What's your threshold? How international students use vague quantifiers of behavioral frequency in student surveys

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Institutional and educational researchers make extensive use of student surveys to understand the nature and quality of the undergraduate experience. Widely used surveys of college students ask respondents to quantify their experience relative to time allocation, amount of reading and writing, and frequency of engaging in various behaviors such as asking questions in class or meeting with faculty outside of class. Yet quantification tasks on surveys can be problematic. Studies of the survey response process have shown that enumeration is cognitively challenging and subject to various forms of error (Sudman, Bradburn, & Schwarz, 1996). As a result, many surveys use "vague quantifiers" (VQs) in response frames as an alternative to enumeration (Nelson Laird, Korkmaz, & Chen, 2009). For example, students might be asked whether they study with their peers "very often, often, sometimes, rarely, or never" in lieu of specifying how many times they do so per week, month, or semester.

In addition to relieving respondents of the burden of enumeration, VQs permit them to adjust the meaning of the response frame to fit the context of different questions. For example, a given person's threshold for "often" might be several times per day for one behavior (say, asking questions in class) but several times per month for another (discussing career plans with a faculty member) (Ouimet, Bunnage, Carini, Kuh, & Kennedy, 2004).

Previous research has investigated the extent to which VQs of behavioral frequency represent estimates that are relatively consistent across students and has examined the extent of linearity across the response frame (Nelson Laird at al., 2009; Pace & Friedlander, 1982; Rocconi, Dumford, & Berry, 2018). Findings generally support the use of VQs from a concurrent validity standpoint. While there is some evidence of differences in the meaning of VQs for certain subgroups (Rocconi, Dumford, & Berry, 2018), effect sizes for these differences are small.

One important area that has gone unexplored involves international students: How they interpret and use VQs, and whether these interpretations and uses differ from those of domestic students. This is important because of the large number of international students attending U.S. institutions (about 1,095,000 in 2017-18 according to the Institute for International Education's Open Doors project [n.d.]) and the risk of misinterpreting their survey responses.

A related concern involves heterogeneity within the international student population. Although much research fails to acknowledge it, international students do not represent a single undifferentiated group. They come from a wide variety of national contexts, with differing cultural norms related to education, among other things. We might speculate, for example, that Canadian students might use VQs in ways that are largely similar to U.S. students, whereas students from China or India (which accounted for 51% of international students in the U.S. in 2017-18 [Institute for International Education, n.d.]) might not. Different cultural norms related to certain academic behaviors could result in a substantially different "threshold" for VQs such as "often" or "very often. Consider student-faculty interaction: If it is rare or counternormative in a student's home country to ask questions of faculty during class or speak to faculty about their academic progress, the student's subjective assessment of what constitutes "often" engaging in these behaviors may be considerably lower than for students from countries where such behaviors are routine and normatively acceptable.

In short, to the extent that the use of VQs differs between international and domestic students, or differs among international student populations, users of student survey data should be aware of these differences and their implications for the validity and interpretation of results. Informed by these concerns, we ask the following research questions:

1. To what extent do domestic and international students interpret VQs differently?

2. Among international students, to what extent do students from Western and non-Western countries interpret VQs differently?

Data and Methods

We use data from the 2016 administration of the National Survey of Student Engagement (NSSE). NSSE is an annual survey administered in the spring to first-year and senior students at baccalaureate degree-granting colleges and universities in the United States and Canada. NSSE's primary aim is to assess the extent to which students are exposed to and participate in a variety of empirically supported effective educational practices (McCormick, Kinzie, & Gonyea, 2013). The survey asks students about various aspects of their undergraduate experience, such as the time and effort they invest in their studies, their interactions with faculty members and students, and other educationally purposeful activities.

We examined responses from more than 14,000 respondents from the 19 U.S. institutions that participated in an experimental item set designed to investigate respondents' use of VQs. The subject institutions included six baccalaureate colleges, six master's institutions, six doctorate-granting universities, and one special-focus institution as classified in the "Basic" Carnegie Classification. The average institutional response rate for these institutions was 31% (compared with 29% for the full 2016 administration). Two out of three (66%) respondents attended a public institution. Approximately 46% were first-year students, and 90% were attending their institution on a full-time basis at the time of survey completion. Females accounted for 63% of the sample. The racial-ethnic makeup of the sample was as follows: 8% Asian, 6% Black or African-American, 15% Hispanic or Latino/a, 58% White, 3% who identified as another race-ethnicity (e.g., American Indian or Alaska Native, Native Hawaiian or other Pacific islander), plus 9% who indicated two or more race-ethnicity categories. The remainder selected "I prefer not to respond." About one in five (19%) respondents were taking all their coursework online. About 3.5% of the sample identified as an international student, roughly one-third of whom (35%) were from Western countries. These characteristics were generally consistent with the overall patterns for NSSE respondents.

Eliciting Enumerated Behavioral Estimates

In the experimental item set used for this study, 11 items from the NSSE survey that use VQs were repeated at the end of the survey using an enumerated-response frame. The selected items spanned a range of behaviors including asking questions in class, collaboration with peers, learning strategies, and student-faculty interaction. Respondents were first reminded of the original question (e.g., How often have you asked questions or contributed to course discussions in other ways?) and their response (e.g., Often). They were then asked to quantify their response by indicating the number of times they typically engaged in the activity per day, week, month, academic term, or year. (Thus respondents indicated both the relevant time frame and the number of occurrences within that time frame—2 times per day, 12 times per month, 4 times per year, etc.)

To adjust for the variety of time frames selected by respondents, we transformed all responses to a standard time frame. We selected a per-week basis and adjusted responses using other time frames using the multipliers from Nelson Laird et al. (2008): 5 for day; .231 for month; .1, .077, or .067 for academic term, depending on the institution's academic calendar (semester, quarter, and 4-1-4 system, respectively); and year = .033.

International Status and Country of Citizenship

In the core NSSE survey, respondents who identified as an international student (i.e., responded “yes” to “Are you an international student?”) received a follow-up question asking them to select their country of citizenship from a list of 258 countries. For the present study we adapted Sasha Trubetskoy’s (n.d.) “Cultural definition”.of Western and non-Western countries.[1] Countries in Africa, Asia, the Middle East, and Oceania (except Australia and New Zealand) were classified as non-Western. Countries in North America, Europe, Latin America, the Caribbean, Australia, and New Zealand were classified as Western.

Of the international student respondents in the sample, 35% were from Western countries. Table 1 displays the number of international student respondents by country of citizenship for countries with five or more respondents.

Table 1.

Number of international respondents by country of citizenship

China	69	Bahamas	10
Saudi Arabia	38	Indonesia	10
Mexico	28	United Kingdom	9
Vietnam	27	Hong Kong	8
Panama	25	Marshall Islands	7
Kuwait	21	Venezuela	7
Japan	17	Brazil	6
India	16	France	6
Nepal	16	Russia	6
Nigeria	14	Dominican Republic	5
South Korea	14	Kenya	5
Bolivia	12	Pakistan	5
Canada	11	Philippines	5
Federated States of Micronesia	11	Rwanda	5

Note: Countries with fewer than five respondents not listed

Analysis

To assess the extent to which the meaning of each VQ option differs by international status (research question 1), we computed median response values for the distribution of numeric responses associated with each category of vague quantifier for each question included in the experimental item set. The results indicate the typical enumerated frequency of behavior that respondents associated with “never,” “sometimes,” “often,” and “very often” for each question. We chose the median response because the

[1] There is no authoritative list of Western or non-Western countries, and we acknowledge that the very notion of such a classification is contested and controversial (see Peace and Collaborative Development Network, n.d.). We used the list that we judged best suited to the present study, with slight modification—classifying Greece and Cyprus as Western.

minimum values are bounded at zero, resulting in a positively skewed distribution. We present the results in the form of line graphs to revels patterns of consistency or inconsistency with regard to median values. Because all comparisons are at the response-option level, some results are based on fewer than 30 respondents; we indicate this in notes to figures.

For the second research question, we performed a similar analysis limited to international students, comparing the enumerated responses of students from Western and non-Western countries.

Limitations

Our analysis is subject to a number of limitations. Although the survey research literature identifies difficulties associated with asking respondents to provide enumerated responses, we assume that respondents' enumerated responses are valid for the purposes of interpreting the meaning of VQs. In addition, the survey design reminded students of their VQ response prior to eliciting an enumerated response. Results may have been different without the prompt.

The analysis examines a subset of NSSE questions involving behavioral frequencies to compare VQs and enumerated responses. It is possible that a similar analysis of different survey questions might yield different results.

The analysis relies on a coarse Western/Non-Western distinction as a proxy for cultural norms related to education. It may be that a different or more nuanced approach would better reveal differences within the international student population.

The analysis assumes that students' prior (elementary and secondary) education took place in their country of citizenship. It is possible that the sample includes students from non-Western countries whose prior education included time in a Western country (for example, children of professionals employed in Western countries).

Finally, the analysis is based on a convenience sample of 19 institutions that participated in NSSE 2016 where the experimental items were administered. Although the sample represents the range of institutional diversity as represented in the Basic Carnegie Classification, a nationally representative sample might yield different results.

Results

Research question 1: To what extent do domestic and international students interpret VQs differently?

When comparing domestic and international students, results are consistent with previous research demonstrating that, in general, students assign distinct and increasing quantities to "never," "sometimes," "often," and "very often" across a range of behaviors, with "never" being consistently zero (Rocconi, Dumford, & Butler, 2018). Additionally, international and domestic students' enumerated responses appeared to be fairly consistent for the majority of items (Figures 1-11). For five of the 11 items, the two plots mirrored one another very closely and in one case they were identical (see Figures 1, 3, 5, 6, and 8).

While we observed a general pattern of consistency in students' enumerated responses across international-student status, a few exceptions were apparent. In some of these cases, international students reported higher enumerated values for the vague response options than did domestic students. For instance, international students had a higher threshold for “sometimes” and “often” with regard to the number of times per week that they “worked with other students on course projects or assignments” compared to their domestic counterparts, while the two groups had consistent thresholds for “very often” (Figure 4). Additionally, international students reported more frequent “discussions with faculty about course topics, ideas, or concepts outside of class” (Figure 7) and “conclusions based on their own analysis of numerical information” (Figure 9) corresponding to “very often.” International students also reported a somewhat higher numeric value for “sometimes” when reporting about having “reviewed notes after class” (Figure 11). In only three instances did domestic students assign higher values for the vague responses than their international counterparts. For two of the items, “explained course material to one or more students” (Figure 2) and “used numerical information to examine a real-world problem” (Figure 10), domestic students reported higher frequencies for “very often.” Additionally, they assigned higher values than international students to “often” for “discussed your academic performance with a faculty member” (Figure 8).

Research question 2: Among international students, to what extent do students from Western and non-Western countries interpret VQs differently?

Comparing international students from Western and non-Western countries, the majority of items also reveal only little differences between the two groups, but with a few exceptions. For example, whereas international students mirrored their domestic counterparts on values corresponding to VQs for how often they “prepared for exams by discussing or working through course material with other students,” non-Western students assigned a much higher frequency to “very often” when compared to their Western international student counterparts (4.5 versus 2 times per week), while the two groups were quite consistent on the other VQs (Figure 14). (A similar pattern is evident for “worked with faculty on activities other than coursework” [Figure 17], but the median for non-Western students is based on fewer than 30 respondents.) Non-Western students also assigned notably higher values to both “often” and “very often” for the number of times per week that they “used numerical information to examine a real-world problem or issue” (Figure 21), but the Western students estimate for “very often” is based on fewer than 30 students.

Discussion and Implications

Overall, our findings should be reassuring to institutional researchers and others who rely on survey data to understand the experiences of undergraduates—and to survey researchers, as well. In general, international students interpret VQs in ways that are largely consistent with domestic students, and we found relatively little evidence of differences between Western and non-Western international students. In most of the cases where we observed differences, they ran contrary to the speculation that motivated the present study: We found international students and non-Western international students to have *higher* thresholds relative to the respective comparison groups. For only three of the 11 items examined did we find evidence of lower behavioral frequency thresholds for international students: “explained course material to one or more students,” “used numerical information to examine a real-world problem” (lower threshold for “very often”) and “discussed your academic performance with a faculty member” (lower threshold for “often”). Yet in none of these cases did we find a notable difference between Western and non-Western international students, which would be most consistent with the proposition of distinctive cultural norms shaping subjective judgments about frequency of behavior.

Despite these generally reassuring findings, future research should incorporate controls for student characteristics to control for potentially confounding factors such as student demographic and enrollment characteristics. In addition, qualitative methods could inquire further into how all students interpret and use VQs for different academic behaviors.

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Figures

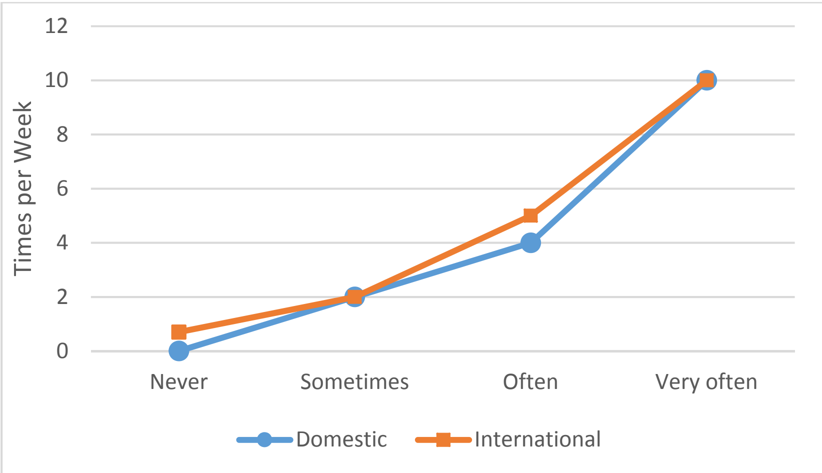

Figure 1. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Asked questions or contributed to course discussions in other ways.

Note: Cell count is less than 30 for "Never" for international students.

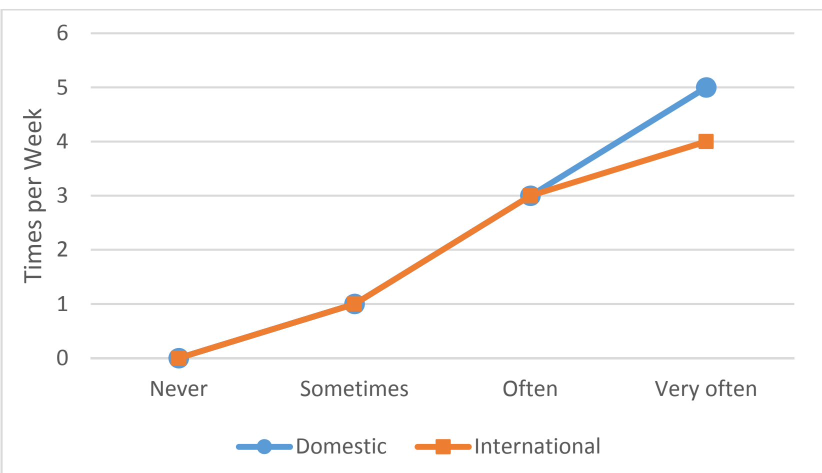

Figure 2. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Explained course material to one or more students.

Note: Cell count is less than 30 for "Never" for international students.

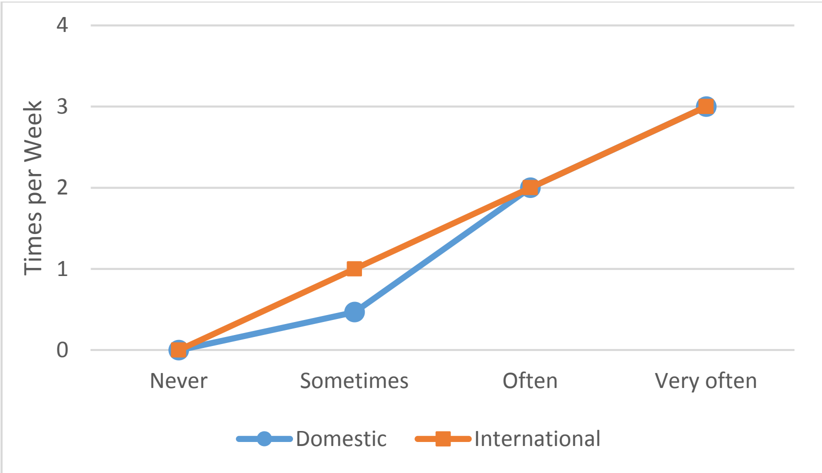

Figure 3. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Prepared for exams by discussing course material with other students.

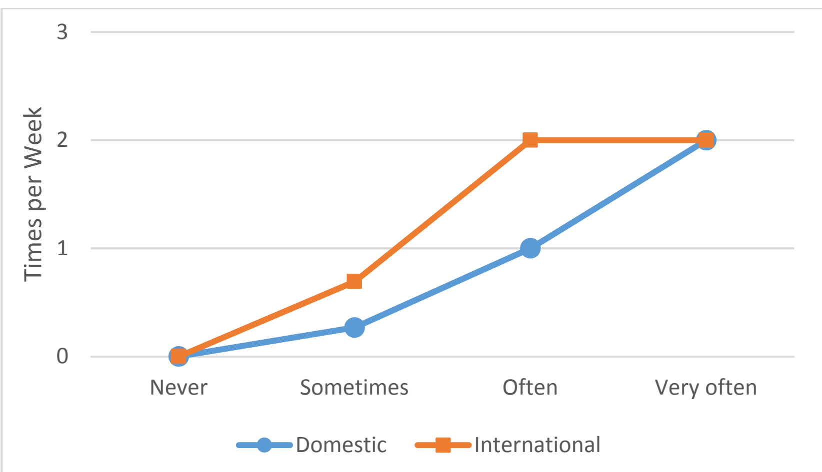

Figure 4. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Worked with other students on course projects.

Note: Cell count is less than 30 for "Never" for international students.

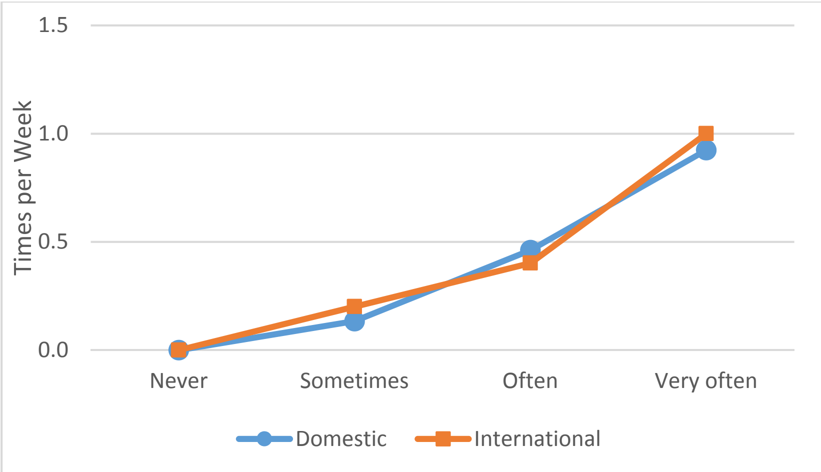

Figure 5. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Talked about career plans with faculty.

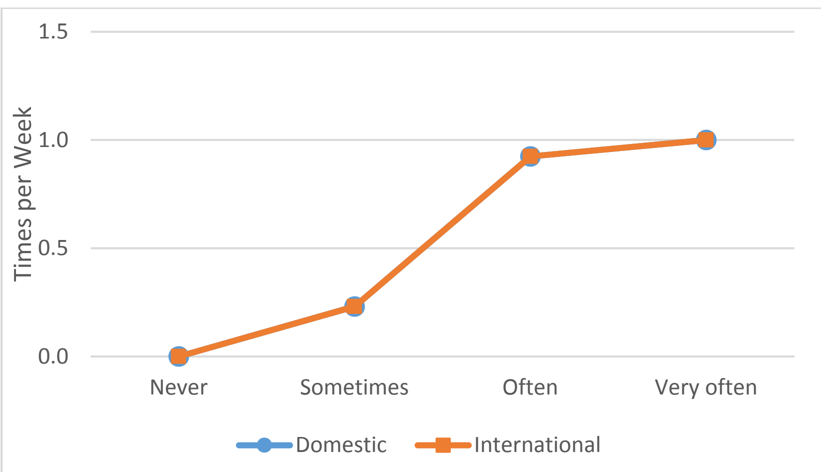

Figure 6. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Worked with faculty on activities other than coursework.

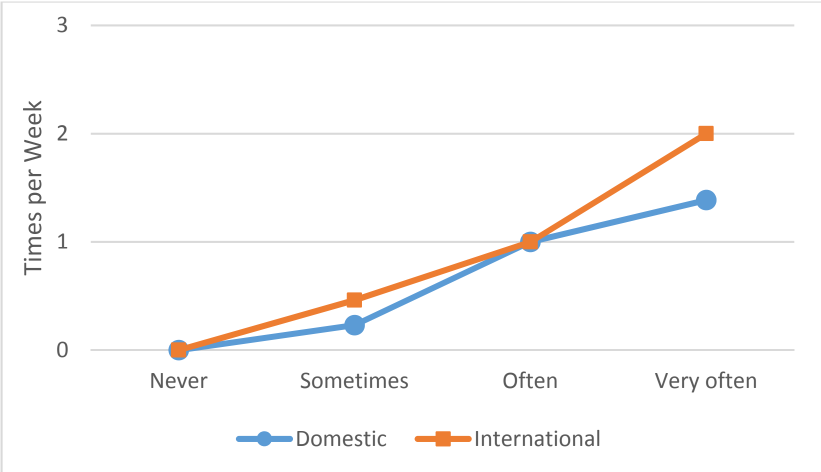

Figure 7. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Discussed course concepts with faculty outside of class.

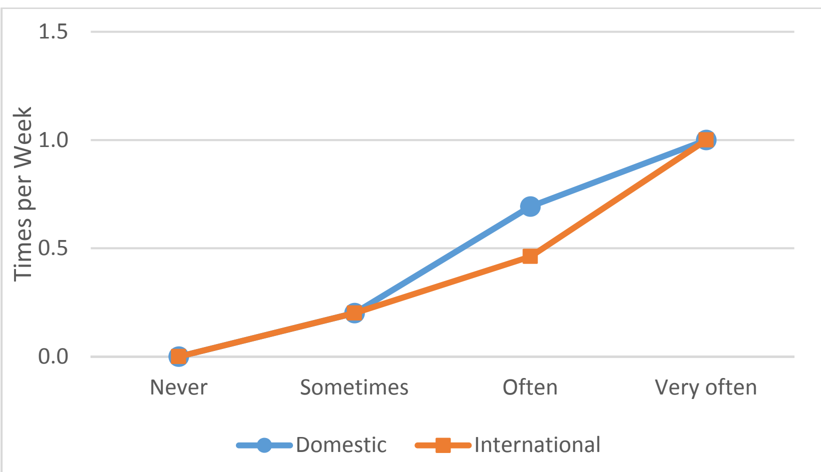

Figure 8. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Discussed your academic performance with a faculty member.

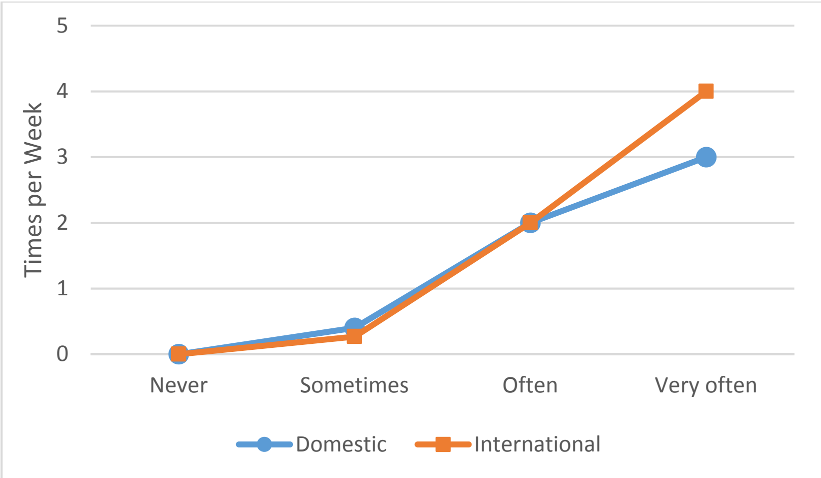

Figure 9. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Reached conclusions based on your own analysis of numerical information.

Note: Cell count is less than 30 for "Never" for international students.

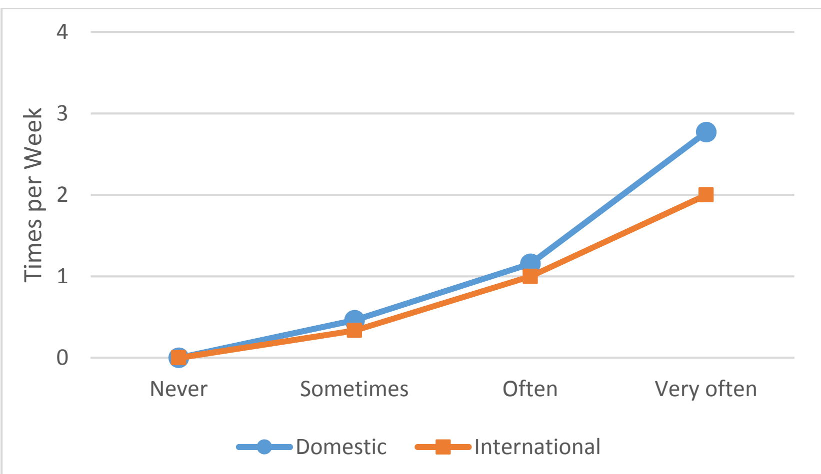

Figure 10. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Used numerical information to examine a real-world problem.

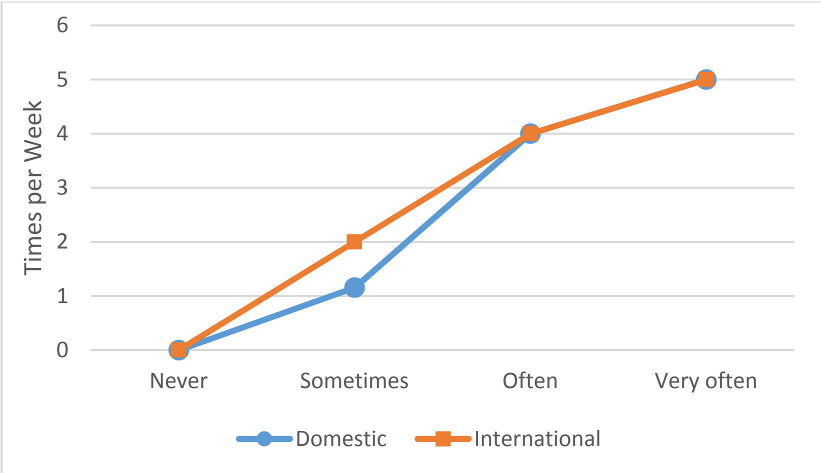

Figure 11. Comparing domestic and international students' median numeric values given for each vague response for the survey item: Reviewed notes after class.

Note: Cell count is less than 30 for "Never" for international students.

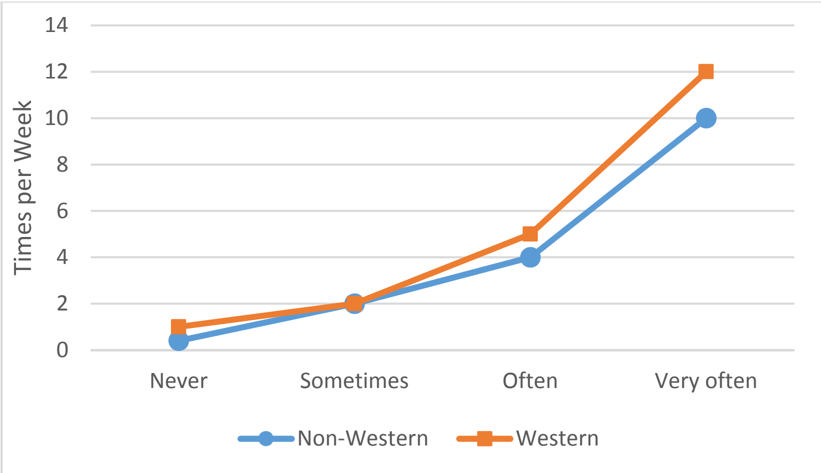

Figure 12. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Asked questions or contributed to course discussions in other ways.

Note: Cell counts are less than 30 for "Never" for both Western and Non-Western students.

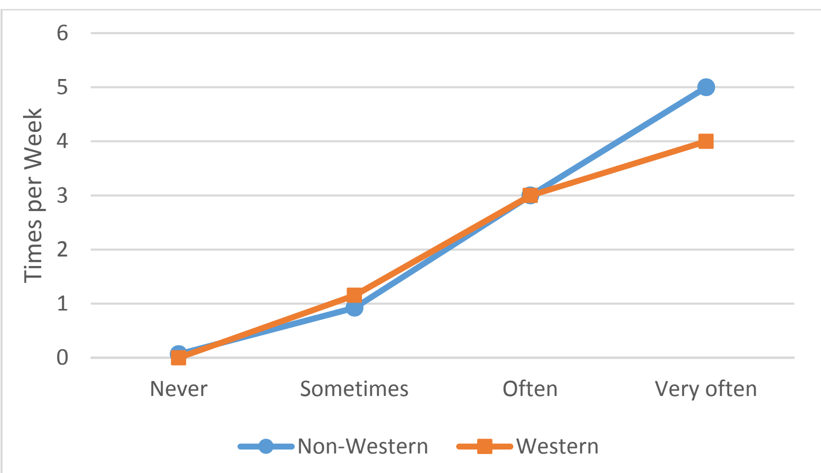

Figure 13. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Explained course material to one or more students.

Note: Cell counts are less than 30 for "Never" for both Western and Non-Western students.

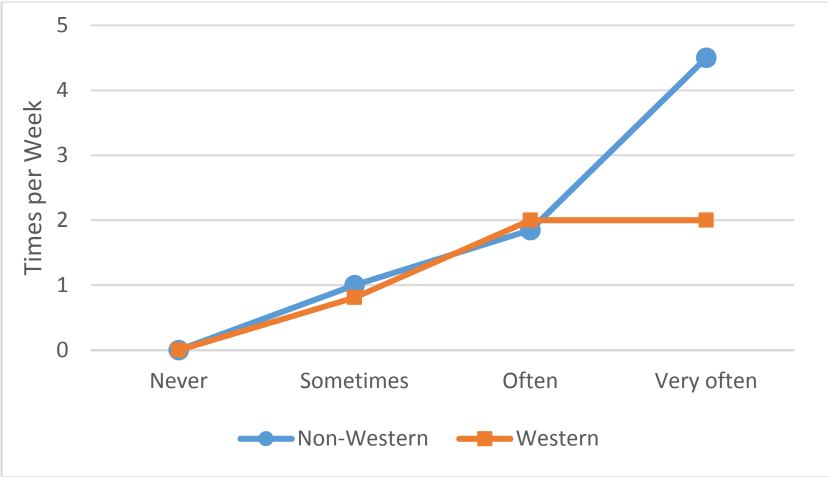

Figure 14. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Prepared for exams by discussing course material with other students.

Note: Cell counts are less than 30 for "Never" for both Western and Non-Western students.

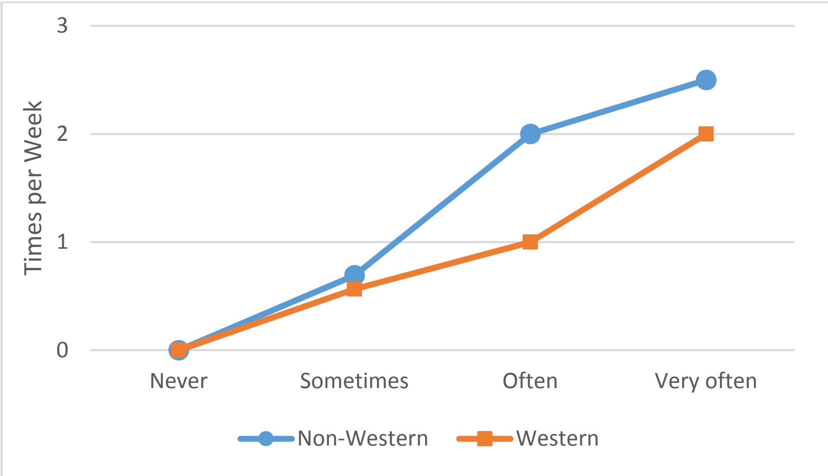

Figure 15. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Worked with other students on course projects.

Note: Cell counts are less than 30 for "Never" for both Western and Non-Western students.

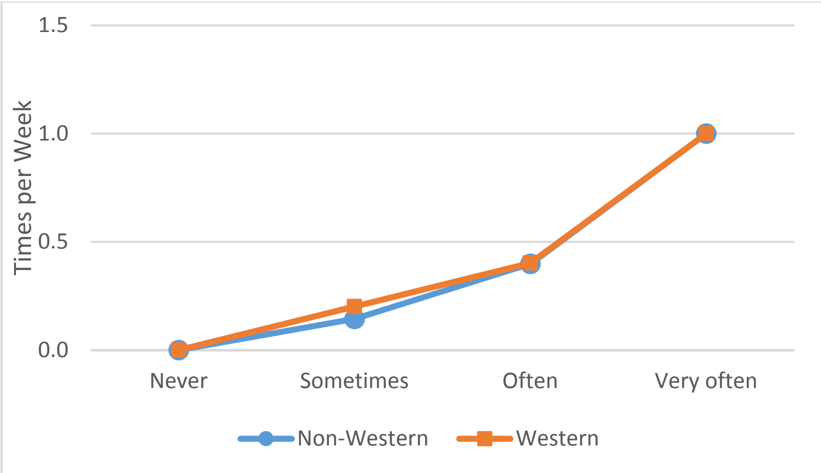

Figure 16. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Talked about career plans with faculty.

Note: Cell counts are less than 30 for "Very often" for Non-Western students and both "Never" and "Very often" for Western students.

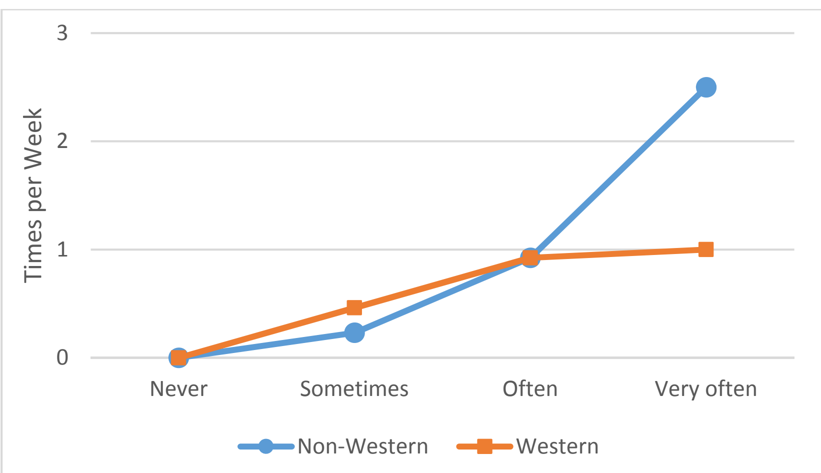

Figure 17. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Worked with faculty on activities other than coursework.

Note: Cell counts are less than 30 for "Very often" for Non-Western students and both "Often" and "Very often" for Western students.

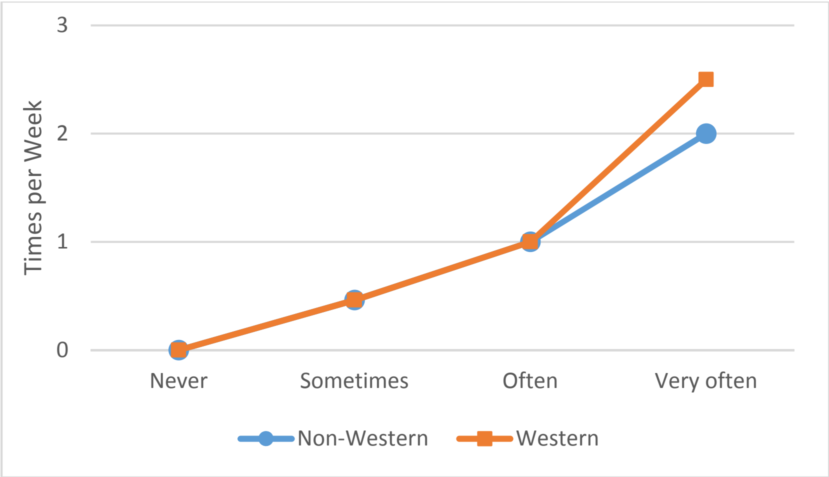

Figure 18. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Discussed course concepts with faculty outside of class.

Note: Cell counts are less than 30 for "Never" and "Very often" for Western students.

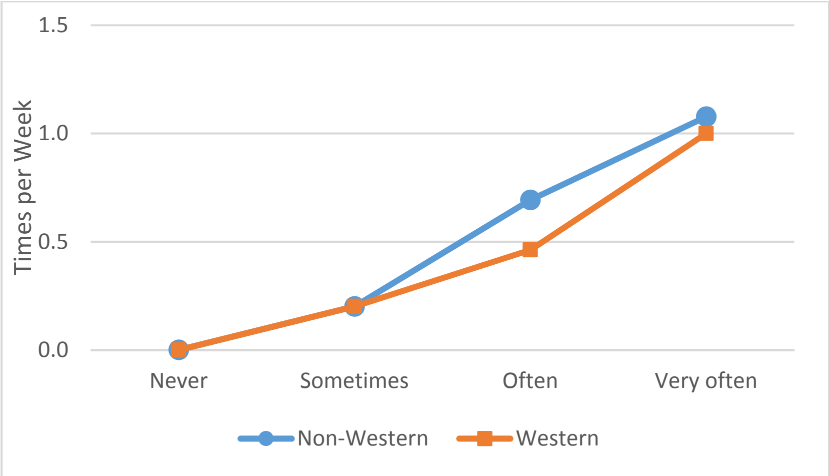

Figure 19. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Discussed your academic performance with a faculty member.

Note: Cell counts are less than 30 for "Very often" for Non-Western students and both "Never" and "Very often" for Western students.

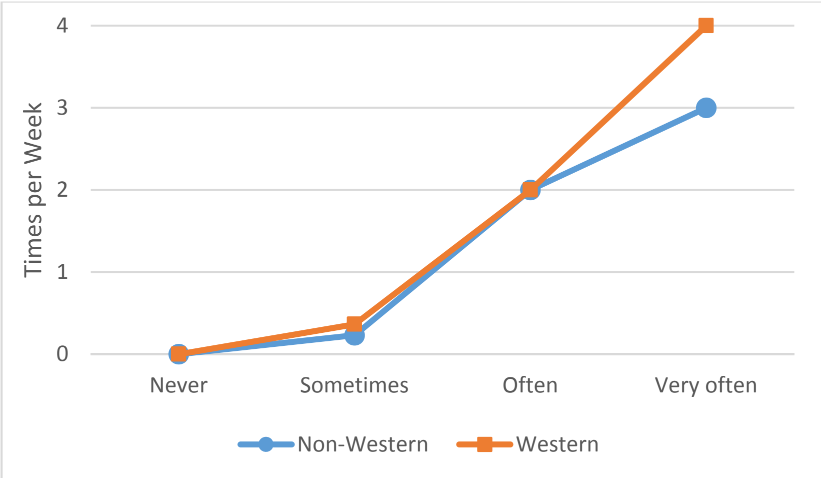

Figure 20. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Reached conclusions based on your own analysis of numerical information.

Note: Cell counts are less than 30 for "Never" for both Western and Non-Western students.

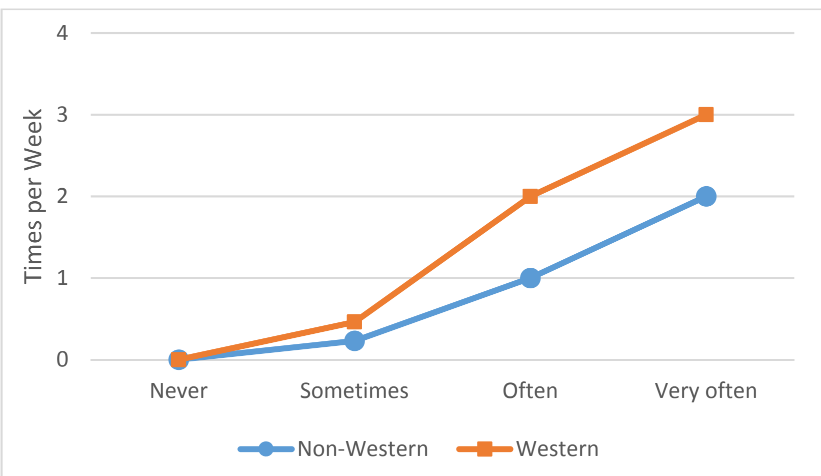

Figure 21. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Used numerical information to examine a real-world problem.

Note: Cell counts are less than 30 for "Never" and "Very often" for Western students.

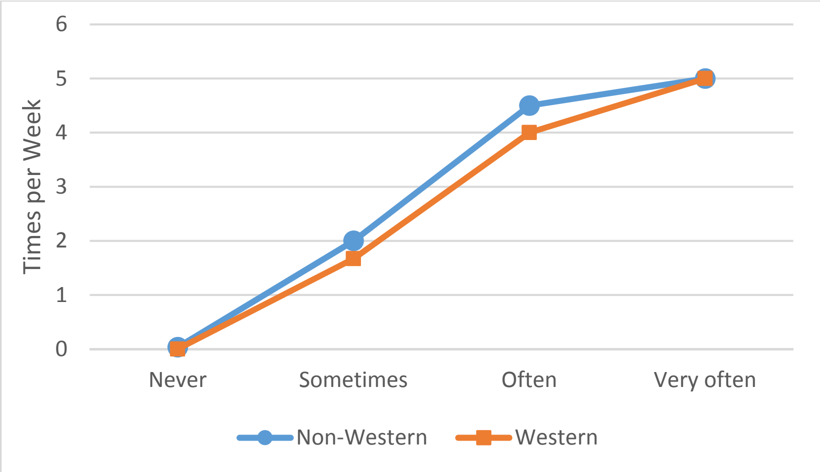

Figure 22. Comparing Non-Western and Western international students' median numeric values given for each vague response for the survey item: Reviewed notes after class.

Note: Cell counts are less than 30 for "Never" for both Western and Non-Western students.