

Student Perceptions of Faculty Support: Do Class Size or Institution Type Matter?

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Abstract

In the context of Tinto's Model of Institutional Departure, faculty support is critical to academic integration, which in turn is an essential element of persistence in college. Thus, understanding students' perceptions of faculty support in varied settings can provide insight into student satisfaction, performance, and persistence in engineering programs. In this study, focus groups were conducted with 175 students from five different institutions and a variety of engineering and computer science majors. The institutions in this study included a small women's college, a historically black university, a small private university, a medium size teaching university, and a large public research university. Focus group transcripts were coded and analyzed qualitatively. Findings from this analysis show that in some settings, despite a perceived lack of formal, in-class faculty support, students are still able to find faculty support outside the classroom, while in other settings this informal support is also perceived as lacking. In general, smaller environments with smaller student-to-faculty ratios appear to support stronger perceptions of support, although through different pathways. A small class size does not guarantee that students will perceive greater faculty support in that class. Large class sizes are not automatically detrimental for students, but they can be if students in those classes feel a lack of faculty support or availability both in and out of the classroom. With regard to institution type, the notion that undergraduates perceive lower levels of faculty support at research institutions holds true. This study has not verified whether the level of faculty support is actually less at research institutions, but only that students' self-reported perceptions of that support were lower at the research-focused institution when compared to teaching-focused institutions in this study. Regardless, given the importance of faculty support in persistence and other academic outcomes, this study suggests that greater attention to the ways in which faculty support students may be in order, particularly at research institutions and other large educational settings.

Keywords: faculty support; faculty-student interactions; class size; institution type; engineering

Introduction

There is a commonly held view that as class sizes grow larger, students' interactions with faculty decrease and subsequent perceptions of faculty support diminish. Understanding undergraduate students' perceptions of the support received from faculty is of interest because, as Tinto¹⁻² argues, faculty interaction with students is an important factor in students' academic integration, which in turn plays a key role in students' decisions to persist in college. While the findings of previous studies on academic integration are mixed in their links to and predictions of persistence³, the role of faculty in the student experience is nevertheless important. This study posits that one potential reason for the mixed role of academic integration in predicting persistence may be the widely fluctuating role that faculty play in such integration across different courses and institutions. If such a fluctuation exists, especially if it is non-linear, models for academic integration may be sufficiently different among different institutions and disciplines that attempting to generalize Tinto's Model of Institutional Departure across

institutions may unintentionally discredit the model. In order to better understand the links among class size, institution type, and faculty influence, this study examines undergraduate students' perceptions of faculty support – both formal (in class) and informal (outside of class) within engineering and computer science at five diverse institutions.

Background

There is a commonly held notion that smaller classes and an institutional focus on teaching lead to higher levels of student success and persistence; however, the findings of studies on this topic are mixed.

Class Size: The impact of class size on the student experience has been studied extensively, largely focusing on outcomes such as academic achievement or instructor effectiveness. Many studies suggest that smaller classes are linked to better learning outcomes⁴⁻⁸. However, several studies question this notion, both at the elementary and secondary levels⁹⁻¹² and in higher education settings. For example, in a study of undergraduate student test scores from 305 sections of 24 courses, ranging in size from 13 to 1,006 students, Williams et al.¹³ found that although faculty and students preferred smaller classes, “students perform academically as well in larger ones” (p. 317). Similarly, Karakaya et al.¹⁴ found that, “class size has no effect on student final scores as measured by overall course grades” (p. 89). Looking at instructor effectiveness, Gilbert¹⁵ reviewed existing research on the effects of class size on educational quality in higher education and concluded that, “Small classes are not necessarily better. ... Instructor effectiveness has been found to be as good or better in the best large classes as in the best small classes” (p. 1). In two separate studies analyzing the relationship between class size and students' perceptions of faculty using student evaluations of instructional effectiveness, Feldman¹⁶ and Marsh¹⁷ both found that students' evaluations of instructors were not consistently higher in smaller classes. It should be noted that instructional effectiveness is different from faculty support. A student may feel that an instructor teaches effectively without believing that the instructor cares about or is invested in students' learning. Therefore, a study of student perceptions of faculty support relative to class size will complement the existing research.

However, class size is only one part of the institutional setting. Therefore, we also consider the impact of the larger context in which students learn: institution type.

Institution Type: As with class size, there are some commonly held ideas about the impact of institution type on students' academic experiences. For example, several studies suggest that higher levels of student engagement are associated with small liberal arts colleges¹⁸⁻²¹. Other studies have also found links between institution type and student learning outcomes, such as Kuh and Hu's²² examination of the learning productivity of undergraduate students at research universities, in which they found that, “different types of institutions have differential effects on student quality of effort, engagement in good practices, and gains from college. This was the case whether student background characteristics were controlled or not” (p. 17).

However, other studies have resulted in mixed findings regarding the influence of institution type on student experiences. For example, Pike and Kuh²³ found that differences in levels of engagement across Carnegie classifications disappeared after taking into account the background

characteristics of the students. Similarly, in another study Pike and Kuh²⁴ examined data from the 2001 National Survey of Student Engagement (NSSE) College Student Report, including over 177,000 students from 321 colleges and universities, and found that, “While many of the institutions with high levels of engagement in varied educational experiences, interaction with faculty outside of class, and course challenge and student effort were baccalaureate colleges and universities, other types of engagement were associated with other Carnegie classifications” (p. 203). Thus, students may adjust what they do and how they perceive their experience based on institution type. This study complements these large, quantitative studies with qualitative analyses that look more deeply into how and why student perceptions of faculty support may vary as a function of institution type.

Our assessment of both formal and informal faculty support focuses on engineering and computer science, disciplines that are still dominated by traditional lecture where the faculty role in the classroom remains front and center. We expect that when faculty play a central role in classroom activity, links between faculty support and institutional demographics are less likely to be confounded by other student and institutional characteristics.

Conceptual Framework

This analysis is framed by Tinto’s Model of Institutional Departure¹⁻² (Figure 1). In particular, we focus on the segment of the model where faculty/staff interactions influence academic integration, which then influences students’ persistence. To persist, Tinto argues that students need integration into formal and informal academic systems and formal and informal social systems. The model theorizes that such integration increases students’ commitment to the institution, making them more likely to graduate¹⁻².

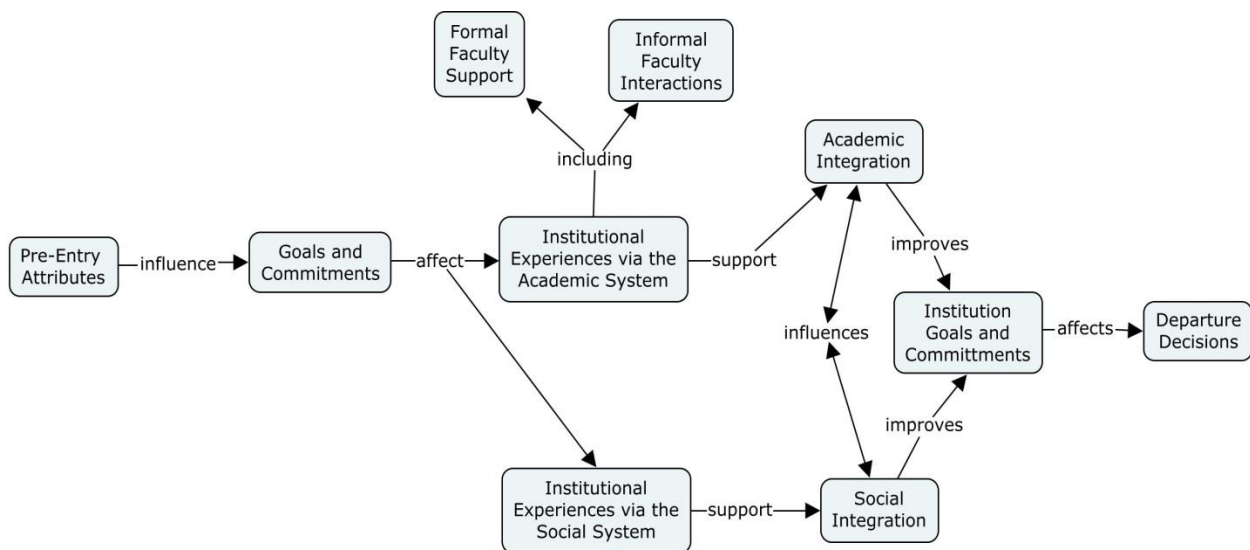


Figure 1: Conceptual framework for this study (adapted from Tinto¹⁻²)

Since the introduction of Tinto’s model, several studies have examined the effects of faculty-student interactions^{22, 25-32} on students’ academic outcomes. While other studies have

emphasized the importance of positive faculty interactions and support, this study specifically looks at how such interactions and support are influenced by class size and institution type within engineering and computer science.

Research Methods

This research is part of a larger five-year, multiple-institution, mixed-methods study that examines connection, community, and engagement in STEM education. In this larger study³³, patterns of belonging, connection to community, and related affective outcomes were investigated with the goal of predicting and improving engagement and connection to community across a diverse range of institutions, students, teaching styles, and faculty. In the portion of the study discussed here, qualitative analysis of focus group data was used to identify differences in student perceptions of formal (in class) and informal (out of class) faculty support by class size and institution type at five different institutions in engineering and computer science majors.

Research Setting

The five participating institutions in this study, described according to their Carnegie classifications³⁴, and their key characteristics as drawn from institutional data and mission statements are as follows:

- *HBCU (Masters S)*: A historically black, independent, and state-related institution of 3000 students in the Southeast which offers four undergraduate engineering degrees and small class sizes (typically 5-50).
- *Private/Faith Based (Masters L)*: A small Christian teaching institution in the Pacific Northwest of 4,000 students which offers six engineering and computer science majors. Class sizes typically range from 15-40.
- *Research (RU/VH)*: A large public research institution and flagship university in the Pacific Northwest which serves over 92,000 students and offers ten engineering and computer science undergraduate degrees. In the freshman and sophomore years, classes are large (100-500) but get smaller in junior (40-80 students) and senior years (15-40 students).
- *Teaching (Masters L)*: A medium-sized public teaching institution of approximately 15,000 students in the Midwest that offers over ten undergraduate degrees in engineering and computer science. Class sizes typically average 25 students, with upper division classes averaging about 15 students.
- *Women's (Masters L)*: A small liberal arts women's college of approximately 1,900 students in the Northeast with fifty majors, including three computer science and related degrees. Class sizes are typically 6-12 students, with the largest class size around 20.

These five institutions were deliberately chosen in order to capture diverse campuses that vary significantly by size (enrollments), variety of engineering and computer science majors, institutional cultures, and diversity of undergraduates on campus.

Research Questions

Our research questions focus on students' perceptions of faculty support, as defined by both formal and informal faculty-student interactions. In particular, the patterns of these perceptions

in relation to class size and institution type are examined. The study was guided by the following research questions:

RQ1: How is class size linked to students' perceptions of faculty support?

Previous studies of impact of class size on students' experiences have produced mixed results, and have not specifically addressed the connection between class size and students' perceptions of faculty support. We address one gap in the existing research by looking at connections between various class sizes and students' perceptions of faculty-student interactions in those classes.

RQ2: How is institution type linked to students' perceptions of faculty support?

Previous studies have shown that student perceptions of faculty support, particularly in terms of informal (out of class) interactions, fare best at smaller institutions²⁴, but it is not clear why this is the case. This analysis uses qualitative data to explore whether this notion holds true across our five participating institutions, and to examine the reasons behind potential institutional differences.

Data Collection: Focus Groups

The focus groups included 1 to 8 participants, and followed a semi-structured protocol based on the research questions and preliminary survey findings from the larger study³³. This protocol included 15 required questions as well as optional follow-up questions and prompts in order to obtain richer data when appropriate. The questions most relevant to the present analysis included:

- How does the size of [your institution] (including the number of majors, number of students, class sizes, etc.) help or hinder your ability to engage in your education, or your ability to be a part of the community here?
- The main focus of [this institution] is [research, teaching]. How does that emphasis help or hinder your ability to engage in your education, or your ability to be a part of the community here?
- Is there anything else about [this institution] that specifically influences how you engage in your education, or how fully you can be a part of communities here?
- How does feeling like you're supported by faculty affect your performance in a class/lab? How does it change your participation/engagement in the class/lab?

Subjects

Focus group participants were a subset of the survey participants in the larger study, and their recruitment will be described below. For the larger study, convenience sampling was used to recruit and survey undergraduate engineering and computer science students, resulting in a total of 1090 participants across the five participating institutions. The subject population was 32% female and 68% male, and was predominantly Caucasian (55%) or Asian (24%), with ethnic distribution varying across schools. Participants were predominantly African American at the HBCU, predominantly Caucasian and Asian at the Research institution, and mostly Caucasian at the three remaining schools. The mean age of the sample varied between 19.7 and 22.1 years among the five schools.

After completing the survey, respondents were recruited to participate in follow-up focus groups. A total of 175 students participated in focus groups across the five campuses. Focus group participant demographics closely reflected the survey participant pool at each institution. Focus group participants were recruited in the Fall 2010 and Spring 2011 terms, after surveys were completed. The number of focus groups that were conducted represents the point at which data saturation was reached at each of the institutions.

Data Analysis

Nearly all focus groups were audio recorded and transcribed. In the few instances where focus group participants did not consent to audio recording, the researcher took extensive field notes. In these cases, excerpts from the researcher's notes are presented rather than exact quotes from participants. Transcripts and field notes from focus groups were analyzed qualitatively. An initial coding scheme was developed based on the research questions and informed by the larger study's quantitative findings. This coding scheme was piloted with a small number of transcripts by one researcher, and codes were revised as needed to more accurately capture data addressing the research questions. All transcripts and field notes were then coded and analyzed by the research team at the Research institution. Coding was done using the constant comparison method³⁵⁻³⁶ in order to identify emerging trends and themes, and findings were triangulated with the larger study's quantitative findings. This paper focuses specifically on the findings of the qualitative analysis.

Results

Research Question 1: How is class size linked to students' perceptions of faculty support?

Qualitative analysis of the focus group data indicated that across institutions, students perceived lower levels of support from faculty in larger classes than in smaller classes. When describing their classroom experiences, focus group participants were asked to estimate the size of the class to which they were referring. For this analysis, class sizes were defined as follows: Very Small (fewer than 10 students), Small (10-25), Medium (26-40), Large (41-100) and Very Large (over 100 students).

Frequency or interactions: One aspect of the perceived lower level of faculty support in larger classes had to do with the amount or frequency of faculty-student interactions. Across institutions, students in Large and Very Large classes reported few personal interactions with professors, and felt that professors were not accessible for asking questions except during official office hours, which often were not frequent or convenient for the students. For example:

I think if you're in those classes that have a lot of people...it can make it a little harder just to get help because teachers don't always have time to give one-on-one help to 300 students. (Research)

Some students reported that their professors did not seem to be accessible at all, and instead directed students to teaching assistants.

One thing that's kind of irritated me at this point is the size of the EE introductory class. Because it's so large there's no way to really access the professor. You have to resort to TAs only. And I mean, they can only show you so much. (Research)

Although some students expressing such frustrations reflected that this situation was likely due to the fact that, because there are so many students in the class, the professor simply does not have time to interact one-on-one with everybody. Others felt that the professors were simply not interested in interacting with students.

In general, the feeling among students in our study seemed to be summed up by this student:

Everybody needs help once in a while, and if there are a lot of people there, the professor is not going to give you as much time as you want or need. (Teaching)

Quality: Another aspect of students' perceptions of faculty support (or the lack thereof) had to do with the quality of faculty-student interactions. That is, compared to students in Very Small to Medium classes, students in Large or Very Large classes tended to perceive a lack of personal relationship with their professor, or even a lack of caring on the professor's part.

Most students speaking about their experiences in Large or Very Large classes indicated that they felt low levels of in-class support from their professors. For example:

With the bigger classes you get bigger lecture halls, and...if you don't consciously choose to sit in the front you're going to get moved to the back, and then you just sit there and just listen to the professor drone on. Sometimes people bring their laptops, and in a lecture hall that big the professors don't really care as much, I feel. They feel disconnected from the students too. They're just there to talk about what they need to teach, right? (Research)

In contrast, students discussing Medium, Small, or Very Small classes seemed to feel fairly well supported by faculty:

In our major, there are not a lot of students so the class size is really small, it's like 6 or 7 students, which actually helps me a lot because my professor knows me better. And [if] I have questions we can talk about it and make it a class issue. ... I think overall it's a good thing that there are not a lot of people because there's not a lot of competition and you can have a good personal relationship with your professor. (Women's)

I feel like the smaller the classes, the closer you are to your teachers. Therefore, you have that one-on-one with them versus having a big class and your teacher not even knowing your name personally. (HBCU)

The smaller class size helps when you want individual attention. The teachers know you personally, and they're always there to help. (HBCU)

Typically...each teacher kind of knows your name. Each teacher individually knows you and they kind of have an idea what you're going through. ... The faculty are here for you and they're actually trying to help you do the best you can and give you all the opportunities you can. So when you know that, you actually want to perform your best so that when that opportunity is put in front of you, you can actually take it. (HBCU)

From the quotes presented above, it might be tempting to assume that patterns of perceptions about faculty support fall along institutional lines. That is, many quotes illustrating a lack of

faculty support come from the large Research institution, while several quotes illustrating greater support come from the smaller and/or more teaching-focused institutions. However, it is important to note that even within the same institution, a difference between faculty support in larger classes and in smaller classes was noticed by students. For example, one student described the differences he perceived between classes at his institution. First, he discussed the Large or Very Large classes that students take early in their undergraduate careers:

General education classes that are held in big auditorium rooms the professor doesn't know your name. You are not paying much attention on that class and you are not so focused. For example those 100 level classes you can just not go to class, because there are like 200 people in the class where everyone misses half of the classes all the time. (Teaching)

In contrast, he then described the smaller classes that he encountered once entering his major:

You can ask [professors] questions and ask for help. When they know you it is easier for them and for me too. We got the same professor for different classes it is easier to get to know the professor before you go to higher level class and you know how he works, what you should work more on like homework or tests. If all the professors know you is really good because they pay more attention to you and they can help you more. (Teaching)

In summary, from the students' descriptions of their experiences in classes of various sizes, it appears that the faculty-student interactions which tend to correspond to smaller class sizes (i.e., more frequent and/or more personal) are a key factor in whether students feel supported by faculty.

Research Question 2: How is institution type linked to students' perceptions of faculty-student interactions?

Qualitative analysis of the focus group data indicated that patterns of student perceptions of faculty-student interactions and faculty support did vary in certain ways by institution type. In particular, students at the Research institution consistently perceived low levels of faculty support outside of the classroom. For example, several students at the Research institution made comments along the lines of the following:

I was always very serious about talking to my professors but the problem is I never could. And a lot of them wouldn't even respond to my e-mails. (Research)

I've had some [professors] where it's one or two office hours a week, and you kind of get a feeling like you're getting your head bitten off. (Research)

Students at the Research institution also indicated that they saw a connection between this perceived lack of faculty support and the type of institution:

The research [that the professors] are doing is wonderful, but at the cost of undergrad students, because...the professors are so busy...that they really don't have time for the undergraduates at all... Most of my professors left during the quarter...to do some of the awesome research that they were doing. But if they're so committed to their research then they shouldn't be teaching a class, if they can't give the time to the students. And most of the time I'd go to my professor's office hours and they weren't even there. (Research)

It feels like when I have questions I wouldn't be able to reach the professor because I feel like the professor will be so overwhelmed with the research that they have to do and everything. And plus it's a research focused school so we know that professors are more focused on the research so we feel like we won't be able to get as much help from the professors. So a lot of times even if I have questions I end up just not asking. (Research)

In contrast, most students at the other four institutions indicated that they felt well supported by or connected to faculty outside of the classroom, as illustrated by the following representative quotes:

I know all the science professors and they know me. They say "hi," they care about what I'm doing, they know what I'm doing, what program I'm in. It's good to know they care. (Women's)

It helps if professors have a relationship with their students, and I feel like the professors here – I know some of my profs I've had for multiple classes, and they even know about my personal life, so it really helps. (Women's)

You can definitely make a connection with your professor, and if you have any concerns, you can go to them right away and they know who you are. So it's definitely helpful. And definitely stay on top of your schoolwork and stuff just because a professor can be there for you. They know who you are. (Women's)

You can be "friends" with your faculty since it's a small school and they don't have to get to know lots of other people. (Private)

It helps when professors are available for help outside of class. They all try and be helpful, but it varies with professor. (Private)

We have some professors that will stop you in the hall and start talking with you. They'll talk with you by name or they'll say, "Oh I saw you were listed here for this accomplishment. That was a really good job that you did that." Or we have a couple athletes and some of our professors would say, "Oh I saw you placed. That is awesome." I think it looks more like they care. (Teaching)

Typically...each teacher kind of knows your name. Each teacher individually knows you and they kind of have an idea what you're going through. ... The faculty are here for you and they're actually trying to help you do the best you can and give you all the opportunities you can. So when you know that, you actually want to perform your best so that when that opportunity is put in front of you, you can actually take it. (HBCU)

One of my teachers, I was doing awful in class and the teacher went out of his way to send me emails during the weekend, was going and preparing for some of my tests over the weekend via emails. (HBCU)

In summary, our qualitative findings suggest that student perceptions of faculty-student interactions and faculty support do vary by class size and by institution type. Namely, we found

that across institutions, students perceived more frequent and higher quality interactions with faculty in smaller classes, and that students at the Research institution perceived lower levels of faculty support than students at the other four institutions. Our findings also show that students are often aware of the common assumptions and expectations regarding faculty support that exist at their institutions, which may influence their decisions about whether or not to actively seek out such support.

Discussion

As anticipated based on previous studies, we found that students perceived less faculty support – as defined by frequency and quality of faculty-student interactions – in larger classes than in smaller classes. A higher student-to-faculty ratio unsurprisingly leads to less attention per student and a resulting loss in perceived faculty support. Our study has also shown that even when students report low levels of formal faculty support in their large classes, they often perceive informal faculty support outside of class at their institution – with the exception of the Research institution, where students reported low levels of formal *and* informal faculty support. This suggests that a student’s experience of low faculty support in a large class can be counterbalanced by an institutional culture that includes an expectation of informal, out of class faculty support. However, institutions vary in regard to whether that type of culture exists.

Based on our findings, we conclude that large class size is particularly problematic for students’ academic integration – and subsequently persistence -- at the Research institution because both formal and informal faculty support are perceived as low, likely due to the combination of large classes and a perceived lack of an institutional culture which promotes informal faculty support. At each of the smaller schools in our study, most students reported that at least one type of faculty support (formal or informal, if not both) was perceived as high, which likely contributes to students’ academic integration and thus, following Tinto, persistence. At the Research institution, the low level of perceived faculty support is particularly salient in the early undergraduate years, during which students experience larger class sizes and develop lasting perceptions of faculty as unavailable, both formally and informally.

Our findings suggest that it is important for faculty at any institution to pay attention to students’ perceptions of faculty availability, particularly at large institutions with large classes. We do not intend to assert that large class sizes are automatically detrimental for students, but we argue that they can be if students in large classes feel a lack of in-class faculty support and also perceive that faculty are unavailable outside of class. If students know that faculty are available in informal ways, this can counteract the negative effects of large classes on students’ academic integration and persistence.

Limitations and Implications

Limitations: Because this study has a relatively small sample size drawn from only five institutions, we cannot claim that our findings are generalizable to all undergraduate engineering and computer science students. In addition, our findings highlight the importance of institutional culture, also making it difficult to generalize beyond the five partner institutions. However, because of our strategic recruitment and sampling approach, we argue that the findings presented

here are representative of the experiences of undergraduate engineering and computer science students at these five institutions. In addition, because of the efforts made to include institutions of several different types, our findings provide insights that may lead to a deeper understanding of student experiences in a wide range of settings.

Implications: Regardless of the actual amount of time spent with students by faculty at the institutions in this study, students perceive that they are less supported by faculty at the Research institution than at the teaching-focused institutions. This may be due in part to impressions developed in Very Large classes early in students' undergraduate years, and might also be influenced by students' preconceptions about what faculty at research institutions do (i.e., more research than teaching). This finding is important because it implies that research institutions may not be ideal environments for students who need a significant amount of faculty support. Our results also suggest that faculty at research institutions may need to be more conscious of helping students realize that they are in fact supported and cared for both inside and outside of the classroom.

Although a detailed analysis of specific ways in which faculty can help students feel supported is beyond the scope of this paper, this question has been explored to some extent in other portions of our larger study³⁷⁻³⁸. Based on these other analyses, we can begin by suggesting that faculty at institutions of all sizes or types can help students feel supported through efforts including (but not limited to) learning and using students' names, using interactive lecture techniques, providing a safe academic environment in which there are no "dumb" questions, encouraging students to attend office hours, and being available to students by arriving early to class, staying after class, and/or being responsive to emails. These and other practical suggestions for faculty are elaborated on in greater detail elsewhere³⁷⁻³⁸; however, we argue that the findings presented here are valuable in that they provide further confirmation that making these efforts to help students feel supported are worthwhile in the big picture of student success and persistence.

Conclusions

Findings from this study showed that, in general, class size inversely impacts perceptions of formal faculty support, with very large classes (over 100 students) drawing out negative impressions from a range of students. Our findings also highlighted that informal faculty support is perceived to be significantly weaker at the participating research institution than at four teaching institutions of different sizes. With regard to institution type, the notion that undergraduates perceive less faculty support at research institutions holds true. This study has not verified whether the level of faculty support is actually less at research institutions, but only that students' self-reported perceptions of that support are lower at a research-focused institution when compared to other types of institutions. Thus, freshman and sophomore mega-classes at large, research-focused institutions, when combined with students' preconceptions regarding faculty's roles at these institutions, may contribute to an overall perception that faculty care less, whether or not this is true.

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