*ARTICLE*

# From Availability to Access

## How Students Perceive and Navigate Access to Online Information Resources

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**ABSTRACT**

*This paper reports on student perspectives on access to online information resources when conducting an initial search for a school project. Through thematic analysis and user vignettes based on data from 175 students in elementary through graduate school, this paper explores how students determine whether they have access to online information resources, the barriers and enablers they attend to when pursuing access, and the characteristics that influence this process. Results reveal that resource previews, university and library branding, and the word* download *are generally viewed as enablers of access, while payment cues, learned heuristics around brands and formats, and the need to take extra steps to obtain the full text were barriers that often prevent students from trying to get access even when resources were available to them. Potential influences on individual capacity are also revealed, including experience in high- or low-availability information environments, ability to manage the complex cognitive load of determining access alongside other types of point-of-selection evaluation, a variety of dispositions related to information seeking, and situational factors related to the importance of the information need to the individual. While library staff work diligently to make online resources available, this does not automatically result in students' ability to access those resources. This paper provides evidence to better equip library professionals for constructing their online information systems, collaborating with information providers about their online information systems, and teaching students about converting availability to access.*

**INTRODUCTION**

Students' experiences with search engines, social media, and other online information systems shape their assumptions, expectations, and behaviors when they interact with library systems and services. Library professionals need to understand these expectations and behaviors in order to ensure users can access the online resources that libraries provide. This paper seeks to identify how students perceive and navigate access to online information resources by analyzing data collected from a larger research project.[1] The students in this study interacted with simulated search engine results pages and the resources found on those pages. The resources found in the simulation mimicked those provided by libraries at a typical large research university. This paper

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focuses on their comments about access as they explored the resource pages they clicked into and the barriers and enablers that surfaced from these comments.

The idea of access to information resources is fundamental to the library. Access to information resources is not only an American or Western ideal; it is shared by librarians across the world.[2] From the first public libraries of Ancient Rome to Ranganathan's five laws of library science, information access is embedded in library institutions, their information systems, and the library profession.[3] The American Library Association describes the role of library professionals as individuals who "create systems that ensure members of their community can freely access the information they need for learning, growth, and empowerment regardless of technology, format, or delivery methods."[4] The systems that enable access to information resources are created and facilitated from the perspective of librarians, cataloguers, publishers, and other information professionals.[5] This library perspective is primarily concerned with the provision and preservation of information resources.[6] This suggests that providing information resources within these systems is equated to users' access to them.

The open access (OA) movement is a good example of equating provision with access. The OA movement began in 2001 when a group of international scholars known as the Open Society Institute (now Open Foundations Institute) wrote the Budapest Open Access Initiative (BOAI) declaration. The declaration advocated for free and open access to scholarly publications to become the standard since the internet allowed easier information sharing and collaboration. BOAI argued:

> Removing access barriers to this literature will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge.[7]

BOAI postulated an idyllic future solely based on removing barriers to scholarly information, thus enabling unfettered access.

While universal OA has not been achieved in the twenty years following the BOAI declaration, it has become increasingly apparent that the free availability of scholarly publications is not necessarily sufficient for users to be able to discover and access them.[8] Just as it is necessary for library professionals to assess whether freely available OA resources can be discovered and accessed by their users, library professionals have to understand their users' expectations and behaviors in order to ensure users can access the online information resources that library professionals provide.

## LITERATURE REVIEW

The provision and preservation of information resources are components of the much more complex phenomenon of access. Lievrouw contends that institutional approaches to access, or systems-based approaches, are better described as *availability*. Lievrouw describes this institutional availability as "the presence and circulation of institutionally produced and mediated information in a given community."[9] These approaches focus on the conduit, or the mechanism, by which information resources are provided to users. Lievrouw argues that *access* is dependent on each user's ability to convert institutional availability to "information that they can actually obtain and use for their own purposes."[10] In other words, users must first be aware of the institutional availability of the resources and then be able to navigate the system in order to get to them. In this

model, access is dependent not only on the presence of an information resource within a system but, more importantly, on users' individual capacities to seek, use, and share information. Thus, improving access is not only about improving the provision of resources but also about improving individual capacities.

To describe and explain these differences in individual capacities, Lievrouw and Farb developed a conceptual framework that distinguishes between hierarchical (vertical) perspectives of access and heterarchical (horizontal) perspectives.[11] Hierarchical perspectives interpret information as a good or commodity, where individuals who are higher on the vertical axis are "information rich" and lower on the axis are "information poor."[12] Heterarchical perspectives posit that "a person's access and use depend mainly on her or his capacity to understand and benefit from information and information technology in a particular situation."[13] To put it another way, hierarchical perspectives focus on an individual's position within the societal structures that shape information access, while heterarchical perspectives focus on individuals' information needs within a particular situation and context.

Mooers and his self-declared Mooers' Law state that "an information retrieval system will tend not to be used whenever it is more painful and troublesome for a customer to have information than for him not to have it."[14] Essentially, users' perceptions of accessibility and their willingness to pursue access are often defined by the barriers and enablers they perceive. Barriers and enablers to access, specifically information retrieved electronically, have been considered for as long as these electronic information systems have existed.

McCreadie and Rice identify six categories within which there is a continuum of barriers and enablers to access: physical, affective, cognitive, political, social, and economic.[15] Although not looking at barriers and enablers explicitly, Burnett, Jaeger, and Thompson draw on previous models to describe three aspects of access: physical, intellectual, and social. Physical access is enabled by an information system to provide an information resource to a patron. Intellectual access centers on the patron's ability to understand the resource. Social access employs Chatman's small world theory in which social contexts "influence individuals' approach to, understanding of, and use of information."[16] Oltmann's review of their model points out that they fail to consider economic aspects.[17] As such, McCreadie and Rice's six categories may offer the most comprehensive framework for considering individuals' barriers and enablers.

In a conceptual analysis of works in the *Journal of Information Science*, Savolainen identifies cognitive barriers while selecting and accessing information sources, specifically, poor search skills, an inability to deal with information overload, low self-efficacy, and an unawareness of relevant information sources.[18] Cole et al. argue that middle school students encounter a cognitive barrier in their transition from Kuhlthau's Stage 3 to Stage 4, the exploring information stage to the formulation of focus stage.[19] In a study of high school students, Meyers observed limited access to resources, devaluation of interpersonal sharing for academic purposes, a lack of affective support, and a failure to validate students' previous experience when attempting to change information habits.[20] Some components of this research complements what the Association of College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education describes as dispositions, which are the ways in which learners "address the affective, attitudinal, or valuing dimension of learning."[21]

## METHODS

The data for this paper were collected from 175 students in the Researching Students' Information Choices (RSIC) study from six educational cohorts (Table 1): elementary school (*n* = 29), middle school (*n* = 30), high school (*n* = 26), community college (*n* = 30), undergraduate (*n* = 30), and graduate (*n* = 30). The students all resided in the same county in the southeastern United States. The county included a large research university, a state community college, and a public school system. Students volunteered to participate in the simulation sessions after completing a questionnaire that gathered demographic and background information.[22] Students who were chosen to participate in a simulation session completed pre- and post-simulation interviews that asked about their information-seeking experiences in educational environments.

**Table 1.** Number of students in each educational cohort.

| Cohort | Number of students |
|---|---|
| Elementary school | 29 |
| Middle school | 30 |
| High school | 26 |
| Community college | 30 |
| Undergraduate | 30 |
| Graduate | 30 |
| Total | 175 |

Each participant completed a facilitated task-based session using a simulated search engine environment. During the sessions, participants were presented with a research assignment prompt about the Burmese python's impact on the Florida Everglades appropriate for their cohort and asked to complete five tasks.[23] The five tasks were as follows:

1. Select resources that they deemed helpful for their assignment (Helpful)
2. Explain why the non-selected resources were not helpful (Not Helpful)
3. Decide whether they would cite the helpful resources in their assignment (Cite)
4. Judge the credibility of their selected helpful resources (Credible)
5. Select the container type (blog, book, conference proceeding, journal, magazine, news, preprint, or website) of a preselected set of resources that they may or may not have selected as helpful (Container)

The simulated environment allowed students to navigate and interact in a realistic way with a controlled set of Google Search results, including clicking into resource pages from the results pages, scrolling through resource pages, and clicking buttons or links to access the full content of resources.[24] A short video demonstration of the simulation session can be viewed at https://ufdc.ufl.edu/IR00010570/00001/videos.

A think-aloud protocol was used to capture participants' thoughts as they navigated each task. Students were asked to say whatever they were thinking as they went through the simulation, and this think-aloud was recorded and transcribed. Themes from the sessions were identified both inductively and deductively and organized into a codebook through iterative rounds of coding and discussion. Once acceptable intercoder reliability was achieved, the transcripts of each session were coded using NVivo software.[25]

From the initial round of coding, there was a small group of codes capturing participants' comments about access, including full content access and paywall access, that constitutes the data for this paper. To further investigate the patterns surrounding access, a second round of coding was conducted on this dataset to more fully capture the ways in which participants conceptualized, recognized, and discussed access, with particular emphasis on barriers and enablers to access. Second-round codes were generated inductively, agreed upon, and defined among the group. Particular attention was paid to whether participants' discussion of access differed across simulation tasks, cohorts, or resource types.

To further investigate the ways individual students approached access, participants who frequently discussed access in their think-aloud were identified. Their think-aloud commentary was combined with their responses to the questionnaire and pre- and post-interviews to create a set of user vignettes. One student from each of the following cohorts was selected: high school, community college, undergraduate, and graduate. There were not enough think-aloud data to create a vignette for a middle school or elementary school student.

## RESULTS

Ninety-nine of the 175 student participants (57%) mentioned access at some point during their simulation tasks. The majority of the access mentions centered around the more academic content of books and journals, with more than half of the mentions on book resources. The text content of the news, magazine, and website resources in the simulation tended to be immediately available on the page, whereas the online book and journal article resources tended to require students to click a button or link for full text. Students could access the full content of every resource in the simulation except for one book that had a broken link on the resource's page. The following analyses represent all access mentions from the originally coded data.

The thematic analysis identified cues that students used to determine whether they could access the full content of a resource, how those cues were viewed as barriers or enablers to access, and whether students could perceive a path to access for particular resources. While there was a shared set of cues that students paid attention to, not all students reacted to these in the same way. Students often had expectations and learned heuristics around different cues that led them to make assumptions about whether the full content of a resource was available to them. In this way, these heuristics themselves were barriers and enablers to access, leading students to determine a priori if it was worth pursuing access. Because of this, the thematic analysis is organized according to whether the student did or did not perceive a path to access and what cues, expectations, and heuristics allowed them to determine (or not) that path.

Although the thematic analysis did not reveal patterns among students by cohorts, there were some patterns in the data about how individual students approached access. In order to make these thought processes and behaviors more apparent and examine the ways that students' backgrounds and prior experiences might influence them, the user vignettes examined four students more holistically. This analysis revealed potential connections between students' dispositions, education, and experience in different information environments and their ability to identify and gain access to resources.

### *Thematic Analysis*

Most cues were not universally regarded as either barriers or enablers to access. Instead, students' perceptions of barriers and enablers were based largely on their previous experiences with specific types of resources and different information environments. However, most

comments about access could be grouped into one of two broad categories. In one, students perceived a path to access, meaning that they either said they had access to the full content of the resource or they identified steps that they could take that would get them access. In the second, students did not perceive a path to access the full content of the resource. The findings of the thematic analysis are organized into these two categories, and the cues students identified as barriers and enablers when determining a path to access are addressed in each.

Mentions of access happened across all five simulation tasks (Table 2), although they occurred most often in the Helpful task. The thematic analysis did not reveal meaningful differences in the way that students talked about access across tasks when students perceived a path to access. However, there were some differences by task when students did not perceive a path to access, so tasks will be addressed in that section.

**Table 2.** Number of students who mentioned access in each simulation task.

| Task | Number of students |
|---|---|
| Task 1: Helpful | 53 |
| Task 2: Not Helpful | 20 |
| Task 3: Cite | 16 |
| Task 4: Credible | 8 |
| Task 5: Container | 27 |

*Perceives a Path to Access*

Students' ability to perceive a path to access did not necessarily mean that they were willing to or intending to pursue that path. In other words, the student's perceptions of an available resource did not always result in converting that availability into access. There were a variety of barriers and enablers that influenced both students' perceived access and their willingness to pursue that access. Students used the information available to them on the page to determine whether the steps that they had to take were worth pursuing.

When discussing access to a resource, students, especially the higher education students, very often mentioned previews, defined here as descriptions, samples, or portions of an information resource, including abstracts, citations, and tables of contents. Sometimes, these previews were seen as an enabler, either because they were useful in determining whether to pursue access or because they were useful on their own without the full content of the resource. Students looked to preview elements such as abstracts and tables of contents to determine whether a resource was relevant or helpful enough to pursue access. These helped to pique their interest in the full content and motivate them to access it: "This one's about a book, but it only really gives the abstract. Probably, would go to the library and find that book if I really wanted it based off the abstract" (community college 17).

When a preview did not have enough detail or fully explain the purpose and content of the resource, students often chose not to pursue access. In other instances, when a reference list was available without the full content, they would consider citation chaining but not necessarily pursue access to the original resource: "A quarter page abstract and a page or two long of list of references so as no other option. So I'm going to mark this and look at the reference list instead of the actual article" (graduate 32). In some instances, previews were also mentioned as a barrier, particularly when students anticipated being shown part of the content that was relevant but

navigating a payment or login barrier to access the rest of the content. These were often learned heuristics related to brand or format assumptions.

> Springer is always just—they are one of those for-profit ones, so they charge money to download or charge money to read generally. And even though I sign in using [a university] account, it's not a perfect system. It doesn't always get me access to these papers. So I generally don't bother with Springer. (undergraduate 11)

Attention to the word *download* on a resource page seems to serve several purposes for students. It was used to help identify the resource when accompanied by words like *download book*, *download chapter*, or *download PDF*. Students also saw it as an indicator that the full content was available, although not necessarily accessible to them. While students generally perceived a download as an enabler to access, it was also viewed as another step they had to take to gain access, and one without a guaranteed outcome. Similarly, having a link to the content was seen as an enabler, but some students were still skeptical that the link would work correctly. In these instances, a path to access, even when clearly identified and simple to follow, was still sometimes seen as a barrier because students did not know for certain whether they could achieve access until they took the steps to try. They also viewed these extra steps as an unnecessary barrier: "I just like to be able to open it and immediately start reading it, versus you have to come in and download this so you can read it. So accessibility, I guess, and ease of accessibility" (community college 2). Some students also expressed an aversion to having to download a resource, particularly an entire book, just to be able to determine whether it would be useful to them.

Despite being a path to access, payment was the one access characteristic that was overwhelmingly considered a barrier. The mere presence of a dollar amount on a resource page often led to the automatic assumption that they would have to pay to access. Most students would see a payment cue and automatically disregard the resource. The vast majority were not willing to spend money, and a few specifically framed this within their ability to get other resources for free. Based on previous experiences, some students assumed that they would have to pay based on the format (book or article) and their affiliation (not affiliated with the university or not on campus).

Books, in particular, were heavily associated with payment barriers, and many students dismissed book resources because they assumed that they would have to pay for them: "That's a book. I'm not trying to buy a book, obviously" (high school 4). Students considered books to be high-quality resources, but their perceived inconvenience was often a barrier to access. Students mentioned that it takes time both to get books and to go through them for information, and that they are not as easy to use because they often do not have search and find functionality to identify relevant information:

> Well, they usually make you buy the books if there's good information on a specifically page like 300, and you can't really look inside because, usually, they only give you a short amount of time to find stuff for your research paper and everything. So books are usually the best source, but in the time that we have and stuff to do projects, it's not worth it. (community college 17)

Some students did mention that if there were format requirements for an assignment, such as having to cite a book in their reference list, that they would pursue access: "So I don't think I would use this one unless the research paper said you had to have at least two references from a print book just because it doesn't seem like it's that useful to me, and I wouldn't go to the trouble of going to the library to check it out" (high school 15). In this way, these requirements served as

an enabler of access by providing an incentive for students to pursue access that they otherwise considered too inconvenient, costly, or time consuming.

Google Books had an almost universally negative association, in part because students had personal experience with being denied access to resources and in part because it occurred at the intersection of several of the other heuristics that students associated with barriers to access. Students assumed that the Google Book resource would show them an excerpt of a book and then charge them a fee to access the full content of that book: "But Google Books seems something like you would have to pay for the books and we don't have money in school. We got to get the information for free on the computers" (elementary 21). Several students commented on the model of preview then payment, with many stating that they won't even look at Google Books because they don't expect to be able to see the content that they actually want in the preview: "Oh, this is a book on Google, and from just searching stuff on Google, usually, if there's a book on Google that is not an article that's given to us by [the university], you can't access the whole book. And I doubt that the few pages they give you would allow you to read enough about that" (undergraduate 24).

The library and university were mostly seen as enablers to access, but in some situations and for some students, they were also barriers. Some students mentioned going through the library as a possible path to access when they encountered barriers, especially for books: "But I would at least go to the library and check it to see what it's like so I would check that one off as a potential source" (middle school 25). However, the library had its own barriers, in terms of time and convenience, that were tightly connected to the inconvenience that books posed. When mentioning the university, the undergraduate and graduate students of that university most often perceived it as enabling their access, such as comments on the university's subscriptions or needing to use the university's VPN for access. Those students not from the university perceived the university and library branding as an indicator that they did not have access: "Because you need a subscription for it and my parents don't work for [the university], so I don't have that. So I usually avoid those … if I had access to them, I definitely would use them more often" (high school 8). This was also true for university students who talked about trying to access resources when they were not on campus.

*Does Not Perceive a Path to Access*

Students who were unable to determine a path to access often did not elaborate beyond saying they did not have access. Some mentioned not seeing a link to access or a download button. Some also pointed out that they could see only the abstract or preview and did not have access to the full content. It was most common for students not to perceive a path to access for books. When they did not perceive a path to access, these students were then faced with the challenge of deciding how to complete the simulation tasks without access to the full content of the resource.

Within the Helpful task, students had mixed views about the helpfulness of resources they could not access. Most chose not to mark these resources as helpful. However, a few still marked them as helpful because they felt they could get around the access restrictions in other ways. Some students said they would squirrel away resources that seemed helpful based on the preview, hypothetically saving them to come back to later when they might be willing to spend more time trying to find a way to access them. Other students found the resource's references valuable for citation chaining, making the resource helpful to them even without the full content. Some graduate students made distinctions about how much time and effort they were willing to spend on getting access to resources depending on the situation and context of their information need:

"Again, if I was just doing a real quick idea, I don't think I would dig into this too far. But if I was actually writing a thesis, I would probably look at these things" (graduate 16). They more highly valued their thesis or dissertation than their coursework, which was the information-seeking situation specified for the simulation.

Even when they marked resources that they could not access as helpful, students were not willing to cite those resources. Most explained their reasoning as some version of "you can't cite what you can't see." However, a few made distinctions between not citing a resource that they could not access and hypothetically citing the resource *if they could* access it: "I would not cite this, because I have no access to it. If I really did have access to it and I liked what it said, I would cite it for sure" (undergraduate 11). Some were willing to say they would cite the resource if they could access it, while others needed to access the full content to be able to evaluate whether they would cite it.

Similarly, students found it difficult to assess the credibility of resources without access to the full content. In the Credible task, students evaluated the credibility of resources that they could not access using the information that was available to them on the page, including the preview, metadata, characteristics of the webpage, and domain. However, they were not confident in these evaluations, and some expressed concerns that evaluating credibility without the full content was not a good practice: "The professor would not be happy with that [inaudible] just because I couldn't open. I shouldn't have picked it in the first place" (community college 5). When students were not able to access the full content of an information resource, their ability to make important evaluations about that resource, including its relevance, credibility, and suitability for citation, was seriously impeded.

***User Vignettes***

Participants from all six cohorts mentioned access while discussing resources (Table 3). More than half of the students in high school, community college, university undergraduate, and graduate school discussed access, while just under half of middle school students and less than a quarter of elementary school students did. During thematic analysis, there were no patterns that emerged in relation to the students' cohort. Instead, the cues, judgments, and heuristics above were mentioned across cohorts, with individual students employing them at different times based on their backgrounds and prior experiences. The following user vignettes illustrate the ways in which a student's individual capacities to access information resources might be shaped by their societal experiences and situational information needs.

**Table 3.** Number of students who mentioned access in each cohort.

| Cohort | Number of students |
|---|---|
| Elementary school | 4 |
| Middle school | 12 |
| High school | 18 |
| Community college | 21 |
| University undergraduate | 24 |
| Graduate | 20 |
| Total | 99 |

"Bobbie" (high school 7) was a 14-year-old high school freshman. They attended the K–12 experimental school attached to the large university in town. They had at least one parent with a

bachelor's degree. They rated their confidence in selecting online information for research projects at three out of five and found the URL domain an important factor in evaluating online resources. They did not expect to encounter many barriers. Bobbie had a quick, analytical mind and rapidly honed in on the salient pieces of online information. When they encountered a journal article, it often went like this: "Full text, methods, results, discussion. So this is definitely a study. Lots of literature cited. Yeah. And I like the diagram. I mean, the .com worries me, but internally. But looking at the site, it seems trustworthy because there's lots of citations."

Despite not rating their confidence very highly, Bobbie's ability to scan information resources for a path to access was impressive for their age and education level. They were accustomed to an information environment with a high availability of information resources for academic projects. Their high school was part of a major R1 university, and all of the university's library resources were available to them. This gave them much greater potential resource availability than the average 14-year-old high school student. Their think-aloud comments suggest that they had not only become accustomed to that availability but that their evaluation skills and approaches had evolved to let them efficiently access and evaluate resources for school projects within the high-availability environment.

"Jay" (community college 21) was a 23-year-old community college student pursuing a degree in the life sciences. At least one of their parents had a bachelor's degree. Jay rated their confidence at four out of five when selecting online information for research projects. However, Jay's experiences searching for online information had involved a lot of roadblocks where they were asked to pay for access: "I feel like it's ingrained into me to be scared of the pop-up, to be like, 'Hey, pay for this.'… I know it's probably entitled sounding, but I don't want to pay for information that I can consume for free, and I can go elsewhere." When encountering a resource on Google Books, Jay stated, "That sounds like they're going to give me a blurb preview and then blur out the rest. It would be like, 'Give me money.' So I'm not going to click it." They were frustrated with the multiple steps to acquire access and preferred experiences "without any kind of fence to hop over."

Jay's ability to convert availability to access was clearly influenced by previous experiences in environments with low availability of information resources. Paywall cues were an especially large barrier for them, given the heuristics that they had developed. While they could have accessed all the same information resources as other participants in the simulation, their assumption that resources would be inaccessible meant that they did not attempt to pursue potential paths to access in the face of perceived barriers. They were fairly confident in their ability to select information, but that confidence did not necessarily translate to a willingness to attempt actions with uncertain or unlikely outcomes. This made it more difficult for them to convert availability to access in the simulation environment.

"Terry" (undergraduate 3) was an 18-year-old undergraduate in their first year studying health and life sciences and a first-generation college student. They rated their confidence in selecting online information for research projects at five out of five. When looking for sources, Terry emphasized the importance of books, specifically textbooks that they know they can rely on. They believed that the most important thing when finding online information was that they recognized the website hosting the information resource. Terry also held a strong association with university brands, access, and trust: "If I was in the library and I saw that, I guess I would come to the conclusion that maybe [my university] gives us access to this resource and if that's the case, then I would probably trust this just because I don't see why [my university] would give us unreliable sources." They viewed their university's brand as an enabler of access and a sign of credibility,

while other university brands were also tied to trust and reliability: "I'd use this one as well because it says, 'available for online reading,' and it's published by the University of California. So that's a reliable resource."

Terry illustrated the interplay of the different types of evaluation that students have to do at the point of selection. In the case of university or library branding, Terry was using the same set of cues to evaluate both availability and credibility. Their judgments about the credibility of a resource also influenced their willingness to pursue access to it. Despite having full confidence in their ability to select information, Terry mentions not perceiving paths to access for multiple resources, including university-branded resources. Because they are a first-year undergraduate, they may not yet have developed or been taught the techniques to navigate a high-availability information environment that is also complex. Despite recognizing that the university makes such resources available, their capacity to convert availability to access had not yet caught up to their awareness.

"Kin" (graduate 29) was a 21-year-old student in their first year of a doctoral program in engineering. They had at least one parent with a bachelor's degree. They rated their confidence at five out of five when selecting online information for research projects. They considered references and peer review to be vital. Kin was highly knowledgeable about academic resources and even academic publishers, but they still struggled to find the path to access for several resources. When viewing an available article from Springer, Kin remarked, "It hosts many online source[s], so we can access and I think [the university] does have the subscription to Springer in which we can access the article from Springer. So we could download PDF, except that we don't. Abstract only." Even a recognized OA journal was elusive: "PLOS ONE is pretty famous. Okay, do they have—okay, I couldn't download PDF here. No. So I guess all we have is abstract on this page. But technically, you will have access to PLOS ONE because it's open access anyway."

Kin demonstrated the type of information literacy knowledge that might be expected of an early-stage graduate student, including a reliance on peer review and other evidence of scholarly resources like reference lists, as well as knowledge about academic publishers and institutional subscriptions. Kin was highly confident and clearly accustomed to an information environment with a high availability of information resources for academic projects. However, they still sometimes struggled to convert that availability to access.

Outside of the simulation, Bobbie, Terry, and Kin all had access to the same university's information resources, while Jay had access to resources from the community college. However, the vignettes demonstrate that even students with the same academic information resources did not necessarily have the same capacity to convert the availability of those resources to access. Their confidence in their ability to select information online was also not a good predictor of successfully converting availability to access. While social and economic factors likely play a role, the vignettes suggest that students' prior experiences, knowledge, dispositions, and motivation all affected their ability to get access.

## DISCUSSION

By providing equal availability of all resources for students within the same cohort, the simulation deliberately leveled the playing field for students selecting information resources for a school project. However, equal availability of resources did not produce equal access. Students still had to navigate the various technical and intellectual steps for converting availability to access. For many of them, learned expectations around the availability of certain resource types or brands

constituted cognitive barriers that prevented students from even attempting to access the full content of an information resource.

Students often viewed paths to access as barriers to access. For some students, even something as simple as clicking on a download button was too much because it introduced uncertainty. This uncertainty was an affective barrier that prevented students from taking steps to pursue access. Students were not sure that the button would work as they wanted, and they did not always know exactly what they would get in the download. Without access to the full content, they were unsure whether the information resource was something that they wanted and would be able to use. Until they got access, it remained possible that the resource would turn out to be irrelevant to them, or there would be functionality problems that prevented them from doing something like searching within the downloaded file.

Students wanted easy, clear, and immediate access to information resources. Ideally, that would be the full content of the resource immediately visible on the page. The immediate presence of the full content was a physical enabler that avoided the need for students to navigate their cognitive and affective barriers. In lieu of that, students looked for a clear indication that the full content was available and could be accessed with a single action. Anything on the page that suggested a potential physical barrier, such as a price or login prompt, triggered students' cognitive and affective barriers and could prevent students from putting in effort to get access. This suggests that information systems for the provision of resources could be improved by reducing the number of steps needed to gain access (ideally, no clicks or a single click), reducing ambiguity around whether an individual user has access, and clearly labeling what the user has access to (e.g., a PDF, a video).

Part of the reason that immediate access was so important to the students in this study was that there were several interrelated evaluations being made at the point of selection. When navigating search results, students were determining not only whether they had access to an information resource, but more importantly, whether it was relevant to their search topic, helpful or usable for their current information need, credible within the context of their coursework, and, ultimately, citable in their project. As the thematic analysis indicated, when students could not easily see the full content, they could not effectively make these other evaluations that were part of searching and selecting information resources. Search and evaluation were concurrent and interwoven parts of the information-seeking process. A lack of easy and immediate access to information resources confounded that process, making it more difficult for students to effectively navigate the large amounts of information available to them.

As shown in the user vignettes, students developed habits, heuristics, and strategies in different types of information environments and applied those to their current information seeking. Students who have experience in environments with low availability of a particular type of information resource may not be able to take advantage of environments with high availability because they do not have the experience they need to recognize that availability and convert it to access. This illustrates what Lievrouw and Farb call the hierarchical perspective on information access.[26] Students who are used to not having access to particular types of information resources may perpetuate that lack of access unintentionally as they progress on their educational journey. This points to the crucial need to help students understand what information resources are available to them and how they can access those resources as they enter new information environments. Effective instruction can help them adapt strengths and strategies from previous environments to new ones.

Lievrouw and Farb also point out that access may vary from a heterarchical perspective, based on the information need and its context.[27] Graduate students, for example, were happy to skip over some resources in the simulation because the information-seeking context was a class project. However, they pointed out that if they were searching for resources for their thesis or dissertation, they would pursue access much more thoroughly and exhaustively. The information need and its context dictated their approach to pursuing access, in this case by determining their motivation and how much effort they were willing to expend. This illustrates that not only the type of information need and its context affect individual capacity for converting availability to access, but also the individual's motivation, either intrinsic or extrinsic, matters. Just as uncertainty was an affective barrier for students, motivation was an affective enabler that could make them more willing to navigate and persist in the face of barriers.

This also suggests that dispositions, as much as skills and experience, may play a significant role in students' individual capacity to secure access to information resources. In this analysis, dispositions such as persistence, tolerance for ambiguity, willingness to attempt actions with uncertain outcomes, and ability to cope with information overload were affective and cognitive enablers that seemed to help students convert availability to access. As students navigate increasingly complex information systems, environments, and information-seeking needs, these may all be important dispositions not only for securing access but also for navigating the myriad evaluations that they must make at the point of selection.

## CONCLUSION

This paper examined students' perceptions of access to online resources for an educational assignment. A thematic analysis of students' comments about access revealed that resource previews, university and library branding, and the word *download* were generally viewed as enablers of access. Payment cues, learned heuristics around certain brands, learned heuristics around certain formats, and the need to take extra steps to click through to or download the full text were barriers that often prevented students from trying to get access, even when resources were available to them.

This distinction between being able to determine a path to access and not pursuing it confirms that the availability of resources does not necessarily result in an individual's ability to convert that availability to access. User vignettes revealed potential influences on individual capacity, including experience in high- or low-availability information environments, an ability to manage the complex cognitive load of determining access alongside other types of point-of-selection evaluation, a variety of dispositions related to information seeking, and situational factors related to the importance of the information need to the individual.

While library staff work diligently to make online resources available, this does not automatically result in students' ability to access those resources. This reinforces the need for instruction to orient students to pursuing access to these academic resources within the online information environment. Finding ways to help students adapt the strengths and strategies they've developed in other information environments to the library may help them to take full advantage of the resources available to them and smooth their transition into higher-level academic work. Additionally, information providers can reduce the number of barriers by making the full content immediately available on the page whenever possible, eliminating payment or login cues for users who have access, and clearly labeling the type of resource and the actions available to the user.

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