Student Observations of Postsecondary Classroom Instruction: Accessibility Challenges and Collaborative Feedback

Yasmine R. Jassal, M.A.
Graduate student in School Psychology
The University of Texas at Austin
Austin, Texas 78712
yasmine.jassal@utexas.edu

Stephanie W. Cawthon, Ph.D.
Director of the National Deaf Center/Professor in Educational Psychology
The University of Texas at Austin
Austin, Texas 78712
stephanie.cawthon@austin.utexas.edu

Sara Schley, Ed.D.
Associate Professor
Rochester Institute of Technology/National Technical Institute for the Deaf
sxsdor@ntid.rit.edu

Abstract

For deaf students, accessible classroom design is often provided through external services such as interpreters or speech-to-text providers. An approach based in Universal Design for Learning (UDL), though, seeks to engage students in learning by creating classroom spaces with accessibility integrated into the pedagogical approach. Realizing these goals requires participation from one of the most valuable, yet underused, resources: the students themselves. To that end, this paper examines a student-faculty collaborative approach to increasing accessibility for deaf students in postsecondary classrooms. Results of this study suggest that student observers are able to provide concrete and constructive feedback on strategies to increase classroom accessibility.

Keywords: *universal design; pedagogy; deaf, higher education; collaboration; student engagement*

Introduction

Students with disabilities are more and more prevalent on college campuses, with an estimated 11% of currently enrolled undergraduate students disclosing a disability to their institution (U.S. Department of Education, 2015). In contrast with the accessibility processes during their elementary and secondary school years, where schools are legally obligated each year to determine a student's eligibility for services with teachers, parents, and administrators involved, undergraduate students are responsible for requesting their services, providing relevant documentation, self-disclosing their disability to the university, interacting with faculty, and advocating for themselves within the postsecondary setting. These responsibilities, coupled with their course load, present a unique, often overwhelming set of challenges for students with disabilities (Getzel & Thoma, 2008). Yet the accommodations listed in a student's transition or postsecondary education plan are oftentimes essential for equal access to course material as well as fair opportunities to demonstrate their knowledge (e.g., permission to take exams in a reduced distraction environment, access to a student note-taker).

According to the 2015 American Community Survey (ACS), a national survey conducted by the U.S. Census Bureau, educational attainment for deaf individuals indicates areas of both progress and concern (Garberoglio et al., 2017). While legislation has been enacted (e.g., Section 504 of the Rehabilitation Act, Individuals with Disabilities Education Act, Americans with Disabilities Act) to address the educational needs of eligible children and adults, current data suggests that the playing field is not yet level. That is, while data shows more younger deaf students are graduating from high school and general educational attainment rates have increased since 2008, only 51% of deaf people complete some college (2017). Moreover, the gap in educational attainment between deaf and hearing people was the largest (15%) amongst individuals who completed at least a bachelor's degree (2017). One of the primary reasons for this gap may be the unequal access to postsecondary education—perpetuated by reduced social opportunities, limited access to language and communication, negative attitudes and biases, and a lack of qualified/experienced professionals—between deaf and hearing individuals (National Deaf Center on Postsecondary Outcomes [NDC], 2018).

These inequalities in postsecondary education outcomes for deaf students are concerning, oftentimes limiting their career and employment options. This paper will first discuss strategies to enhance classroom access, and subsequently student engagement, for and with deaf students. It will then highlight the importance of ongoing student/faculty partnerships for optimizing how strategies are designed and implemented. The literature review will conclude with the purpose of the current study, which seeks to partner deaf students in the process of developing strategies and to examine the effectiveness of pedagogical strategies designed to address classroom access needs when deaf students are mainstreamed in college classrooms.

Literature Review

Most classrooms are designed without students with disabilities in mind. That is, teachers create their curriculum and, should a student with a disability enroll in the class, they implement accommodations and modifications after the fact—generally once provided with an access/accommodation notice from the school's Disability Services Office. For some deaf

students, ensuring access to a general education curriculum can require direct services such as interpreters and/or speech-to-text captioners, especially at the postsecondary level. In general, one of the ways educators can increase access is through Universal Design for Learning (UDL) principles. The term "universal design" was coined not by a teacher, psychologist, or legislative official, but an architect—Ronald L. Mace. The purpose of universal design is "the design of products and built environments that are 'usable by all people, to the greatest extent possible, without the need for adaptation of specialized design' " (CAST, 2020). UDL incorporates principles of universal design into an educational environment; that is, just as public spaces should be accessible to all, so should education—a one-size-fits-all approach is ineffective due to the notion that each student learns in a unique manner. As such, the educational materials are created with accessibility in mind, and the pedagogy itself integrates many research-based approaches to learning with the provision of material in a variety of formats.

Access to Classroom Talk

While these strategies are indeed helpful for increasing access, they are oftentimes not enough to meet the needs of every learner. While mediated communication (e.g., ASL/English interpreter, speech-to-text captioning) for deaf students does provide access to classroom talk, there are challenges with respect to engagement and interaction during more conversationally dynamic portions of the class. For example, there is a lag in receiving any conversational message—first, the speaker says something in spoken English, and then it is translated into ASL (via an interpreter), or to printed text (via a captioner). This delay results in a deaf student lagging "behind" other students in comprehension as well as in their own contributions to any discussion (see Blizzard & Foster, 2007; Marschark et al., 2006). Further, this kind of mediated communication works better when one person is talking at a time. When a dynamic discussion is occurring in a classroom, the deaf student has trouble keeping track of who says what, and the interpreter cannot always catch everything being said since multiple individuals overlap in talking (Blizzard & Foster, 2007). In addition, poor lighting may make it difficult for the deaf student to adequately view the interpreter and supporting content. These dynamics lead to decreased access to course activities, as well as classroom engagement challenges for deaf students.

Student Engagement

Engagement is arguably important within a long-term educational context; that is, how students participate in their education, and how faculty provide education, are more important than the content of the curriculum (Astin, 1993). The notion of student engagement makes an assumption about the learning process—that it is collaborative and social—rather than a one-way transaction. The National Survey of Student Engagement (NSSE) proposes that student engagement is not determined by student performance in a single course, but rather, a pattern of behaviour across a variety of activities. At the college level, student engagement is defined as "the frequency with which students participate in activities that represent effective educational practice," and oftentimes is used as an indicator of not only institution quality, but also as the quality of the education itself (Smith et al., 2005, p. 1). In a longitudinal study by Astin (1993) two environmental factors—interaction amongst students and interaction between faculty and students—were highly linked with positive general education outcomes. Much of extant research

supports the notion that student engagement, as a construct, is one of the most important contributors to a positive educational experience (MacGregor et al., 2000). Student engagement is often bolstered by the pedagogical approaches of cooperative and problem-based learning, wherein students are encouraged to work together towards the resolution of a presenting problem. These approaches work in tandem with individual characteristics (e.g., emotions, wellbeing, and self-efficacy) to affect student engagement (Kahu, 2013). However, ensuring access to these learning opportunities requires UDL principles one and two: to facilitate this active learning requires a classroom design that seamlessly allows diverse learners to engage with the material in their own unique way, while also being provided with the opportunities to critically think about and be challenged by (i.e., engage with) the material together (CAST, 2018). For deaf students, adequate lighting is crucial for access to the interpreter and visual class materials. If an instructor speaks too quickly, the interpreter may miss information; if the information is missed, the deaf student cannot engage with it. In a dynamic and positive class atmosphere, deaf student engagement is maintained through consistent communication access and the ability to see peers or the instructor without obstruction. As deaf students are a minority, their voice is often missing from the important discussions surrounding classroom access.

Achieving active inclusion in classroom instruction for diverse learners remains a work-in-progress, especially for deaf students. While the goal of accommodations is to provide equal access to education, the services most commonly used by deaf students (e.g., interpreters, captioners, or student note-takers) are beneficial, but do not yield *full* access to class sessions (Foster et al., 2004; Marschark et al., 2005). This is especially difficult when deaf students receive simultaneous input from multiple sources, such as students speaking at the same time or when an instructor lectures while also writing on a chalkboard. When considering student engagement, extant research suggests that active deaf student involvement cannot be accomplished solely via mediated communication (e.g., captions, interpreters) (Long & Beil, 2005).

Student/Faculty Partnerships

To understand student engagement, it is also important to acknowledge the rising interest in how students potentially serve as co-creators of their own learning. In fact, students are a valuable, yet sorely underused, resource in postsecondary settings (Gardebo & Wiggberg, 2012). While the decision-making in teaching usually comes from academic staff, active student involvement in educational development is also advantageous, creating benefits such as enhanced motivation, learning, classroom/teaching experiences, engagement, and teacher/student relationships (Brooman et al., 2015; Cook-Sather et al., 2014). This push for student engagement aligns with the tenets of critical pedagogy, a philosophy at the nexus of critical theory and education developed by Brazilian educator Paolo Freire. The value of critical pedagogy is often illustrated in contrast with the Banking Model of Education, in which Freire establishes an unequal power dynamic between teachers and students; that is, the students serve as empty vessels in which teachers place knowledge. The principles of UDL extend this philosophy, such that it is not only the content of the information but how that information is delivered. That is, the method of delivering knowledge may not be accessible for everyone, just as two different people may withdraw the same amount of money but request it in different forms (e.g., cash, money orders). Just as educators should not assume their curriculum will be well-liked by all

students, they also cannot assume their curriculum is accessible to all without the valuable student voice. One of the most important aspects of co-creating learning is through effective communication about what the process might look like as well as what the overarching benefits might be (Bovill et al., 2016). To take an inclusive approach to these types of partnership requires that faculty and institutions reframe their perceptions of traditionally marginalized students—such as the deaf student population. That is, the curricular or pedagogical development of a classroom may benefit from experiences shared by deaf students to encourage thoughtful classroom design that benefits all students and staff, such as implementing principles of UDL.

Research on the effects of student/faculty partnerships on various learning outcomes is a relatively nascent field, with several seminal articles published in the last five years. In this model, faculty and students work together "to contribute equally, although not necessarily in the same ways, to curricular or pedagogical conceptualization, decision-making, implementation, investigation, or analysis" (Cook-Sather et al., 2014, pp. 6–7). Student/faculty partnerships are conceptualized differently than student engagement: Student engagement focuses on what students do as part of their learning, while student/faculty partnerships emphasize ways that students and faculty can work together towards larger shared goals for the learning environment (Matthews, 2016).

Yet even within this shared goal perspective, the research still focuses on the impact on student outcomes. Specifically, Mercer-Mapstone et al. (2017) conducted a systematic literature review of sixty articles related to the impact of student/faculty partnerships on a variety of outcomes. The vast majority (92%) reported at least one positive outcome for students. The top three benefits were: increased student engagement, student confidence/self-efficacy, and understanding of the "other's" experience (e.g., students expanding their understanding of faculty experiences and perspectives) (Mercer-Mapstone et al., 2017). In contrast, only 26% of papers reported negative outcomes for students, the most prevalent being that the partnerships reinforced pre-existing power inequalities, made students feel vulnerable, and increased stress/anxiety (Mercer-Mapstone et al., 2017). The majority of extant research documents consistent benefits of faculty/student partnerships at the student, faculty, and institution level, as these partnerships may transform teaching and learning in postsecondary settings (Felten, 2013). Deaf students may be encouraged to notify the instructor when they cannot view their interpreter or the visual aids due to poor lighting, or when the instructor's pace is too rapid. In other words, a historically marginalized voice may be empowered to take control of their own learning within a collaborative space.

To this end, the Access and Inclusion Project at Rochester Institute of Technology/National Technical Institute for the Deaf (RIT/NTID) seeks to examine the design and implementation of pedagogical strategies designed to address classroom needs when deaf students are mainstreamed in college classrooms. While the aforementioned extant research describes the benefits of embedding access into the classroom design, much of the research focuses on *how* instructors deliver the information. However, another crucial component is student engagement, which is especially important for deaf students mainstreamed in college classrooms where factors such as multiple visual cues, quick instructional delivery, and faculty with less experience teaching deaf students often serve as barriers to full classroom access even with accommodations. As such, the integration of access into classroom design will likely

increase deaf student involvement, which is related to higher learning outcomes (Lang et al., 1999). A key component of this project is an online Accessibility Tool Kit (ATK), which features resources and materials aligned with UDL for use in classrooms to provide access to a wide range of deaf and hearing learners.

The purpose of this paper is a descriptive examination of preliminary data from the first three semesters of the Access and Inclusion Project, focusing on deaf student mentor observations of classroom sessions. These students were not enrolled in the courses observed and were trained to observe class sessions and note feedback on physical, interactive, and accessibility challenges (as well as what was not a challenge) (Cawthon, et al., 2019). Using an observation tool as a guide, these deaf student mentors were hired to (a) partner with faculty and (b) offer their perspectives on what went well during class sessions, and what did not go as well from their vantage point as deaf students. The observation tool was designed to offer a starting point for observation and reflection, with prompts to note classroom lighting, pacing, use of visual displays (e.g., slides, multimedia, etc.) during the session, instances of faculty giving positive feedback to enrolled students, and class atmosphere. In addition, there were open-ended areas on the observation tool to note additional observed factors. The guiding principle was to observe from the students' own perspectives of access and inclusion as a deaf student (albeit not as an enrolled student in the course). Thus, the intention of the deaf mentor observations was to see how the course's infrastructure and classroom engagement would impact students who are deaf or hard of hearing. Early observations were used to identify "challenge points" within the sessions, and in the faculty learning communities, to design and implement a strategy to address these challenges.

The faculty in this project participated in a semester-long learning community, which met every other week throughout the semester. The learning community had three distinct phases:

1. An exploration phase, where faculty learned about Universal Design for Learning principles, and about pedagogical strategies which encourage deaf student access to course materials (Marchetti et al., 2012; Schley & Stinson, 2016; Blizzard & Foster, 2007; Atchison & Gilley, 2015; Schley et al., in preparation).
2. A design phase, where they brainstormed classroom challenges and potential solutions, designed a specific strategy, and tested it out within the group.
3. And an application phase, where they implemented the strategy and explored assessment options.

During finals week of the semester, the group met one more time to collect feedback about the experience, and to review the template we provided to summarize their pedagogical strategy development and implementation notes. Deaf student mentors were full participants in these learning community sessions alongside the faculty, discussing all topics and offering their insights. These student mentors conducted the classroom observations between these biweekly sessions, and both faculty and students brought back insights about these observations (and post-observation discussions) to these learning community sessions (Atkins et al., in preparation; Marchetti et al., 2019).

Here, we focus on analysis and summary from the deaf student mentors' notes on the class observation forms. Specifically, we are interested in the student mentor notes about how factors such as lighting, instructor pacing, use of visuals to support instruction, feedback, and atmosphere impacted the mentors' sense of inclusion and interaction in the class sessions—especially as a deaf student. While these deaf student mentors were not actually enrolled in the course, we asked them to observe the class sessions and note their perspectives of factors that encouraged and inhibited deaf student engagement and inclusion. This study was designed to answer the following research questions:

1. What is the prevalence of comments about lighting, pacing, use of visuals, positive feedback, and class atmosphere?
2. What is the prevalence of comments noting positive aspects of the class sessions?
3. What is the prevalence of comments noting negative aspects of the class sessions?
4. What is the prevalence of negative comments that provided an alternate approach?

These questions were identified at the start of the project as probable contributors to inclusion and classroom engagement of deaf students in communicatively diverse classes (such as co-registered deaf and hearing students, and/or deaf students with varying communication preferences). Lighting and pacing are identified challenges for deaf students in some classroom scenarios (see the student engagement section of the literature review to this paper): If not managed appropriately, they can interfere with deaf students' access to classroom interaction as well as their ability to engage with classroom activities and conversation. Similarly, the effective use of visuals can have a positive impact on deaf students' access to and engagement in post-secondary courses. Observations also included an open-ended space for deaf mentors to reflect on additional things they noted; these open-ended comments were coded for whether they noted positive contributors to access and inclusion or negative barriers.

Method

Participants

Nineteen faculty members volunteered to join as members of three Faculty Learning Communities (FLCs) at RIT/NTID, held each semester between spring and fall of 2016. Descriptions of their roles at RIT/NTID and years of experience are provided in Table 1. A total of 58% of these faculty members reported previous experience working with deaf students. Participant recruitment targeted faculty who were motivated to improve classroom pedagogy for deaf students faced with diverse communication needs (e.g., enrollment of deaf, hard of hearing, and hearing students; enrollment of deaf and hard of hearing students with diverse communication preferences such as signing without voice, voicing without signing, and signing and voicing simultaneously). Five deaf undergraduate students at RIT/NTID were assigned to serve as student mentors to faculty and were responsible for classroom observations and provision of feedback throughout the semesters. Additionally, these student mentors were full participants in the learning community sessions and were an important part of the process for discussing and designing strategies to address challenges to inclusion in these class sessions. Note that not all classes had deaf students enrolled—as the observations were focused on the

viewpoint of the deaf student mentor observing the class sessions, rather than the perspectives of enrolled deaf students.

Table 1

Demographics of Instructors

Title at RIT*	
Professional Staff	6
Lecturer	6
Senior Lecturer	2
Assistant Professor	4
Tenure Status*	
Not Tenure Track	14
Tenure Track and Tenured	4
Time at RIT*	
1-5 years	4
6-10 years	6
11-15 years	2
>16 years	3
Years as Educator*	
1-5 years	2
6-10 years	5
11-15 years	2
>16 years	5

*Title at RIT; One instructor did not report; Tenure Status: One instructor did not report; Time at RIT: Four instructors did not report; Years as Educator: Five instructors did not report

Faculty-Student Mentor Pairs

Deaf student mentors were paired with each faculty participant. The criteria for pairing included attention to schedules; deaf mentors did not have other course conflicts with faculty

class sessions. Criteria also attended to access needs of the deaf mentors. Mentors who preferred ASL/English interpreting access were paired with faculty whose courses already had interpreters assigned to their courses. Mentors who preferred speech-to-text captioning were either assigned to courses that already had that accommodation occurring in the course or, the project provided captioning via a remote service to the deaf student mentors.

Starting in week three (out of fourteen) of the semester, they observed their faculty partner's class sessions on at least a biweekly basis. During the first week of observations, they observed all class sessions during that week to lay a foundation for understanding course content, the instructor's teaching style, and student interaction. For subsequent weeks, they observed a single class session and took notes using the observation tool. In addition to standard questions, faculty identified specific areas for feedback from the student mentors. After each observation, student mentors met with the faculty member to discuss what they observed and to talk about access and inclusion challenges. They used the observation form (described below) as a starting point for the discussion and followed a structured protocol that allowed for both connections to the learning community topics as well as specific examples that arose in the class session.

Observation Measure

The current study developed an observation form that was used by each student mentor to document their observations. This tool was also used to facilitate interaction between the participating faculty and the student mentor. This class observation tool served as a template for students to take observational notes about access and inclusion factors in the classroom. The tool itself was designed to track access and inclusion topics related to accessible and inclusive pedagogy, engagement, and interaction. Topics were also discussed in detail throughout the semester with the faculty and student mentors, within the context of a Faculty Learning Community which met a total of seven times.

The observation tool was thus designed to help evaluate teachers using inclusive teaching strategies throughout their course. The tool included different types of questions (rankings, checking yes or no, and answering open-ended questions). The goal of the tool was not to evaluate or assess teaching skill, but instead to observe and reflect on classroom practices in order to design better access and inclusion pedagogical strategies. The student first noted descriptive information about each observed class session (name of observer and class instructor, class details such as the number of students, presence of support services, an estimate of the number of deaf and hearing students present during the observation, and time of observation). Their estimates of the number of deaf students came from observing who was consistently watching a classroom interpreter (if present), who had a campus-provided iPad to view captions (if evident), and or any knowledge from self-disclosures of students. Examples of such open-ended questions included, "What did you like about the class, what did the faculty member do well?" and "What did you think could help make the class more accessible for deaf students?" These were not meant to be unbiased, reliable observations in general, but rather, based on the perspective of the student mentor as a deaf undergraduate student at this institution. Additionally, students checked off whether they noted any access challenges with areas like lighting (e.g., interpreter placed in under-lit space), pacing (whether the instructor modulated for the timing lag

of interpreted/captioned messages), use of visuals (projected slides, etc.), giving positive feedback to students, and the classroom atmosphere.

Student mentors were trained in using this structured observation and feedback tool (Cawthon et al., 2019). This approach was formative, not summative—the goal was not to provide evaluative feedback to the faculty, but to engage the student/faculty partners in a collaborative process of reflecting on accessibility and engagement in the classroom, and brainstorming possible pedagogical solutions. Key to this process were the following factors: (a) Students were not enrolled in the courses that they observed, (b) observations continued throughout a semester, (c) student mentors and faculty participated together in a semester-long faculty learning community, (d) after each observation, students and faculty met 1:1 to dialogue about the observation, and (e) the observation template included focus on the faculty member's chosen teaching strategies, student engagement and interaction, as well as elements identified by the faculty member as targeted areas of feedback and input.

Once faculty started implementing a specific access strategy, the student mentors gave a brief description of the strategy, rated the implementation on a scale of one to five, and gave a verbal description of why they gave the rating they gave. Additionally, there was space on the observation form to note various student and instructor activities. For instructors, these included incorporating different kinds of activities in class (e.g., discussions, group activities, active learning assignments), presenting ideas in more than one way rather than relying only on projected slide information, giving students more than one way to participate (a UDL principle), and student participation and collaboration encouragement. Student activities included responding to instructor questions, participating in group activities with other DHH students and with other hearing students, "disengaged" behaviour such as using cell phones or computers in non-class-related activities, and asking unprompted questions (which arguably could be an engaged or disengaged/disruptive event depending on the context). Following its creation, the observation tool was revised twice in response to student mentor feedback, once after the pilot and once when online teaching components arose as a key area for further observation.

Coding and Analysis Procedures

The current data was collected over the course of three semesters. Data was then moved to a secure spreadsheet where the data preparation took place. Discrete (e.g., number of deaf students in the classroom) and binary (e.g., the student mentor documenting "yes" or "no" for observation of particular strategies) variables were coded for each student mentor observation. Qualitative comments written by the student mentors during each observation were also extracted from rating forms and used in the current study.

Results

As noted earlier, the purpose of this paper is to examine preliminary data from the first three semesters of the Access and Inclusion Project at RIT/NTID and determine which observable faculty ATK strategies supported access from the perspective of designated deaf student mentors. It is important to recall that the observation forms students filled out contained predetermined categories that guided their attention to specific aspects of the classroom as well

as its management. This paper focuses on one section of the observation tool: where deaf student mentors were prompted to comment on lighting, pacing, visuals used during the session, giving positive feedback, and class atmosphere for deaf students. Table 2 shows the distribution of comments according to these categories.

Table 2

Student Mentor Observations by Category

	n	Positive (%)	Negative (%)	Negative with Feedback (%)
Total	474	-	-	-
Lighting	112	84	16	50
Pacing	90	83	17	100
Visuals	103	100	0	0
Giving Positive Feedback	64	100	0	0
Class Atmosphere	105	81	19	25

Based on the results of this study, a total of 474 comments were documented by the deaf student mentors over those three semesters. All categories appeared to be quite well-represented, which suggests that when prompted, the mentors are able to note aspects of the classroom that may increase access. In addition, across all categories, the majority of comments were positive, suggesting that the faculty applied their training effectively and implemented numerous strategies to support access well. Examples of specific comments related to each category, as documented directly by the deaf student mentors (i.e., from their perspectives) can be found in the Appendix.

Lighting

A total of 112/474 (24%) of comments were related to lighting, making it the most documented area on which student mentors commented. Of these, 84% were positive, noting that the level of lighting allowed the student mentor to easily view all aspects of the classroom (e.g., the instructor, other students, the projector screen). Sixteen percent of the comments were negative; one comment indicated that the light was too low, which required students to use their phone flashlights to help them see their worksheet. Though no feedback was given for that particular comment, another noted that the presence of the light made it difficult for the observer to view all parts of the projector screen, and feedback to slightly dim the lights was provided.

Half of the negative comments about lighting provided direct feedback to the instructor, such as suggesting the instructor dims the light to help enhance the visibility of the visuals.

Pacing

        The rate at which the instructor presented their material, pacing, represented 90/474 (19%) of comments. Eighty-three percent of the comments related to pacing were positive and noted that the pacing was adequate and that there was enough time for the instructor to convey the information and also allow students to work together; 17% of the comments were negative, of which the student mentor noted that the pacing was either too fast or slow. None of the negative comments included feedback.

Visuals

        The instructors' use of visuals represented 103/474 (22%) of comments. All of the comments were positive, possibly indicating that visuals were often used as aids to enhance the teaching experience. Project staff did not provide specific training about effective vs. ineffective visuals—which could explain the lack of negative comments. However, we did expect that students would be able to observe and note certain specific and not-uncommon visual challenges, such as when faculty stand in between the projector and projected slides (occluding some of the projection).

Giving Positive Feedback

        The provision of positive feedback by instructors to students represented 64/474 (14%) of comments. This was the category in which the fewest comments were documented. All of the comments related to positive feedback occurring in the classroom were positive in nature and noted that students were often praised for being engaged in the teaching. To clarify, the absence of negative comments related to positive feedback may be an artifact of the observation tool structure. That is, students were not prompted to document whether instructors made negative comments about students or their work, and they were not prompted to document the number of times positive feedback was absent from lecture.

Class Atmosphere

        Class atmosphere represented 105/474 (22%) of comments. Eighty-one percent of the comments were positive, noting that the class atmosphere was light, focused, free-flowing, or friendly. Nineteen percent of comments about the class atmosphere were negative, noting that the class atmosphere appeared slightly tense or dull. Twenty-five percent of the negative comments included feedback in which the student mentor pinpointed difficulties with a particular student and provided thoughts on how the professor could mollify the influence of this student and maintain a positive class atmosphere.

Discussion

This investigation aimed to take a closer look at data from the first three semesters of the Access and Inclusion Project and describe factors observed by deaf student mentors which supported classroom access, inclusion, and engagement. Student mentors had time to grow into this role as not only observers, but analysts of the tools they were using (Cawthon et al., 2019). An important component of this project was an online Accessibility Tool Kit (ATK), which featured resources and materials aligned with UDL for use in classrooms. Student mentors were asked to document observations across five categories of predetermined classroom characteristics: lighting, pacing, visuals, giving positive feedback, and class atmosphere. While these were identified as distinct categories on the observation form, it is also important to consider how these intersect to create an accessible classroom environment.

One of the more prominent areas of overlap between these categories is between lighting and visuals. That is, the use of lighting appeared to be most beneficial when it allowed students to view the visual aids presented by the instructor. Consequently, lighting was not seen as promoting an accessible classroom environment when it rendered it difficult for students to see the visuals or be actively engaged in class (e.g., students needed adequate light to complete a lab activity). As noted above, no negative comments were documented about the visuals themselves, which suggests that the use of a multimodal approach to teaching (e.g., verbal, sign language, visual, tactile) engender an accessible classroom. However, the accessibility of visuals, as well as classroom instruction can be compromised by inadequate lighting. That is, it may be difficult for a deaf student to view their interpreter or projector screens depending on the level of light. Fortunately, lighting is an aspect of the classroom over which instructors typically have some control. If a student provides feedback that the visuals are unclear or that it is difficult for them to complete their classwork due to inadequate lighting, responding to this feedback simply requires the instructor to adjust the lighting. This overlap between visuals and lighting is also important for the notion that faculty/student collaboration can enhance learning. Though not directly measured in this study, it may be that the classroom setup does not allow for adequate lighting across all areas of the classroom. Instructors may therefore be unaware that the lighting makes visuals or other classroom aspects difficult to see without student feedback. This highlights the importance of soliciting student feedback about access issues early and often within a semester.

Classroom pacing was also an area on which the student mentors commented. Qualitative comments suggest that adequate pacing is subject to a "Goldilocks Effect"—that is, the pacing is satisfactory if it is not too fast, nor too slow. This area of inquiry is slightly limited, as the deaf student mentors were solely asked to provide their perspectives on classroom pacing. They did not comment specifically on the interpreters, captioners, or potential lag-time. However, it is important to note that pacing likely varies between professors, as well as between deaf, hard of hearing, and hearing faculty (i.e., secondary to their preferred communication modality). That is, hearing faculty (with interpreters and/or speech-to-text captioning in the classroom for access by and with deaf students) may not be familiar with the "lag" that occurs with mediated classroom communication (Marschark et al., 2008). Managing pacing while your classroom discourse is interpreted or captioned can mediate this lag, such that deaf students are not responding to comments after the conversation has already moved forward. When considering access to

information, it is the speed of pacing which most often results in missed instruction. As such, a student is quite unlikely to request that an instructor speed up their lesson. However, ensuring full access to a classroom environment may be difficult if the pacing is too fast. Interpreters or captioners may struggle to keep up with the rapid pace of someone speaking, and may omit words to ensure equitable pacing. Yet, the provision of student feedback for the instructor to slow down may assist with ensuring full access to instruction, especially in a classroom where deaf students receive input from a wide variety of sources. Arguably, effective pacing might help reduce cognitive load of interpreting information from multiple sources—for both deaf and hearing students (Pelz et al., 2008).

One might wonder how *deaf* student mentors could observe problems in pacing. All student mentors had interpreting or captioning services. They could thus evaluate for themselves whether the instructor was moving too fast to allow for processing information in multiple visual channels (e.g., allowing time to look at slides and then follow narration via an interpreter). The observation forms thus noted when student mentors were having trouble following the classroom verbal interaction (not the enrolled students). Certainly, this observation tool would not be useful for evaluating whether the spoken messages were interpreted or captioned completely or faithfully (see Moody, 2011). However, we believe that student mentors were able to reflect on class pacing given their own experience of access to the class sessions.

The provision of positive feedback by the instructors was the category with the least amount of comments. In addition, the observers noted that students were often praised for completing the work and that it generally yielded positive results (e.g., "helped point students in the right direction"). This was the only category that documented direct communication between the instructor and the students. That it is not as present as other categories suggest that increased provision of positive feedback may be beneficial for promoting positive academic outcomes for deaf students. Positive feedback also implicates the notion of behavioural theory. That is, instructors appeared to praise behaviours they found desirable, such as student engagement, focus, effort, and learning. Under this theory, it is assumed that students will continue to participate in these behaviours more frequently, as those behaviours were reinforced, therefore building rapport with instructors (Watson, 1913). Such positive rapport may increase the likelihood that a deaf student would advocate for themselves within the classroom, as they will likely trust instructors with whom they have a relationship. The direct, positive communication between instructors and students also may facilitate a positive class atmosphere. Comments about the class atmosphere were generally positive (e.g., friendly, free-flowing). Notably, negative comments about the class atmosphere appeared to be in response to a particular event (e.g., the teacher notified the student that they did not do well on their tests), rather than a longstanding pattern.

Limitations

Faculty at RIT are perhaps more aware of the needs of deaf students in the postsecondary classroom compared to faculty at most colleges. RIT presently enrolls about 19,000 students in total, with over 1,000 deaf students. Faculty are likely to have had deaf students enroll in their courses at some point in their careers, and/or talk with colleagues about co-enrollment of hearing and deaf students. Results here may thus not generalize to faculty at other institutions. RIT regularly hosts information and workshop sessions on working with deaf students and has a

number of policies in place which mediate a minimum of access and inclusion (e.g., a course policy on all video and media materials being captioned before being shared in class sessions). That said, many of the strategies that students noted of faculty are not especially challenging and could be mastered relatively easily by many.

Additionally, this study focused on a small number of faculty teaching a small number of courses, at a single university (admittedly, one with nine colleges). We do not suggest that findings would necessarily be replicated in other contexts. It would be beneficial to expand this work to other universities, to a wider range of courses, and importantly, to other populations of student mentors.

Given the context of working with real faculty in real courses with real students as mentors, there were a number of challenges regarding continuity and research design. First, the observation form prompted the student mentor to focus their attention on certain areas of the classroom, which likely affected the aspects to which students turned their attention. Student schedules did not always allow for the same number of observations across all faculty participants. Some faculty/student pairs "clicked" well together and worked for longer and more detailed sessions. Between semesters, some students served as student mentors again, and some did not—thus new student mentors were hired. While all students had similar training on the use of the observation tool (and on how to interact with faculty), there were differences across mentors in how they approached this task: Some left some of the fields blank when they didn't have much to say about those topics, and some went into more detail. Importantly, the majority of sessions did not afford the opportunity to develop interrater reliability scores of observed behaviour. The analysis relies solely on the written transcriptions of the observation forms without an opportunity to verify the context of those comments.

Additionally, the focus of partnering deaf students with faculty means that the classroom observations and feedback did not focus on universal design per se, but on access and inclusion with and for deaf students. The observations and resulting strategies thus may not address the needs of all students in the classroom. Students with other challenges or backgrounds may need a different focus on pedagogical development.

Finally, enrolled student feedback was not collected as part of this study. Future work should try to incorporate their perspectives too on access and inclusion in the classroom. And, faculty participants consisted exclusively of volunteers, i.e., faculty who committed a semester's worth of attention specifically to the faculty learning community, to the partnership with a deaf student mentor, and to developing and implementing a strategy for addressing access and inclusion challenges.

Conclusion

Taken together, the integration of these various categories yields specific areas where instructors can develop a faculty/student collaborative relationship to inform the accessibility of pedagogy, as well as ascertain various methods in which they can embed access into their classroom design. First and foremost, the classroom atmosphere typically affects student engagement and behaviour. Thus, while former models of education likely posited that achieving

such a positive classroom atmosphere requires the initiative of an instructor and the responsiveness of the students, the results of this current study suggest that it also requires the participation of informed students and the responsiveness of the instructor. In addition, instructors benefit from being open to student feedback about their teaching and providing an environment where students feel comfortable to do so. While the student mentors in this study were not enrolled students within the faculty member's class, the lessons learned from this model could, in an appropriately safe environment, be applied to students who are in the class every day and the direct recipients of instruction.

A shift in a power dynamic encourages students to think critically and take a greater role in their education. Students rarely, in any setting, are empowered to observe and provide their insights into the process of teaching, and not just their own individual learning outcomes. In addition, especially amongst a historically marginalized population such as deaf students, it is likely empowering to advocate for their peers when a classroom environment is not fully accessible. Of course, the onus should not be on deaf students to continuously advocate for themselves and their community. Rather, the creation of an accessible classroom environment requires ongoing input from students, and when providing adequate structure, it can result in a constructive dialog. Of course, when the students providing the feedback are enrolled in the course about which they are providing feedback, additional layers of ethics and power dynamics are in play: Instructors should consider ways of soliciting feedback without linking the information to specific students.

In general, student mentors and faculty participants appreciated the opportunity to work together in this capacity as partners throughout the semester. During an end-of-semester feedback session, students commented that they experienced a number of areas of personal growth while participating in this project. Notably, it impacted their views of the educational process, as they had not realized how much work went into teaching a college-level course. They also noted that the experience helped them become better students, as they developed an awareness of instructional goals and meeting them through pedagogy. By offering a semester-long space for faculty and students to partner together in the process, both experienced unexpected positive outcomes. Future work should examine faculty perspectives of these partnerships to enhance these working relationships and their pedagogical outcomes.

To our knowledge, this is the first time where college students with disabilities have been partnered with faculty in the process of improving pedagogy and faculty development. While faculty/student partnerships are not a new idea (see Cook-Sather, 2015; Cook-Sather et al., 2014; Oleson, 2016), students with disabilities generally do not serve as partners. Typically, student interaction with faculty regarding their teaching practices is limited to the receipt of access services and accommodations as facilitated by campus disability services offices (as long as students elect to seek such services). Faculty are usually not involved in this process beyond being informed of necessary accommodations (e.g., extended time on exams, ASL/English interpreting and/or speech-to-text captioning, enlarged print for vision needs, etc.). Student mentor models, in contrast, directly engage with faculty on the design of their instruction as a whole.

Additionally, many of these noted areas (pacing, visuals, positive feedback) are likely to be beneficial for all students—whether they are "in the margins" in some way (be it disability status, gender, race/ethnicity, etc.), or whether they are not. The focus is about centering on the needs of the specific students who show up in your classroom, which arguably is the focus any time faculty set foot in the classroom. Rather than trying to address everyone's complex needs at once, this project instead identified one specific area of improvement as the basis for inquiry. In the end, the efforts to address some students' challenges resulted in a better experience for both other students and faculty (see also Marchetti et al., 2012).

Certainly, faculty already manage several aspects of teaching and teaching well, which is time-consuming. However, these pedagogical development efforts are not meant to be onerous. Instead, they intentionally focus on identifying one aspect to experiment with and to address in the classroom. All of the strategies are relatively easy for faculty to tackle, especially if faculty are given the space and time to develop and practice the strategies. Future work should extend these faculty-student partnerships to other groups of students (including other disabilities, race/ethnicity, gender, etc.). Additionally, the field would benefit from a network of colleges and universities conducting similar partnerships and sharing strategies and outcomes. This network could even be international in scope. The cost of conducting these kinds of activities is relatively inexpensive: Faculty need a semester with enough time to invest in a learning community; the primary "out of pocket" budget consists of salaries for student mentors. By taking a semester to consider challenges and solutions in depth, and by collaborating with others involved in the same process, faculty have generative discussions and enough time to develop and start implementing new pedagogical strategies.

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Appendix

Sample Qualitative Comments

	Positive	Negative	Neg. with Feedback
Lighting	*The lighting was good, I was able to see the projector screens well.*	*The light is on. It could be hard to see the screen in certain angles with the light on.*	*There was one slide I couldn't clearly see due to a slight glare; Could work on dimming the lights a bit to help better see the visuals.*
Pacing	*The pacing seemed good, was able to have time to explain content and allows them to work on the practice.*	*The pace of the instructor's presentation is a bit too fast.*	-
Visuals	*She uses the overhead projector to blow up the material onto the whiteboard so all students can see and follow along.*	-	-
Giving Positive Feedback	*Positive feedback helped point students in the right direction.*	-	-
Class Atmosphere	*Very light, focused atmosphere.*	*Bummed, the teacher informed the class that the test grades were not the best and that most received C's.*	*The class is generally friendly and free flowing, however, one student is not willing to cooperate. I don't think he is the problem, though. As long as the professor maintains the healthy relationship with the rest of the students, it will be okay.*