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# Transferability of Benefits of Instructor Trivia Questions Across Instructor and University Demographics

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## 1. Introduction

Classroom integration of polling questions related to a course instructor's personal life, AKA "instructor trivia" (IT) has emerged as a novel pedagogical strategy aimed at enhancing the student-teacher relationship. This practice, which can be implemented through polling platforms such as Top Hat or Poll Everywhere, involves posing ungraded, non-compulsory trivia questions about the instructor during short in-class breaks. These questions serve to re-engage students after brief pauses in instruction, fostering a more interactive and personable classroom environment.

Previous research has demonstrated that students appreciate these trivia questions, which contribute positively to their perception of the instructor and the overall classroom experience [1]. However, existing work has primarily focused on a single instructor within a public university setting, leaving a gap in understanding whether the observed benefits are transferable across different instructors and university demographics.

In this study, we aim to address this gap by examining the transferability of the benefits of IT questions across two different educational contexts. Specifically, we investigate the experiences of two chemical engineering instructors—one male and one female—employed at a public university and a private university, respectively. The trivia questions were designed to be engaging and informative, providing students with insights into the instructors' personal lives while maintaining a light-hearted tone.

The trivia questions used in this study were crafted to be relevant and interesting to students, covering various aspects of the instructors' backgrounds, hobbies, and personal interests. These questions were presented in a multiple-choice non-graded format, allowing students to participate easily and without pressure. An example IT question is shown in Figure 1.

### *1.1. Motivation for Using Instructor Trivia Questions*

#### *1.1.1. Strong student-instructor relationships can improve student success and retention*

As early as the 1970s, Perry suggested that students would cognitively develop and learn more effectively when students felt supported by their instructors [2]. Later work demonstrated the effect of instructor support directly [3-8]. For example, Micari and Pazos found that students' organic chemistry grades, as well as confidence in their success, were positively correlated with students' perceptions of their connection and relationship to their instructor [5]. Others similarly demonstrated positive correlations between GPA and instructor behaviors [6] and student-instructor relationships [7]. Even in courses using a high level of evidence-based

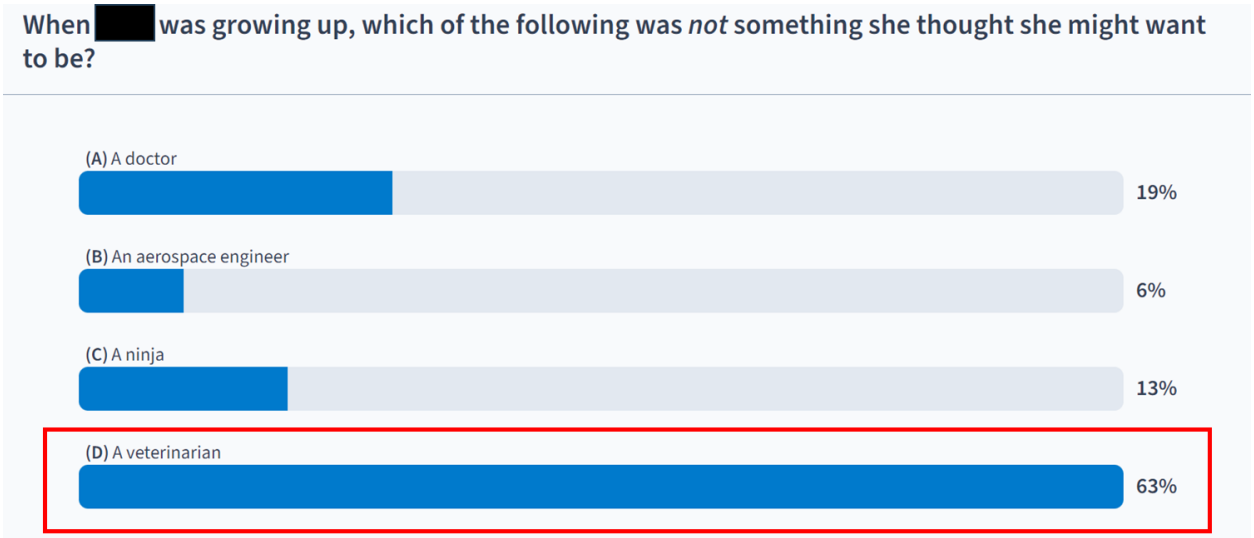


**Figure 1. Example of an Instructor Trivia question used in one of the studied classes. The correct answer is boxed.**

teaching practices, students' trust of their instructors was one of the most significant factors for students' buy-in of the course material and subsequent course performance [8].

Beyond academic success (i.e., grades), the student-instructor relationship can also have an impact on student retention via an effect on their sense of belonging. Walden and Foor noted that students are more likely to believe that engineering is "for them" if their instructors are welcoming and serve as a professional role model [9], and multiple studies have shown that students' intentions to persist (or not) in STEM majors is correlated with having a sense of belonging (or lack thereof) [10]. In particular, the persistence and success of low-income and underrepresented students in STEM fields is closely tied to their sense of belonging [11].

Thus, the primary motivation for incorporating IT questions into the classroom is to strengthen the student-teacher relationship by making the instructor more relatable and approachable. Perrine showed that instructor approachability was highly related to (1) personality (e.g., easy going, good sense of humor), (2) going beyond the call of duty (e.g., showing genuine interest in students' work), (3) respect for students' understanding (e.g., does not make them feel stupid), and (4) lecture and class style (e.g., makes eye contact, brings in everyday examples) [12]. In particular, the IT questions examined here can potentially draw on three of these factors: (1) providing a window to show that instructors have a more "fun" and easy-going personality; (3) by talking about everyday hobbies or experiences, students may feel like the instructor can empathize with their experiences and level of knowledge; and (4) active engagement of students can make the lecture and class style more interesting.

*1.1.2. Class activities unrelated to course content can provide a much-needed cognitive break*

The use of IT questions during in-class breaks can serve a secondary purpose that is no less critical to student learning: a mental reset that can improve focus and attention during subsequent instructional time. While this idea is generally supported by cognitive load theory [13], previous research has shown more concretely that short rest breaks can improve learning and retention [14, 15] and also enhance problem-solving skills that are so critical in engineering [16]. Finally, it is thought that the effects of these mental breaks can be enhanced if the break encourages relaxation [17]. Not only are the IT questions investigated here used as part of a short break in instruction, they center around casual, fun topics that could potentially help students relax. Previous work has shown that students who experienced the IT questions did feel that the questions provided a cognitive break [1].

In summary, IT questions are a novel, easy-to-implement method of improving the student-instructor relationship (which can aid in student success and retention), as well as provide a fun way to provide a mental reset in the midst of an intellectually-strenuous engineering lecture. While the concepts of IT questions have been presented previously [1], this study specifically seeks to explore the transferability of the benefits of IT questions across different instructors and university settings. By examining student perceptions and emergent themes from course evaluations, we aim to determine whether the positive outcomes observed in previous research are consistent across more diverse educational contexts, as well as explore concepts of student motivation to participate and the IT questions' intrinsic value. The findings of this study will contribute to the growing body of literature on evidence-based teaching practices and their impact on student engagement and success.

## 2. Methods and Data

### *2.1. Research Questions*

There are two goals of this study. First, this study aims to identify differences (if any) in the perspectives of two different groups (Group 1 and Group 2) of undergraduate chemical engineering students toward the practice of including ungraded IT questions in mid-class breaks during longer 75- or 110-minute lectures. Group 1 comprises students from a public university with a male instructor, while Group 2 comprises students from a private university with a female instructor. These two groups were chosen to draw comparisons of student perspectives across the axes of type of university (public vs. private) and instructor gender (female vs. male). Second, this study intends to probe the connections between the practice of including IT questions in classes with factors such as student motivation and intrinsic value.

This study aims to answer the following research questions (RQs):

1) Do student perspectives on IT questions vary between Group 1 (public, male instructor) and Group 2 (private, female instructor), and if so, are there indications that these differences are due to the university demographics (public vs. private) or instructor gender (female vs. male)?

2) Does the use of IT questions during mid-class breaks impact student motivation?

3) Is there intrinsic value in the practice of using IT questions during mid-class breaks?

### *2.2. Courses Studied*

As previously stated, this study involves two instructors, each at two different universities. The students referred to as Group 1 were enrolled in one of two courses: one course was a sophomore-level numerical methods course focusing on problem-solving algorithms and programming in Excel, VBA and Matlab, while the other course was a senior-level capstone design course which discusses fundamentals of process design, reading technical diagrams (e.g. P&IDs), safety, unit operations and ASPEN. The students referred to as Group 2 were enrolled in a sophomore-level thermodynamics course.

The courses described above were administered in a twice-a-week lecture format, either 75 minutes in duration (Group 1) or 110 minutes in duration (Group 2). In each course, the instructor provided a five minute break to students at approximately the midpoint of the lecture on non-exam days, which is when they posed IT questions to the class. Students were made aware the IT questions were ungraded and that they were free to chat amongst themselves during the break. Detailed demographic information for the students enrolled in the courses is unavailable due to IRB limitations.

### *2.3. Methods*

The research questions addressed in this study require knowledge of student perspectives and attitudes, which are difficult to extract from quantitative data. With this in mind, a qualitative approach was chosen for this study. Qualitative data is typically rich in detail which brings the benefit of allowing researchers to identify themes embedded in subject responses; a disadvantage of qualitative analysis is the significant time and effort required to analyze data [18, 19]. Many of the research methods employed in this study are similar to the qualitative analyses described in earlier ASEE proceedings [1]. Qualitative data was collected through end-of-semester student course evaluations, which were provided by students enrolled in the studied course on anonymous and voluntary bases through an online survey administered by the university. To facilitate data pertinent to the research questions of the study, the authors included these two custom open-ended response questions (referred to as Open-Ended Response Question 1 and 2, respectively) as part of their online course evaluations:

1. This semester the instructor included short trivia polling questions regarding their personal life during mid-class breaks. Do you think these activities were worthwhile / should the instructor continue this practice in future semesters?
2. The short trivia polling questions on the instructor's personal life were optional / not for class credit. Why did you choose to (or choose not to) participate in answering these questions?

The qualitative responses analyzed in this study resulted from those students who volunteered to provide written responses to the questions above. Group 1 had a total of 35 out of a total population of 148 students enrolled in the studied courses volunteer to provide responses to Questions 1 and 2, while Group 2 had a total of 39 responses to Question 1 and 35 responses to Question 2 out of a total population of 45 students enrolled in the studied course. Proper human subjects approvals at both institutions were secured as part of this study.

*2.4. Data Analysis and Handling*

The authors note that data analysis and handling for this study are similar in many ways to those used in a prior ASEE proceeding [1]. Thematic coding was employed toward addressing RQs 1-3 using feedback from students in each of the two custom course evaluation questions. The strategy of thematic coding of qualitative responses involves extracting common themes from the responses - this involves researchers studying written responses, identifying topics embedded in responses, and documenting these topics in order to find emergent patterns [19-22]. Thematic coding seemed appropriate toward addressing RQs 1-3 since it was desired to find themes relevant to each RQ from the responses.

Regarding data handling, due to IRB limitations each author was only able to review their own students' responses; it was not approved for either researcher to review the global (both Groups 1 and 2) data set. Thus, one author (MC) only reviewed written responses from Group 1, while another author (JB) only reviewed written responses from Group 2. Each author evaluated each student response in their respective data sets, identifying emergent themes from the data, assigning the themes a code, and recording these codes in a preliminary code book; this means two sets of preliminary codes were identified, one for each of Group 1 and Group 2. Next, the authors met to share their preliminary code books (without sharing written student responses) and to negotiate consolidation of the two preliminary code books into a final code book. This final code book was then used by each author during a second time reading their assigned data sets to assign final codes to the text responses.

*2.5. Positionality*

One author of this study (MC) feels that a description of their positionality from previous work [1] continues to be appropriate: He a middle-aged white male who has been teaching university chemical engineering courses for over a decade and has taught the courses examined in Group 1

multiple times in their career. From earlier work [1]: “They approach this study from the perspective of an educator who loves to teach, but feels disappointment (and perhaps sorrow) over their own perceptions of how student interactions have changed since the COVID-19 pandemic. They feel that prior to the pandemic students were more interested in classroom interaction amongst themselves as well as their instructor, whereas currently they feel many students would prefer to watch lecture recordings rather than interact with their instructor and fellow students in the classroom. The author has become interested in devising ways to improve student-teacher relationships and classroom community to repair these important personal connections, and this study represents one step toward better understanding student perspectives toward these emerging practices.”

The other author of this study (JB) is a middle-aged white female from the Midwestern United States who has been teaching university chemical engineering courses for nearly a decade. This was the second time she had taught the course taken by Group 2. She approaches this study from her own experiences both as a student and an instructor, in which she has seen how important the student-instructor relationship can be for learning. She was intrigued by the previous work of her coauthor and wanted to explore the depth of this simple and efficient method of student engagement. She also approaches this with a deep interest in research-based inclusive teaching practices, as the effective use of these improves the learning experience for all students.

### *2.6. Limitations*

One limitation of the current study is that only one of the authors coded each data set of qualitative responses (one for Group 1 and one for Group 2). A more rigorous coding practice which reduces bias [23] is for multiple coders to examine each data set, but unfortunately IRB limitations prevented the authors from examining each other’s student responses. Since the sole coder of each data set was also an author of this study, as well as the instructor of the studied course(s), there is an avenue for biases related to their classroom experience impacting their coding choices. As is typical for end-of-semester course evaluations only a fraction of students provided qualitative feedback. Further, since course evaluations are provided anonymously, it is not possible to complete follow-up questioning of student respondents. Finally, student perspectives may be colored by their perception of the instructor and associated power dynamics related to respective backgrounds. Studies have shown that biases exist in student feedback through (e.g.) course evaluations [24]; thus, this study should be interpreted considering the the authors/instructors are middle-aged, white and cisgender. Student perspectives (and thus their qualitative responses) may be influenced by the various backgrounds, race, gender, age, etc. of faculty and students which were not studied here. It should be noted that due to the nature of this study, many limitations are similar to earlier investigations [1, 20].

## 3. Results

The final code book emerging from the data sets is shown in Table 1. The frequency of appearance of each code in each data set and course evaluation question is also given in Table 1. These findings along with representative comments for illustrative purposes are examined in the context of the study's research questions in the following Discussion section.

**Table 1. Final code book and counts of code appearances in each group and for each open-ended question examined in the study.**

| Code | Appearances of Code (Group 1) | | Appearances of Code (Group 2) | |
|---|---|---|---|---|
| | Open-Ended Response Question 1 | Open-Ended Response Question 2 | Open-Ended Response Question 1 | Open-Ended Response Question 2 |
| **Enjoyable / Fun / Interesting Engaging** | 30 | 27 | 21 | 23 |
| **Break / Cognitive Load Management** | 12 | 7 | 7 | 5 |
| **Better Than Doing Nothing** | 2 | 1 | 1 | 7 |
| **Build Student Relationship (with Professor)** | 8 | 9 | 11 | 5 |
| **Build Student Relationship (with other students)** | 6 | 12 | 2 | 4 |
| **Classroom Community Building** | 2 | 3 | 0 | 2 |
| **Did Not Participate** | 0 | 0 | 0 | 8 |

## 4. Discussion

### *4.1. Research Question #1 ("Do student perspectives on IT questions vary between Group 1 (public, male instructor) and Group 2 (private, female instructor), and if so, are there indications that these differences are due to the university demographics (public vs. private) or instructor gender (female vs. male)?")*

Taken as a whole, students from both Groups 1 and 2 indicated they enjoyed the practice of offering IT questions during class breaks. As shown in Table 1, the most prominent thematic code emerging from student responses in both groups was the **Enjoyable / Fun / Interesting / Engaging** category, as exemplified by these responses to Open-Ended Question 1:

> "These activities are worthwhile as they keep students engaged in the class." (Group 1)
>
> "Yes I loved these, they were fun!" (Group 1)
>
> "It was fun to participate in them during the break to see if I could answer them right" (Group 2)
>
> "I thought it was fun to participate" (Group 2)

Indeed, there were no negative comments on the practice across either of the Group 1 and Group 2 data sets; the responses were overwhelmingly positive. There were two neutral comments recorded, one in each of Groups 1 and 2, as exemplified by:

> "I see no benefit nor detriment of these polls." (Group 1)

It was interesting that there were no comments from students who chose not to participate in the optional IT questions in Group 1, but there were instances of students explaining their lack of participation in Group 2:

> "I wouldn't participate because my phone was glitchy, but they were fun!" (Group 2)
>
> "I am a very observant person and often like to sit back and watch a situation rather than participate." (Group 2)
>
> "I rarely actually voted (...) but I always was interested in listening to the results, to be honest I was just lazy and just didn't like having to pull out my phone and log in and would rather have just voted in my head." (Group 2)

Looking at the remaining thematic codes, there were no wholesale differences identified between the two groups; these findings indicate that students' perspectives of the practice do not seem to vary significantly on the bases of university demographics or instructor gender between male and female. However, one observation of note was that while the majority of descriptors (e.g.

"personable", "approachable") used by students to describe the practice of using IT questions were similar across groups, in some cases the descriptors students chose were unique to either Group 1 or Group 2. For Group 1 (male instructor, public university), there were instances of students choosing terms like "down-to-earth" and "light-hearted" to describe the practice of using IT questions which did not appear in Group 2's data. In contrast, students in Group 2 (female instructor, private university) on occasion used terms such as "cute" and "silly" which did not appear in Group 1's data. While there are many factors that could play a role in these choices (e.g. instructor personality), it is also possible that these differences are due to biases related to instructor gender [24,25].

*4.2. Research Question #2 ("Does the use of IT questions during mid-class breaks impact student motivation?")*

The authors anticipated that the act of taking a break would help reset the students' cognitive load, helping them to learn more effectively the remainder of the class period [13-16]. The code for **Break / Cognitive Load Management** was the second-most common theme in the codebook, indicating that students indeed appreciated having a break from the technical content. However, the authors were interested in investigating whether the IT questions themselves had an effect on student motivation distinct from any impacts resulting simply from taking a break. While the student comments do not provide a conclusive picture, there are hints that the specific format of the IT questions was more effective at encouraging further learning compared to simply taking a pause:

> "[IT questions] helped students be more engaged in the course, which is the best way for them to become immersed in the class." (Group 1)
>
> "The informal nature of these questions helped break up technical content while maintaining student attention and involvement in the class" (Group 1)
>
> "Yes, I think they're a good way to connect with the students and professors and break the rhythm of constant learning/problem–solving. It honestly stimulates learning and knowledge absorption." (Group 2)
>
> "I chose to participate for fun. I feel it would be good to have small little fun bits between lectures to help with class engagement." (Group 2)

Notably, many of these comments were coded for both the **Break / Cognitive Load Management** theme as well as the **Enjoyable / Fun / Interesting / Engaging** theme, and in fact, seem to connect the two themes. The connection between engagement, learning, and fun is not a new one, although not as deeply studied as other areas. Literature suggests that having fun while learning can increase motivation and enthusiasm [25,26], and gamification literature has been expanding on the role that having fun in a class can have for enhancement of learning [27].

*4.3. Research Question #3 ("Is there intrinsic value in the practice of using IT questions during mid-class breaks?")*

Beyond being an entertaining method for a cognitive break which likely improves student motivation and engagement, the authors were also interested to see if the IT question format had some additional intrinsic value (i.e., as compared to some other fun activity done during a break). The student comments strongly indicate positive effects related to relationships; **Build Student Relationship (with Professor)** and **Build Student Relationship (with other students)** were the 3rd- and 4th-most common themes coded. Another emergent theme regards **Classroom Community Building**, which the authors felt was distinct from building relationships with specific people and more about the sentiment of the overall classroom environment. Some sample comments are as follows:

> "...[IT questions] made me more engaged and it made me respect [my instructor] and my peers more as it somewhat built a sense of community, and it was just fun in general." (Group 1)

> "A lot of professors make little effort to share their personal lives with their students, which is fine, but by making that connection with your student, you help facilitate a more enjoyable and community-based learning environment." (Group 1)

> "College instructors are kind of like celebrities to us in a way (...) so getting to know the instructor is fun and makes you seem more down to earth and approachable." (Group 1)

> "They felt like a fun way of getting to know the instructor better. They also created a discussion point with other people around me, i.e. they were a method of relaxing during break that included other people." (Group 2)

> "(...) fun to get to know a little bit about a professor which is unique and very appreciated." (Group 2)

> "I liked competing against my friends to see who knew more about [the instructor]." (Group 2)

The prevalence of these thematic codes suggests that the IT questions likely improve students' sense of belonging and connection, particularly to the instructor. Although this study does not have sufficient data to indicate an effect on student performance or persistence in the major, activities like the IT questions may and may well promote these outcomes [3-12].

Finally, we would be remiss not to mention one particularly poignant comment from a student response in Group 1:

> "I think that more teachers should implement this. At the end of the day, I spent a lot more time with [my instructor] this year than I did with any of my family members. Might as well get to know your teachers if you are going to spend so much time with them. Life is more enjoyable getting to know the people around you."

### *4.4. Future Work*

This work has built upon prior studies on the use of IT questions, and collectively the work has shown that students find the practice to be a fun way to shift mental gears and ease cognitive load during chemical engineering courses. The practice also has benefits regarding improving the student-teacher relationship, encouraging informal student discussion / socializing (which is important in our post-pandemic landscape), and building a sense of classroom community and respect. Thus far the practice of using IT questions has only been investigated in chemical engineering courses. It is desired to build upon this work to determine if success of the practice is transferable across other disciplines, university settings and student/instructor demographics. Another avenue that would be interesting to explore is to cross-reference student perspectives with results from a personality assessment (e.g. DiSC® [28], Emergenetics [29]) since it is possible that how an instructor's personality resonates with students is more relevant than factors such as gender or university setting. Another possible avenue for future research is measurement of the identified "fun" factor of using IT questions in class, perhaps using a Likert-type analysis of student perceptions of the practice, or validated instruments [30].

## 5. Conclusions

A study was performed which investigated student perspectives on the practice of using "Instructor Trivia" questions during mid-class breaks in two settings; the study setup facilitated a look at differences / similarities across two axes, namely type of university (public vs. private) and instructor gender (male vs. female). The study also aimed to probe connections between use of IT questions and factors such as student motivation and intrinsic value of the practice. It was found that regardless of university type or instructor gender, students uniformly approved of the practice, even finding the IT questions fun and engaging. This finding informed student perspectives on motivation, as it emerged that students felt the IT questions not only provided a welcome break from the cognitive load of engineering coursework, but also did so in a way maintained student engagement and stimulated further learning. Student comments also indicated there was significant intrinsic value of the use of IT questions in the realm of student-instructor relationships, student-student relationships, and even forming a healthy overall classroom community. Future research will further investigate the impact of instructor/student demographics on student perceptions of the practice of using IT questions, and attempts will be made to further investigate student enjoyment of the practice.

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