Interpreting Undergraduate Student Complaints about Graduate Student Instructors through the Lens of the Instructional Practices Guide

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College and department administrators take undergraduate student complaints about Graduate Student Instructors (GSIs) seriously. However, little research has been done to examine the nature of undergraduate student complaints across multiple mathematics departments from the lens of student-centered instruction. In this study, we compared formal (i.e. documented in writing by the student) undergraduate mathematics student complaints about GSIs at two universities over five years. Complaints were analyzed by coding the contextualized concerns described in the complaints using the Mathematical Association of America's Instructional Practices Guide to align complaints with topics discussed as best-teaching practices. Results demonstrated that concerns about classroom and assessment practices were the most prevalent. Concerns about classroom practices were slightly more abundant and more pervasive throughout the semester than concerns about assessment practices. Additionally, an outside-of-class issue undergraduate students raised was regarding the effectiveness of GSIs communication via emails.

Keywords: Student Complaints, Instructional Practices Guide, Graduate Student Instructors, TAs, GTAs

Within the current trend towards a consumer-driven higher education model with funding diminishing for higher education institutions (Hasan, Ilias, Rahman, & Razak, 2008), there is a great need to consider undergraduate students' concerns with quality teaching in mathematics service courses (i.e. mathematics required for non-mathematics majors; Harris, 2007). This consideration has been shown to be important for the often-clogged Science, Technology, Engineering, and Mathematics (STEM) pipeline where STEM students change majors in part due to their experiences in mathematics classes (Seymour, 2001). Nationally, graduate student instructors (GSIs)[1] in mathematics departments teach these courses and hold significant influence over the STEM pipeline as well as opportunities for other majors who require certain service mathematics courses (Belnap & Allred, 2009).

Within this context, student complaints have become a critical factor for collegiate administrators because they are a means of quality assurance (Hasan et al., 2008). However, our review of the literature found a dearth of research around student complaints. This lack of literature may stem from limited frameworks on best-practices for teaching undergraduate mathematics students, thus limiting structures in which to look at student complaints. Recently, the Mathematical Association of America (MAA) released the Instructional Practices Guide (IPG, 2018), where evidence-based research provided effective methods of student-centered

[1] GSI was used instead of TA (Teaching Assistant) because GSI references graduate students who are full instructors of record.

instruction for undergraduate courses (p. x). With the release of the IPG, administrators and researchers have the opportunity to examine various aspects of student experiences, including complaints, through the lens of research-supported best practices of student engagement to see if such issues are being raised by undergraduate students of GSIs.

Purpose of Study

As the IPG is gaining national popularity and there is a significant push for improving service courses in mathematics departments that are frequently taught by GSIs, our study focuses on analyzing student complaints with a focus on the IPG's instructional practices: *design practices, assessment practices*, and *classroom practices*. To do so we collected undergraduate student complaints to mathematics departments from any courses taught by GSIs at two doctoral-granting universities over five years and analyzed their content according to the IPG's instructional practices and what time in the semester the complaints occurred[2]. Complaints from this study were found to include multiple concerns, illustrating apprehensions, worries, or fears expressed by the student. As such, we define a concern as a specific context described by the student that indicated inappropriate actions (from the student's perspective) by the GSI. We define a complaint as a collection of concerns a student chose to directly express to the mathematics department (e.g. department chair, graduate director, or course coordinator) about their GSI. Our research questions used the IPG's instructional practices to code complaints and concerns to determine: (1) What type of undergraduate mathematics complaints and concerns occur with GSIs and (2) When did certain types of concerns occur within the semester?

Related Literature

Higher Education, GSIs, and Complaints

Because GSIs teach hundreds of thousands of undergraduate mathematics students each semester (Belnap & Allred, 2009; Speer & Murphy, 2009) supporting their development has been identified as a key component for successful collegiate mathematics teaching (Bressoud, Mesa, & Rasmussen, 2015, p. 117). Moreover, GSIs' teaching methods, goals, and beliefs greatly influence undergraduate mathematics education (Yee et al., 2019). For these reasons, departments are providing GSIs with robust and regular professional development (PD) around instructional practices (Yee & Rogers, 2017), including multiple day orientations, courses focused on mathematics pedagogy, mentoring programs, and post-observation feedback (Rogers & Yee, 2018). Mathematics departments and researchers continue to focus on supporting and improving GSIs' student-centered instruction (Rogers & Yee, 2018; Speer & Murphy, 2009: Yee & Rogers, 2017). Consequentially, many GSI PD programs are striving to focus on research-based, student-centered teaching strategies as illustrated in the IPG (Speer & Murphy, 2009). To this end, answers to our research questions can illuminate what types of instructional practices GSIs may need more support in implementing based on student feedback.

To understand some background literature about student complaints, we note that students' status within a university depends in part upon a sense of mutuality within their community (Ahier, Beck, & Moore, 2003). Furthermore, one essential practice for good governance of higher education institutions is an opportunity for students to bring about complaints via an effective internal process (NCIHE, 1997) and that this process is 'fundamental to the relationship between students and universities' (Harris, 2007, p. 566). In addition, research has indicated that

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complaints about GSIs is one measure of the success of a PD program and of good teaching (Ellis, Deshler & Speer, 2016; Friedberg, 2005).

Although the IPG is designed to facilitate effective teaching, we have found limited literature connecting student-centered teaching methods to student complaints in undergraduate mathematics courses. In this work, we begin the process of aggregating complaint data, systematically examining the issues of concern raised by students in undergraduate mathematics courses taught by GSIs, and frame the work using the IPG to consider complaints through research-based teaching practices.

IPG Framework

> We must gather the courage to venture down the path of uncertainty and try new evidence-based strategies that actively engage students in the learning experience. We must gather the courage to advocate beyond our own classroom for student-centered instructional strategies that promote equitable access to mathematics for all students. (IPG, 2018, pp. vii-vi)

For over a decade, many STEM disciplines have also declared this impetus for change, as expressed in this quotation from the IPG's declaration of values, emphasizing active learning (Freeman, 2014). As we think about GSIs' needed courage and values, it is vital to identify issues they may have with evidence-based teaching strategies and methods of actively engaging students so that we may support them. Another layer of stress and complexity for GSIs is that they have learned from primarily lecture-based mathematics courses but are asked to actively engage students in their own classrooms (Yee & Rogers, 2019).

To structure guidance for mathematics instructors, the IPG describes instructional practices in design, assessment, and classroom practices and emphasizes the dynamic interaction between these practices. These instructional practices are an appropriate framework for this study because they provide a breakdown of critical issues of teaching with student learning as the primary driver. Since this study focuses on student complaints, the need to be focused on student understanding and interaction is critical.

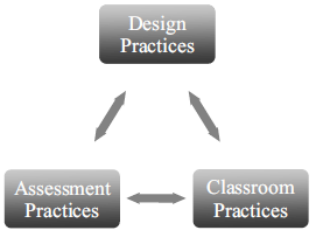

Figure 1. IPG Instructional Practices Model (p. x).

The IPG also recommends considering complaints as an important aspect of learning for mathematics instructors, explaining:

> Student evaluations may suffer during early implementation of a student-centered design. For example, students may complain that an instructor just stands there and makes them do all the work. Untenured and contingent instructors particularly require support from colleagues and chairs as they work toward becoming more effective instructors (IPG, 2018, p. 106).

Our research has indicated student complaints resonate with GSIs (Rogers & Yee, 2017) and thus the results of this study can help inform researchers and administrators of issues students perceive with GSIs.

Methods

Data Collection

Forty-nine complaints about GSIs were collected from two universities in the US over five academic years. The complaints were about GSIs who taught service courses (i.e., Introduction to Statistics & College Algebra). Complaints were obtained by contacting course coordinators, graduate program directors, and department chairs to collect emails that recorded formal complaints about GSIs, not end-of-semester student evaluations. In a few cases, email histories of complaints could not be found but instead the research team collected communications about the complaints by directly talking to the course coordinator (or other faculty members), the student, and/or the GSI. While additional information was gathered about individual complaints (e.g. follow up discussions or meetings), this study focuses on instructional practices that would cause undergraduate students to reach out to administration to discuss concerns. To this end, it is important to note that all results of this study focus on *student perceptions* of instructional practices, not the practices themselves.

Data Analysis

To answer our first research question, the complaints were coded by research assistants at two universities according to the concerns expressed within the complaints. Complaints from multiple students about a single GSI were counted as separate complaints as they were sent separately to administration. A single complaint regularly had multiple concerns that directly aligned with the sections of the IPG (e.g. classroom, design, and assessment practices). To answer our second research question, we analyzed the complaints by looking at when in the semester the complaints occurred. Complaints were anonymized through the coding process using a Google form which omitted any information that would connect the complaint to the GSI. To refine the qualitative analysis of the complaints to a more granular level than the three instructional practices of the IPG, researchers used Rogers and Yee's (2018) topics of concerns for novice GSIs as subcodes within classroom, design, and assessment practices.

Despite the robust design of the IPG, there were a few concerns outside of class that didn't fit clearly into an instructional practice of the IPG. For example complaints included concerns about technology, such as email conversations. The IPG referenced technology as a cross-cutting theme, but we found complaints and concerns focused on how GSIs communicated via email, which is not discussed in the IPG (e.g. a student discussed sending multiple emails, or mentioned not receiving responses, or a GSI sending large amounts of emails in a short period of time). To properly identify these complaints and concerns, we open-coded such concerns as outside-of-class issues with open subcodes. Consider the following concern:

> I emailed [the GSI] right away, and on Tuesday in class I asked her if she got my email, and she said she couldn't remember so I explained the situation and she said that I needed to finish the assignment and to try again and if it didn't work, then I should email her right away. So I tried again and it didn't work, so I emailed her and didn't get a response. So today in class I tried telling her about it again and she said that she forgot I emailed her.

We coded this concern as outside-of-class and subcoded as email discussions.

Student complaints were often explicit about the concerns within the complaint because the complaint was sent to administration. Many complaints were coded to be about multiple concerns within different instructional practices. For example, one complaint contained the following concerns:

> [Concern 1] She also seems to struggle to explain the information in a way that is effective for the group as a whole…[Concern 2] My main concern, however, is something that was said about the grading of our tests…[She] explained that she had to be 'picky' about how she graded our test because if she were to give all of us good scores she feared being questioned about making her tests too easy for the class…[Concern 3] The information being taught in the class is moving at a very slow pace, and when it is realized that we are falling behind on time then we have to rush through material.

The first concern was coded as dealing with classroom practices and subcoded as the GSI being unclear in communicating the material. The second concern was coded as dealing with assessment practices and subcoded as a concern about the grading of summative assessments. The third concern was coded to be about design practices and subcoded as the GSI being unorganized because that was the concern as perceived by the student.

> Some concerns were coded multiple times within the same instructional practice: [Concern 1] I was not successful in the course due to the instructor's way of teaching and clarity. I made the effort of going to his office hours where I found no help at all, due to his unwillingness to help… [Concern 2] This specific course is very disorganized and doesn't follow dates according to the syllabus.

The first concern was coded as dealing with classroom practices because the concern discussed the GSI's method of teaching in the classroom. The first concern was then subcoded as the GSI being unclear in communication and presentation of material and as an Outside-of-Class Issue, subcoded for office-hour meetings. The second concern was coded as a design practice concern and subcoded as the GSI being unorganized.

A section of "Other" was also provided within each instructional practice, which allowed the research assistants to create new subcodes as needed. Altogether, the "Other" category was only used once for complaints that did not align with the original subcodes of Rogers and Yee's (2018) topics of concern. For interrater reliability, two additional researchers checked over 50% of the coding. Initial interrater reliability was above 90%. All researchers openly discussed any coding disagreements until there was 100% agreement among all researchers.

Results

With a single complaint receiving multiple concerns within instructional practices, there were a total of 100 concerns raised from the 49 collected complaints about GSIs. Table 1 summarizes descriptive statistics of complaints and associated codes.

Table 1. Descriptive Statistics about GSI Complaints

Complaints by Academic Year	2014-2015 9 Complaints	2015-2016 15 Complaints	2016-2017 17 Complaints	2017-2018 2 Complaints	2018-2019 6 Complaints
Complaints by University	University of South Carolina 22 Complaints		Bowling Green State University 27 Complaints		
Concerns by Instr. Practice (Percentage)	Classroom Practices 40 Concerns (40%)	Design Practices 8 Concerns (8%)	Assessment Practices 39 Concerns (39%)	Outside-of-Class Issues 13 Concerns (13%)	

The precipitous drop off of complaints in the latter years (2017-2019) may be due to a peer-mentor program implemented at both universities, but due to limited space, this analysis was omitted. When looking at instructional practice type, we see student concerns referenced classroom practices (40%), then assessment practices (39%), then outside-of-class issues (13%), and then design practices (8%) in decreasing order.

To answer the second research question we looked at when the concerns occurred within a semester. Figure 2 shows the frequency of concerns with respect to the timing of the semester in which the complaint was received.

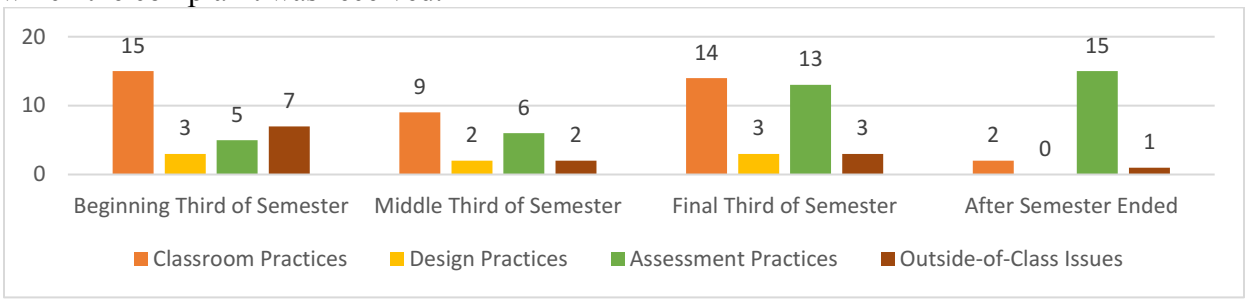

Figure 2. Instructional Practice Types of Concerns Timeline

By focusing on a single instructional practice throughout the semester, we see interesting trends. First there, is a steady increase in concerns about assessment practices (5, 6, 13, then 15). This aligns with the fact that a majority of assessment concerns focused on the grading of summative assessments (Fig. 3) that often accumulate throughout a semester. Second, classroom practices (15, 9, 14) had the highest number of concerns during each third of the semester and then dropped after the end of the semester (2 concerns). Third, design practices had the fewest concerns during every time period in the semester (3, 2, 3, then 0). Fourth, the outside-of-class concerns remained low after the beginning third of the semester (7, 2, 3, then 1). When looking at any single time within the semester, the beginning of the semester had the largest number of concerns about classroom practices while the end of the semester had the largest number of concerns about assessment practices.

Figure 3 provides a further breakdown of concerns by IPG practice as well as outside-of-class issues. Referring to Table 1, recall that different instructional practices had different numbers of complaints, thus each graph in Figure 3 has a different number of concerns.

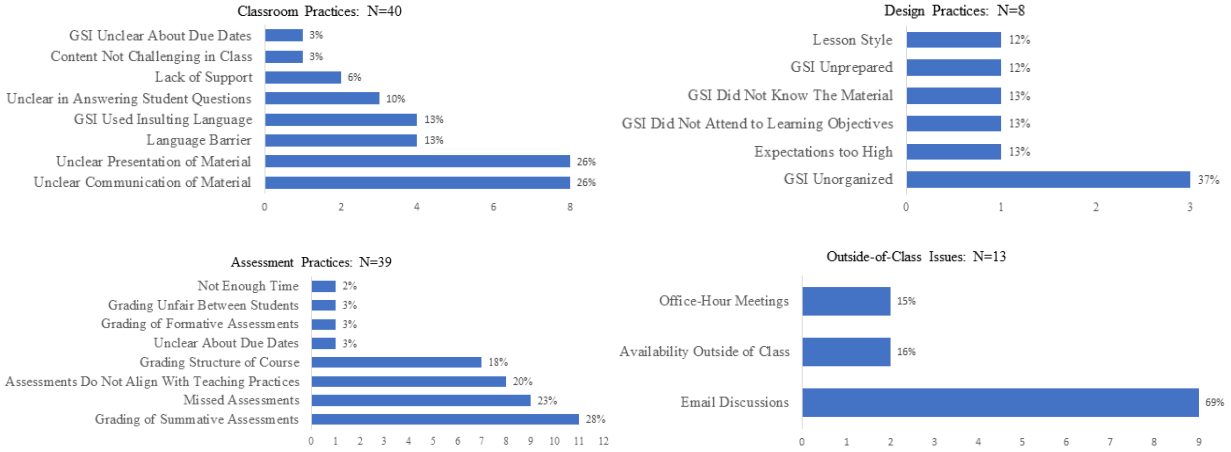

Figure 3. Complaints by Instructional Practice Breakdown.

Classroom practices had the largest number of concerns (N=40). Within classroom practices, unclear communication of material (26%), unclear presentation of material (26%), language barrier (13%), insulting language (13%), and unclear answers to questions (10%) all had at least 10% of the concerns. Within assessment practices (N=39), the four largest concerns were the grading of summative assessments (28%), missed assessments (23%), assessments not aligning

with teaching practices (20%), and grading structure of course with (18%). Outside-of-class concerns (N=13) primarily revolved around email discussions (70%) while office hour meeting issues and availability outside of class each had two concerns (15%). It is interesting to note that while summative assessment dominated assessment concerns, formative assessment of GSIs was only mentioned in one concern. Within design practices (N=8), GSIs being unorganized (37%) had three concerns while others, such as expectations are too high (12%) had only one concern.

Looking across all three instructional practices, classroom and assessment practices each held about 40% of all concerns with classroom practices being slightly larger. Often, it is believed students are complaining directly about the grading of summative assessments, but this indicates that students are also aware of the connections between classroom practices and student learning. Additionally, within the classroom practices we see students saw fit to complain to administration often about communication and presentation of the material. Moreover, we see that students do not complain about the need for, lack of, or inclusion of collaborative learning, which is a central piece of the classroom practices within the IPG.

Conclusion

In answering our first research question, Table 1 and Figure 3 show that classroom practices had the largest number of concerns for undergraduate student complaints, with a strong focus on GSIs' ability to make expectations clear, clearly present content, and communicate with students. Assessment practices were also a concern for students, especially summative assessments. Student concerns about design practices indicated that GSIs needed to be organized. A surprising result was that undergraduate students complained 69% of the time about email discussions within the outside-of-class issues. As shown in the example in the data analysis, students complained about punctual responses to emails. This is interesting, and because a focus on GSI email practices is not a common element of GSI PD programs, it may be a critical issue that GSI PD programs need to address for student success within their class.

To answer our second research question, Figure 2 showed that classroom practice concerns were dominant during the semester and assessment practice concerns were the most popular after the semester ended. Comparing this with Figure 3, it is not surprising that assessment practices increased over the semester as most concerns (e.g. grading of summative assessments, missed assessments, assessments aligning with teaching practice) take time for students to have impressed upon them within a semester. Concomitantly, the most popular concerns about classroom practices are issues that do not take weeks to impress upon students (e.g. communication and presentation of material, answering of student questions). It is important to note that classroom practices, not assessment practices, had the most concerns.

This study found that analyzing undergraduate student complaints and concerns can inform the field for GSI PD around student-centered instruction. The results suggest a few important conclusions. First, there is a large need to have discussions about emails in GSI PD and how they have become a critical method of communication with the student. If we are to be student-centered with our instruction that focuses on student thinking, we must also be aware of the many mediums through which students express their understanding and confusion, such as email. Second, classroom practice concerns were more pervasive than assessment concerns and were the most popular concern during the semester, illustrating that students do not only complain to get their grades changed, but understand the connection between teaching and meaningful learning (Cohen, Raudenbush, & Ball, 2003). Third, within design practices, students complained if the GSI seemed unorganized. This suggests organization needs to be a priority for GSIs to take ownership of the structure they are creating from the perception of the student.

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