacher or an expert and has authority over another (Boud et al., 2014). Doctoral peers are generally those students interact with, who are also in the process of completing their doctoral degrees. With these peers, there is a sense of collegiality given that they are often in the same situation and working toward the same end goal (i.e. achieving a doctorate degree; Mudaliar, 2022).

Doctoral peers are an integral part of doctoral education and can increase motivation and completion rates (Devenish et al., 2009; Lorenzetti et al., 2020). Interaction among peers has several advantages including providing one another with academic, psychological, social, and career support (Flores-Scott and Nerad, 2012; Lorenzetti et al., 2019; Sherman et al., 2023). Academic support is in the form of helping one another move forward in their programs. It includes providing resources, general feedback (Jazvac-Martek et al., 2011), writing feedback (Cahusac de Caux et al., 2017; Kumar and Aitchison, 2018), research assistance (Stracke and Kumar, 2014), and critical thinking (Ferguson, 2009).

Psychological support involves emotional help and fostering a sense that others are also experiencing similar challenges. It also constitutes knowing that there are others one can rely on throughout the doctoral journey (Mullen and Tuten, 2010). Doctoral students also receive social support through peer engagement. This form of support involves helping expand one another's professional networks and creating a sense of belonging to a community with a shared purpose (Lorenzetti et al., 2019). Psychological and social support are especially important as they are shown to be imperative in degree completion (Jairam and Kahl Jr, 2012).

Peer support is especially important during the early and final stages of doctoral studies (Jolley et al., 2015). When doctoral students enter their programs, they feel overwhelmed by the sheer amount of information encountered and peers help ease this transition (Catalano, 2013; Lovitts, 2001; Spezi, 2016). For example, peers provide information that is not found in other communication channels (e.g. websites, documents, etc.; Hadjioannou et al., 2007). Toward the end of their programs, doctoral students may be dispersed and feel isolated. It is shown that support from peers in the form of a support group, even virtual, can help them navigate through these difficult times (Jolley et al., 2015). Overall, the support from peers contributes to a better doctoral experience and can improve the quality of each other's work (Boud and Lee, 2005; Mullen and Tuten, 2010; Stracke, 2010).

Structured and unstructured environments

Peers can be found in structured and unstructured environments. Structured environments have 'organized, formalized activities' (Lincoln and McAllister, 1993: 22), with a purpose and an outcome. Also sometimes referred to as 'formal', they are often organized by an institution and meet on a regular basis (Flores-Scott and Nerad, 2012; Mullen and Tuten, 2010). An example is a writing group, in which peers write and receive feedback on their work. In other words, there is an intent to interact with peers. Classes, workshops, peer support groups, and peer mentoring are other examples of structured environments.

Unlike structured, in which the goal is explicit interaction with peers, peers interact organically in unstructured environments. At times referred to as 'informal', the interaction in these environments is spontaneous, an institution is not involved, and there is no predetermined purpose or outcome. They can also happen whenever and wherever is convenient for those involved (Burns and Schaefer, 2003; Lincoln and McAllister, 1993; Marsick and Volpe, 1999). While there are endless ways of interacting with peers, examples may include talking to peers while sharing an office space, running into one another in the hallway, meeting at a local coffee shop, and social media interactions.

Studies on structured environments (e.g. peer mentoring, support group, writing groups) and the impact of peers in these environments are common and show that they may help peers improve certain skills. Examples include academic writing (Cahusac de Caux et al., 2017; Grossman, 2016; Kumar and Aitchison, 2018; Larcombe et al., 2007), research (Garcia-Perez and Ayres, 2012; Nind et al., 2020), communication, critical thinking, self-motivation, organization, and teamwork skills (Stracke and Kumar, 2014).

In unstructured environments, interaction between peers is more personal with less intimidation and presence of a power dynamic (Mullen and Tuten, 2010; Sloan and McPhee, 2013). In these environments, peer groups are often naturally formed and are a result of being in close proximity and having common interests and goals (Hadjioannou et al., 2007; Hall and Liva, 2021; Lee et al., 2017). For example, doctoral students are shown to be more comfortable with those they shared personal factors with, such as gender, age, marital, and international student status (Lee et al., 2017). Most of the focus in the literature is on the support, as opposed to information, that peers can provide to enhance the doctoral experience in such environments (e.g. Jairam and Kahl Jr, 2012; Jolley et al., 2015). Interaction in unstructured environments is a

choice; yet it is unclear what influences this choice. Consequently, the focus of this study is on the rationale behind this choice.

Information behavior of doctoral students

Often faced with lack of information and overwhelmed, doctoral students seek and share information with one another that helps them navigate through their programs (Lovitts and Nelson, 2000). Information behavior refers to, 'those activities a person may engage in when identifying his or her own needs for information, searching for such information in any way, and using or transferring that information' (Wilson, 1999: 249). What is important in information behavior is an information need that arises when one realizes a gap in what they know (Choo, 2005; Wilson, 1997). This need may be addressed by information seeking and sharing. With respect to doctoral students, they can access information from several sources such as the library (books, journals, etc.), websites (Google, Google Scholar, etc.), friends, family, professors (including supervisor), social media, and peers (Bennett and Folley, 2021; Catalano, 2013; Moore and Singley, 2019; Penner, 2009; Spezi, 2016).

Research on information behavior of doctoral students with respect to their peers, and specifically peer-to-peer, is scarce and generally centered around the types of information a doctoral student may get from their peers and how they obtain information. For instance, in a study examining mentor and mentee relationships, Lee et al. (2017) found basic, administrative, professional, social, and personal information were exchanged among the doctoral mentors and mentees.

With respect to how doctoral students obtain information, the literature is primarily focused on their research-related information needs, revealing disciplinary differences in the sources students rely on to satisfy those needs. In humanities, for example, students often refer to other people (specifically supervisor(s) and other academics) as a starting point (Moore and Singley, 2019); whereas in business, the internet is often used as a starting point (Bøyum and Aabø, 2015; Catalano, 2013; Spezi, 2016). For non-academic information, such as everyday basic information (housing, food, health) or professional (coursework, and topics related to personal development), however, peers are referred to as the first stop (Lee et al., 2017; Morrison, 1993).

There is a dearth of research on why doctoral students explicitly choose peers as opposed to other sources of information. However, borrowing from studies on doctoral peer groups and mentoring (i.e. structured environments), solidarity, a lack of power dynamic, and convenience can be recognized as some of the reasons (Hadjioannou et al., 2007; Nokkala et al., 2022). It is, however, unclear why peers are chosen as a source of information in unstructured environments. This rationale is the subject of this study.

Methods

Given the lack of prior studies on why doctoral students choose peers as a source of information in unstructured environments, this study took an exploratory approach. One-on-one conversation with doctoral students was considered an effective way to capture their experiences and gain insights into the phenomenon; therefore, semi-structured in-depth interviews were employed. This method had several advantages for this study. First, it allowed for flexibility to make modifications to the interview and its process as they went on. Second, it gave the ability to provide clarifications to participants during interviews. Finally, it allowed for back-and-forth interactions among the interviewer and the participant, which in turn not only generated new insights, but also helped the researcher understand information seeking and sharing through the lens of doctoral students (Kvale, 2007; Leonard, 2003).

Procedures

A total of 20 interviews were conducted between 2021 and 2022 among doctoral students in the Faculty of Arts at McGill University in Montreal, Canada. Interviews were conducted at a time when most activities were virtual due to the COVID-19 pandemic. However, almost all participants had commenced their doctoral programs prior to the pandemic and had extensive interactions with their doctoral peers prior to the interviews. Five participants had started their programs during the pandemic (i.e. 2020) when learning had shifted to virtual environments. Regardless, by the time of the interviews, these five had been in their programs for at least 1 year, providing sufficient time to establish peer connections. While the medium of their interactions may have differed from the pre-pandemic cohort, the underlying experience of information seeking and sharing remained comparable.

Participants (P), between the ages of 20 and 39, were enrolled in the following programs: Asian Studies (P6), Communications (P12), Economics (P10, 11, 17), History (P2, 16), Jewish Studies (P20), Linguistics (P18), Literature (P14, 19), Philosophy (P5, 7), Political Science (P3, 13), Religious Studies (P4, 8), Social Work (P1), and Sociology (P9, 15).

The interviews were conducted remotely via the video-conferencing application Zoom. They were based on an interview guide that was divided into sections that can be summarized into the environment, information seeking behavior, and information sharing behavior. The first part of the guide focused on a student's everyday settings and aimed to capture a sense of who and what they are surrounded with by asking questions such as 'what does your typical day look like?' The information seeking portion of the guide explored the types of information students

sought, from whom, and the outcomes. The final section mirrored this structure but focused on information shared.

The interviews were recorded, transcribed, and coded using Thematic Analysis in ATLAS.ti software. This study received approval from McGill University Research Ethics Board Two. All participants were emailed a consent form and provided their consent either by replying to the email or by submitting a signed digital copy prior to their interview.

Findings

Peers are a fundamental part of the doctoral journey as they can provide support and information that can ease the challenges associated with obtaining a Ph.D. Not surprisingly, this was echoed throughout the interviews with all the participants expressing their gratitude toward their peers and noting that their experience would have been significantly more difficult without the support of others who understood the challenges of the doctoral journey. Some participants went as far as claiming they would have been lost in their programs without peers providing information and guidance. The decision to go to peers for information, however, depended on several factors that stemmed from the environment and the students.

Environment and the role of the institution

To go to peers for information, it is essential to know who they are and have access to them. The findings revealed that institutions affiliated with the students play a pivotal role in enabling peer information seeking and sharing by not only introducing peers to one another but also providing access. Defined in this study as any organization related to the student's university, such as the graduate program, faculty, or the graduate students' association, institutions can create peer connections through initiatives such as classes, workshops, shared workspaces, events, and programs. Participants confirmed that such initiatives in turn foster information seeking and sharing with their peers. For instance, when asked about how they met their close peers, P12 indicated being in the same seminars. Specifically, P12 said, 'mainly through seminars that we'd taken together'.

Events (e.g. orientation) and certain programs (e.g. student buddy program) by institutions are other ways of getting to know peers. One of the participants, P18, talked extensively about a close peer whom they had met through the university's student buddy program that connects new students with one another. P18′s connection with their buddy was sustained and had resulted in a close friendship.

The institution is also instrumental in providing access to peers. They can do so by providing an environment where peers can be encountered. Examples include shared office space, computer labs, and student lounge. P2 reiterated the importance of being in the same environment with peers by indicating shared workspace as the rationale behind going to peers for information. P2 explained,

> P2
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> . . . I think part of it is proximity. . . like in my first year, when I didn't have an office yet, I'd be working in the graduate student lounge, and there would be a bunch of other graduate students there. So those are the people that are easy to talk to.

Support and information from institution is important in the success of doctoral students. However, when not readily available, students tend to refer to their peers for help. Therefore, perhaps unintentionally, institutions can encourage information seeking and sharing among peers by having limited resources available to them. This was demonstrated by P9 and P5. P9 went to their peers for support with teaching because the person who was perhaps most qualified to help them, their supervisor, was not willing to help. Similarly, P5 went to one of their peers to obtain a course syllabus, as such document was not available on the department's website.

In summary, institutions play a key role in fostering information seeking and sharing among peers. They do so not only by facilitating introductions between students but also by creating environments that support such interactions. Additionally, they may indirectly encourage peer information exchange by limiting access to resources. Access and resource availability are environmental factors that can have an impact on students' decisions to refer to peers for information.

Personal characteristics

Being in an environment that fosters information seeking and sharing alone does not necessitate engagement in the behavior and factors related to the student (i.e. personal characteristics) also have an impact. Specifically, the nature of the relationship, perception of competence, convenience, desire to help, and a sense of obligation/giving back further contribute to the decision to seek and share information. Each is discussed below.

Nature of the relationship (trust)

Doctoral peers vary in the nature of their relationship. For instance, some can be close, while others can be mere acquaintances. The distinction among peers influences the types of information students seek from or share with one another. P11 described their peers as, (a) those in the same program with whom one is close, (b) those in the same program with whom one is not close (i.e. acquaintance),

and (c) those in other programs with whom one is close. When asked to elaborate, concepts such as 'friendship', 'closeness', 'comfort', and 'trust' were brought up; yet it was difficult for participants to define these terms.

Seeing the difficulty of the participants in defining these terms and that they were often interchangeably used, the word 'trust' was chosen as an umbrella term in this study, even though it is acknowledged that these concepts may not mean the same. Trust entails one's willingness to take a risk and make themselves vulnerable to another (Mayer et al., 1995). In this context, for example, trust may mean risking sharing more sensitive information with a peer, thus making oneself more vulnerable to them. For those interviewed, trust impacted the likelihood of seeking information from and/or sharing it with peers and was a function of time, going through the same experience, sharing a common element, and proven track record.

Duration and frequency of contact (time) with peers played a significant role in developing trust. Duration was described by P5 as 'how long [they]'ve known someone', whereas frequency, as defined by P16, refers to having 'a lot of contact with each other'. The interviews showed that the longer doctoral students knew their peers and the more often they interacted with each other, the more likely it was for trust to be developed.

In addition to time, experiencing the same, often difficult, circumstances brought peers closer together and contributed to the development of trust. P17 defined this as 'the things you've been through' and felt it was like being 'in your same boat [*sic*]' when recalling a difficult period when they had to take their comprehensive exam and complete a challenging course alongside their peers.

Developing trust went beyond time and going through the same situation and included sharing a common element with one another. These elements ranged from the same age, gender, background, and experience to interests, goals, values, stage of life, and even being in the same program. The elements, individually or together, impacted the development of trust and the consequent information seeking and sharing that occurred among peers. A participant made this clear when justifying going to their Ph.D. peers, as opposed to Master's. P3 said,

> P3
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> . . .some of them [master's students] are, like, totally brilliant. But like, maybe they just finished their bachelor's degree, and they're like, 22 or so. And they're doing a master's because they didn't know what to do next, it seemed like the right thing. And, they're probably not going to be as disciplined about like reading everything, they're not going to be as intrinsically motivated, perhaps, to cover the material. And also, they're just often younger. And most of the Ph.D. students in my group have master's degrees as well. So, we've just been going through it for a lot longer and have more background knowledge to fall back on. . . so there's just more, like, we're in the same position, we're going through the same kind of thing together, we have the same kind of complaints, we're at similar level as far as like how long we've been working in our discipline.

The above quote by P3 highlights factors such as age, background, experience, stage of life, and being in the same discipline as some of the factors that helped build trust and impacted information seeking and sharing.

Trust was further elicited when a peer had previously shown to be a useful source of information. Specifically, participants talked about trusting and going back to peers who had, in the past, demonstrated an ability to provide information. For instance, a participant in Linguistics (P18) would often go to the same native English speaker peer for domain-specific questions. When asked about their choice to return to this peer, P18 explained that 'once . . . you get accustomed to something, you don't want to just throw that away. You just keep that'. By the same token, the proven track record of peers is not always positive, and a negative experience can also result in less or no information seeking.

Trust implications. Trust had several implications for doctoral students in this study. With trusted peers, doctoral students could share draft work, brainstorm ideas, and disregard information they did not find useful. When speaking to participants, it became evident that there is an unspoken distance between doctoral students and authority figures, such as their supervisors. A participant (P3) referred to this as a 'power imbalance', which created a fear of being wrong and looking incompetent. With trusted peers, however, this fear was eliminated. P17, who would often present draft work to their peers, explained,

> P17
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> . . . I feel more comfortable practicing a presentation that I'm not 100% polished on in front of, in front of people that I already am close with, because you know, even if I'm not 100%, even if the slides, there might be mistakes, knowing that it's your friends, that makes you a little bit more relaxed.

Similarly, trust also meant that students were able to freely brainstorm ideas with their peers. Brainstorming was not possible with supervisors since participants felt there was expectation for a completed draft or, according to P3, 'a fully formed idea'. P3 defined brainstorming as 'bouncing ideas off of each other' and elaborated by saying,

> P3
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> . . . with peers, I can, like, I can think out loud and. . . I can figure out what my question is as I'm speaking. I can speak through it, and I know that they're not going to be annoyed or going to be impatient, or they don't have to get through my question in five minutes so that they can get on to the next student.

Sharing drafts and brainstorming with peers prepared students for going to their supervisor(s). P9 reiterated the fear of going to their supervisors and identified peers as a coping mechanism that helped reduce anxiety and prepared them for their supervisors. P8 said such preparation meant a higher chance of having a successful meeting with their supervisor.

A final implication of trust with peers was that participants were not bound to the information received and could disregard them. In other words, peers did not have to worry about the potential consequences of ignoring each other. P2 talked about this advantage and said,

> P2
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> I think that also part of the usefulness of going to peers is that I can either take the guidance that they give, or I am able to discount their guidance if I don't feel that it works within the situation that I'm in at that time, or if it works for me.

Overall, trust can be summarized, according to P5, as one of the requirements for information seeking and sharing behavior. P5 said,

> P5
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> . . . When you build up a friendship and you build up trust and you build up like a rapport, you can then go to them [peers] with information.

Perceived competence to help

In addition to trust, perceived competence of peers was a factor in deciding whom to approach for information. Perceived competence refers to the belief that a peer is capable of providing the needed information. While not the primary focus of the study, it became evident that institutions influence the development of such perceptions by introducing peers to one another and providing access.

Across the interviews, it was clear that perception alone, regardless of a peer's actual competence, was often sufficient to motivate students to approach them. Both perception and competence appeared to be relative to a student's specific information need. For instance, while P7 did not consider themselves competent, their peers viewed them as qualified to provide funding-related information. P7 explained,

> P7
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> I don't know if anyone considers me more of an expert than any other graduate student who has applied to these things in the past. But I guess from the perspective of somebody who had never applied to these graduate grants. . . then yeah, I guess we're more knowledgeable because we have.

Competence was often related to a peer's domain specific or academic information. Several participants described either seeking information from peers with expertise in a particular topic or being approached by peers for information on subjects they had previously studied. For example, when P5 needed help on an essay about a scholar, they explained how they went to a peer who was studying that particular scholar as part of their research. Similarly, P5 referred to another peer for broader questions in their field, Philosophy. They explained this peer being 'really good at Philosophy' (i.e. perceived competence). Feedback on paper (P7), help with comprehensive examination (P6), and methodology (P9) were also brought up in the interviews.

Perceived competence also played a role when participants sought help from peers who were assumed to have already encountered or gone through the issue in question. For example, P12 sought information on how to hold virtual office hours from a peer who had been a virtual teaching assistant in the past (i.e. open office hours vs appointment-based).

Assumptions also influenced the decision to exclude certain peers as sources of information. For example, P9 described a peer with similar research interests who was struggling in their doctoral journey, and as a result, chose not to seek information from them.

The concept of perceived competence was further expanded by the notions of relevant and perceived usefulness, which emphasize the value of information to the seeker rather than its objective quality. Relevant usefulness refers to the idea that information only needs to be useful to the person seeking it; the same information may not be of value for others. In other words, the information is considered good enough if it meets the seeker's needs. This highlights the subjectivity in what information is sought or shared. The case of P11 illustrates this phenomenon. Peers frequently sought their help with the English language; yet P11 was not a native speaker and had no special training in the language. They explained that using a 'basic word' often impressed their peers, creating the impression of fluency and prompting others to continue approaching them for help. P11 stated this as,

> P11
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> . . . like— it's funny, you know, they get super impressed with the basic word that I would know, so I just became extremely fluent in English for them, but I'm not that fluent as they would have thought.

In addition to relevance, the perceived usefulness of information is sufficient for students to approach their peers, rendering actual usefulness irrelevant. For example, P5 sought help from a peer while writing a philosophy paper. Although P5 found the peer's input useful and

incorporated it into the assignment, one of the evaluating professors gave them a failing grade. This demonstrates that actual and perceived usefulness may not always align.

Convenience

Participants identified ease of access, saving time, and pre-existing relationship as convenience factors influencing their decision to go to peers for information. While these factors are discussed separately to highlight their individual significance, they often complemented or led to one another. For example, one may approach a nearby peer because it is both easy to reach them and saves time.

Ease of access refers to the effort needed to reach peers. It may be both in terms of physical (e.g. same space) and virtual (e.g. online chat) proximity. In general, peers were a more accessible source, which translated into going to them for information. P6 explained the concept of ease of access by comparing going to their supervisor versus peers. They argued that the latter is more convenient since meeting their supervisor required booking an appointment. P2 recognized ease of access when discussing their time in the department's graduate lounge. Before gaining access to an office, P2 often used the student lounge to grade papers for a course in which they were a teaching assistant. Surrounded by peers, they would occasionally consult with them to ensure objective grading. When asked why they turned to peers, they cited proximity, noting it made it 'easy' to talk to peers. Similarly, P7 emphasized the role of physical space in encouraging spontaneous interaction and admitted they sometimes spoke with peers simply because 'they just happened to be here'.

In addition to proximity, speed (i.e. saving time) also emerged as a convenience factor. P5 described their peers as 'timesaving people and supportive' and shared an instance when they asked a nearby peer how to upload a file to an internal website, thereby avoiding the time it would have taken to search for documentation. They justified going to peers by saying, 'it's definitely quicker to ask someone who knows the material rather than like trawling through various documents'.

The final convenience factor was the pre-existing relationships among peers. Related to the notion of trust, participants often went to those they were familiar with when they needed help. While not always the case, most of the participants had a handful of close peers, whom they referred to as friends, that they would refer to for the same type of situation (e.g. same information). This became evident throughout the interviews by participants either explicitly mentioning it or observing that the participants kept referring to the same peers. For example, P13 talked about being in a group chat with their close peers and using the chat platform to seek and/or share information. When asked why they went to these peers for information, they talked about the notion of pre-existing relationship between them,

> P13
>
> Well. . . they're all close friends. And we have our own, like, you know, friendships outside of this. And for instance, I would go sometimes for coffee with one of them, or have a beer with another, like we would all have our individual relationships together.

At times, information seeking and sharing occurred even when accessing a peer was not particularly convenient. For example, P3 shared a story about reaching out to a peer and offering help to ensure they succeeded on their research proposal. This pointed to another personal factor: the desire to help.

Desire to help

Throughout the interviews, participants talked about the desire to help their peers. This help came in any form possible, so long as it aided in their success. This was explicitly echoed by P17, whose peers were instrumental in helping them navigate through the doctoral program. P17 summed up their desire to help by saying, '[I] care about them a lot. I really wish them all the best in their endeavors'.

Although not as explicit, the same was observed with other participants. Many of them talked about helping peers in the academic context, including with the comprehensive exam, presentations, papers, and software (e.g. statistical and citation manager). For instance, despite having had mobility issues, P16 recalled offering help to a peer with their comprehensive exam. They not only helped with the exam, but they also ensured to check up on the peer throughout the process. P16 remembered the incident as,

> P16
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> So, I mentioned before that this student, my cohort group, [name of the peer], who's a little bit behind me, I had just told her, if you need any help with comps, I'm happy to talk you through it. And she was kind of a little bit of a nervous wreck, which I understand. It's fairly rigorous. And so, she reached out. . . So, I think we just sent like, very brief messages once every three months or something just like, say 'Hi' or whatever. But, she reached out when she was getting close and saying, like, 'I'm really stressed, can we talk?' And I said, 'Yeah'. So, we met for coffee. So, she came to me because I had mobility issues.

The desire to help went beyond direct academic help and included informing one another of certain academic and non-academic opportunities. For example, P5 was subscribed to a philosophy mailing list and would often receive emails they would share with their peers. P5 recalled forwarding various post-doc opportunities in

Germany to a peer who was considering pursuing that path. They also used the mailing list to forward funding opportunities to another peer. Similarly, P9 was more involved in the field of sociology than some of their peers and would often hear about opportunities on social media, which they would send to their peers.

Other examples included help with research and its dissemination (e.g. P7), funding (e.g. P7), work opportunities (e.g. P15, P17), health and well-being (e.g. P9, P15, P20), and even reminders not to miss important dates (e.g. P15).

The desire to help was further illustrated by participants who helped regardless of their expertise. In other words, doctoral students provided help even when they felt unqualified. For instance, P8 participated in a peer's mock virtual presentation, despite the content being out of their specialty, and offered logistical feedback.

The willingness to support peers extended beyond close relationships. For example, P15 did not enjoy interacting with a particular peer but still offered assistance. The passage, below, by P15 demonstrates this:

> P15
>
> There's a girl who's my same year and she complains quite a lot. I also don't like her too much, but I take the time to listen to her. She mostly talks because she's not a great listener. But she complains about her TA-ship [teaching assistantship], she complains about her international student fees, she complains about how she's not going along [*sic*] with profs, and how she thinks she deserves better grades or I don't know what. So, like, I try to give her advice, but like to be honest, I don't go along with her *[sic]*.

Overall, what can be observed is that peers offered whatever help they could to contribute to one another's success. P8 summarized this phenomenon by saying they are, 'invested to. . . making sure each other do well [*sic*]'.

Sense of obligation/giving back

Related to wanting to help one another, at times the participants felt an obligation to engage in information sharing. It was not clear if all their engagement was due to obligation; however, some participants talked about helping their peers because another peer had previously done the same for them. For example, upon entering their program, P16 attended a virtual presentation about funding by a more senior peer. P16 contacted the presenter after, who further helped them with funding questions. They appreciated this and seeing its usefulness, they partook in the same presentation in the following year. P16 explained this as,

> P16
>
> And I did the same thing. Like I had noticed that what [the peer] had done for us during the presentation for the first years on Zoom was helpful. And I was asked this year to do that presentation. And so, I was happy to do that. So, we're trying to like, you know, trying to pay it forward, or like, you know, help.

Another example was P19, who was highly involved in their department and university. They helped organize events, initiated conversations with new students, and answered peers' questions. This form of helping was their way of giving back to the community and was directly influenced by the support they had received at the start of their program.

Discussion and limitations

Doctoral students require information in order to progress through their programs. One important source of information is peers in unstructured environments, with whom they engage in information seeking and sharing. While previous studies have shown that a wide range of information, such as academic, administrative, social, and personal, is exchanged among peers (Lee et al., 2017), it remains unclear why peers are chosen as a source of information. In other words, while the benefits of information seeking and sharing in unstructured environments (i.e. informal interaction) might not be surprising, the rationale behind the choice to engage in it remains unclear. This study addresses the choice and demonstrates that factors related to the environment and the individual can have an impact. These factors are demonstrated in the Doctoral Peer Information Behavior (DPIB) Model, in Figure 1, below. The model groups factors into environmental and personal categories, which is consistent with Bandura's Social Cognitive Theory (1986) and Wilson's (1997) Information Behavior Model. The specific personal factors (i.e. nature of the relationship, convenience, desire to help, perceived competence, and obligation) are also similar to and are observed in Wilson's (1997) model, yet they are within the context of doctoral peer interactions in unstructured environments.

Institutions play a significant role in shaping the environments where doctoral students seek and share information. By introducing peers to one another and providing shared spaces (e.g. offices, lounges), they create opportunities for interaction. Moreover, limited access to resources may inadvertently push students to rely more on their peers for information. While structured environments, such as mentoring and support groups, have been shown to benefit doctoral students (Lorenzetti et al., 2020; Mullen and Tuten, 2010; Nokkala et al., 2022), the present findings extend this body of research by illustrating how institutions also influence peer interactions in unstructured environments. Relatedly, the findings highlight that sharing physical space promotes information seeking and sharing among doctoral peers. This aligns not only with previous research

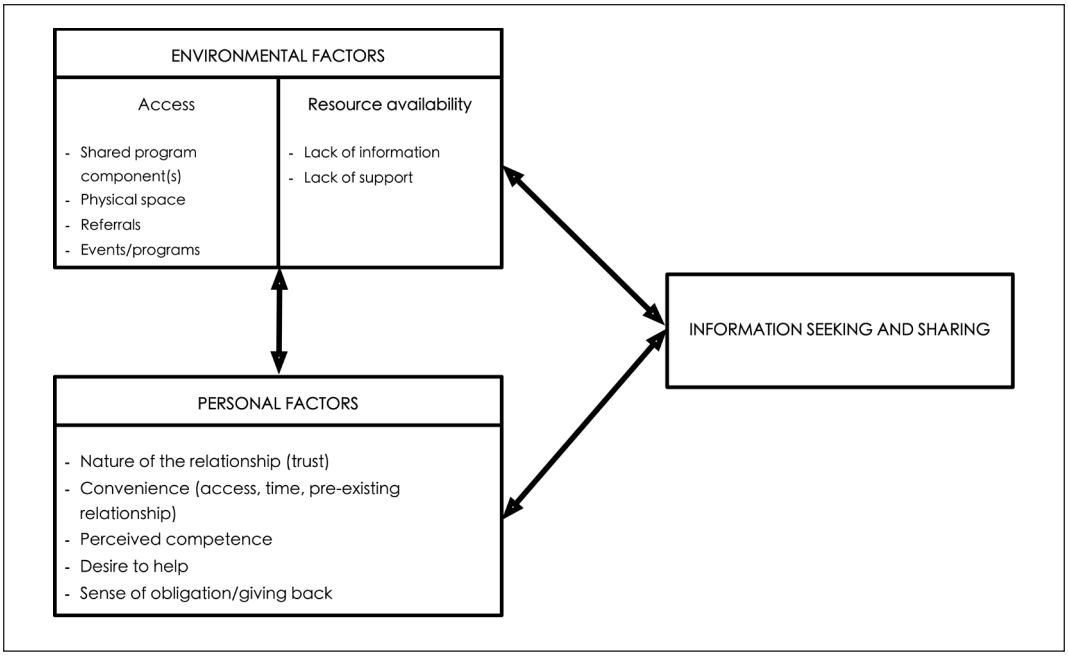

Figure 1. The Doctoral Peer Information Behavior (DPIB) model.

on doctoral students (Hall and Liva, 2021; Sloan and McPhee, 2013) but also with studies of professionals in workplace environments (Nakano et al., 2023), underscoring the similarities between the two groups.

While environmental factors play a significant role, engagement in information seeking and sharing with peers also depends on personal characteristics of both the seeker and the sharer. These factors were trust, convenience, perceived competence, desire to help, and a sense of obligation/giving back. In this study, trust emerged as a prominent factor. Although trust is a complex topic beyond the full scope of this paper, findings, consistent with the literature, indicate that the more trustworthy a peer, the more likely participants were to share or seek information with them (Agarwal et al., 2011). For doctoral students, the comfort that trust brings with peers also means seeking help and support that goes beyond just information (Wang et al., 2023).

Trust, in this study, was developed in several ways, most notably through a common element with peers. These elements, which include demographic, background, shared interests, similar goals and values, and being in the same situation, contributed to higher levels of trust, which in turn fostered collegiality among peers. These findings are supported by prior research demonstrating how shared attributes can cultivate collegiality and enhance peer relationships (Brown, 2021; Hadjioannou et al., 2007).

Convenience was also a contributing factor to information seeking and sharing among doctoral peers. Prior research has shown that convenience influences doctoral students' choice of digital information resources, such as Google and Wikipedia (Spezi, 2016). In this study, students reported going to peers due to ease of access, speed, and existing relationships. These findings suggest that convenience extends beyond the medium itself and if a source is perceived as convenient, it is likely to be used regardless of the format.

Perception manifested itself in the context of competence, as well. Doctoral students often referred to peers they perceived as competent, regardless of those peers' actual expertise or outcomes. This finding aligns with literature emphasizing the importance of perceived usefulness in decision-making. For instance, the Technology Acceptance Model (TAM; Davis, 1989) suggests that individuals' decisions to adopt a technology are guided by the belief that it will enhance their performance, rather than by evidence of its actual effectiveness. Similarly, in this study, the perception that a peer was competent was sufficient to influence the decision to seek them out as an information source.

The desire to help peers and a sense of obligation also influenced the decision to engage in information seeking and sharing, pointing to a broader theme concerning the personality of doctoral students and their commitment to supporting one another's success. While such behavior has been observed in research on peer learning, mentoring, and support (e.g. Brown, 2021; Hadjioannou et al., 2007; Meschitti, 2019; Sherman et al., 2023), the findings of this study demonstrate that it also holds true in unstructured environments.

It should be noted that environmental factors, personal factors, and information seeking and sharing behavior are interconnected, with each capable of influencing on another. This interplay can manifest in various ways. For instance, even in an environment designed to facilitate information seeking and sharing, personal factors may inhibit participation. Conversely, personal factors may drive engagement in information seeking and sharing, even when the environment is not especially conducive to it.

Limitations

This study relied on one-on-one interviews to collect data (i.e. self-reported data). Participants were not given the interview questions in advance and were asked to reflect on their current and past experiences of information seeking and sharing on the spot. Consequently, their responses were limited to memory, which was subject to the participant's ability to recall past events. While examples were used to aid recall, some students may have forgotten or selectively reported certain events.

In addition to self-reported data, it is acknowledged that having conducted the interviews during COVID may have impacted the findings; yet, given the extensive interaction participants had with their peers up until the interviews, it is unlikely that the outcomes would have been significantly different during non-pandemic times. Therefore, it is not believed that these circumstances impacted the goal or the usefulness of the findings.

Conclusion

This paper explored the factors influencing information seeking and sharing among doctoral students in unstructured environments. The findings show that doctoral students exchange information under conditions related to the environment and the students involved. With respect to the environment, institutions play a pivotal role by serving as an avenue for introducing peers to one another. Hence, institutions should strategically plan and establish spaces that facilitate these connections. Examples might include peer-led activities and shared workspaces.

For students, becoming aware of their information behavior and understanding the value of shared environments can help them intentionally plan their interactions with peers. For instance, given that physical proximity encourages peer interaction, it might motivate them to spend more time in that environment.

Conceptually, the DPIB model acts as a theoretical bridge. While prior studies have looked at the interaction among doctoral peers and its usefulness (e.g. Devenish et al., 2009; Lorenzetti et al., 2020; Mudaliar, 2022), the DPIB model provides a framework that addresses the rationale behind choosing peers as a source of information in unstructured environments. The primary value of the model lies in its identification of the factors, and the interplay between them, that impact this choice. The model, therefore, can be used as a foundation for future research; for instance, the factors can be used as a reference to understand the information behavior of doctoral students in other disciplines, countries, and universities.

It is hoped that the findings and the model presented here will contribute to improving the doctoral experience and serve as a starting point for future research on peer interactions in unstructured environments.

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Ethical considerations

This study received approval from McGill University Research Ethics Board Two on September 30, 2021.

Consent to participate

Participants were emailed a consent form and asked to indicate their consent by replying to the email or sending back the signed digital consent form prior to their interviews.

Consent for publication

Not applicable.

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Declaration of conflicting interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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