

# Student Behaviors and Their Effects in an Asynchronous Lecture with Face-to-Face Q&A Sessions

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**Abstract:** This study examines student questioning behaviors and learning outcomes in an asynchronous university lecture supplemented with scheduled face-to-face Q&A sessions. Using system logs and questionnaire data from first-year students, this study explores how students utilized these inquiry methods and how their behaviors relate to assignment completion.

**Keywords:** Asynchronous instruction, Question-support methods, Learning analytics

## 1. Introduction

Student questioning behavior is widely regarded as an important indicator of active learning engagement (T Santoso & others, 2017). When students are able to articulate uncertainties and receive timely feedback, they can clarify their misconceptions and adjust their learning strategies. However, many students hesitate to ask questions due to psychological and social barriers, such as the fear of making mistakes publicly or uncertainty about how to formulate questions appropriately.

Various instructional approaches have been proposed to mitigate these issues, including flipped classroom models and ICT-based inquiry tools (Shunya Suzuki & others, 2023). Flipped classrooms typically emphasize discussion or application activities during synchronous class time after students have completed preparatory work. In contrast, the instructional approach examined in this study introduces scheduled face-to-face Q&A sessions within an otherwise asynchronous lecture framework to support students when their understanding becomes insufficient to proceed with assigned tasks.

The purpose of this study is to examine how students use various inquiry methods in this type of lecture design and how their questioning behaviors relate to assignment completion. Rather than evaluating causal effects, this study adopts an exploratory perspective to clarify patterns of student behavior and discuss their educational implications.

## 2. Research Background

From a learning perspective, questioning can be interpreted as a behavioral response that externalizes uncertainty and signals the need for support. In asynchronous learning environments, students are required to regulate their learning with limited immediate feedback, which increases both cognitive and affective demands.

Previous research suggests that lowering the barrier to inquiry, such as through immediacy or accessibility, can encourage students to seek assistance (T Santoso & others, 2017). However, question frequency alone does not fully explain learning outcomes, as task context and available support channels also shape questioning behavior.

Within this framework, face-to-face Q&A sessions function as a low-barrier inquiry mechanism that enables immediate, context-sensitive interaction. In this Q&A session, questions are not posed in an open format among the participating students; instead, students who have questions approach the instructor and engage in one-on-one Q&A interactions.

Asynchronous inquiry tools, such as email, complement this support by enabling delayed reflection and access to previously addressed questions.

### 3. Structure of the Lecture and Methods for Submitting Questions

The lecture design was implemented in a mandatory first-year information literacy course. The study targeted a total of 167 enrolled students, and the course was conducted during the first semester in 2025. The lecture materials and assignments were distributed three days prior to the face-to-face Q&A session, and students were allowed to make multiple attempts until the submission deadline, which was set to be three days after the Q&A session (Shin'nosuke Yamaguchi, & others, 2025).

Outside of class hours, students may submit questions to the instructor using the Question Database or by email. To facilitate information sharing, all questions submitted to the database and their corresponding responses are made accessible to other students. However, to ensure that students feel comfortable submitting questions, the names of the students who post questions are not displayed. Email was an alternative for students who prefer not to have the content of their questions visible to others or who find the Question Database system difficult to use.

We aggregated the content, frequency, and number of students associated with questions submitted through each support modality, namely, face to face Q&A sessions, the question database, and email-based inquiries. We also recorded the number of email inquiries and the number of students who sent them. Based on these aggregated data and the responses collected from the student survey, we report on students' learning-related behaviors in the following section.

### 4. Students' behaviors in response to learning difficulties

To examine the types of actions that students took other than asking questions when they encountered learning difficulties, we administered a questionnaire to the students. The questionnaire was administered on the final day of the course, and responses were collected from 150 students.

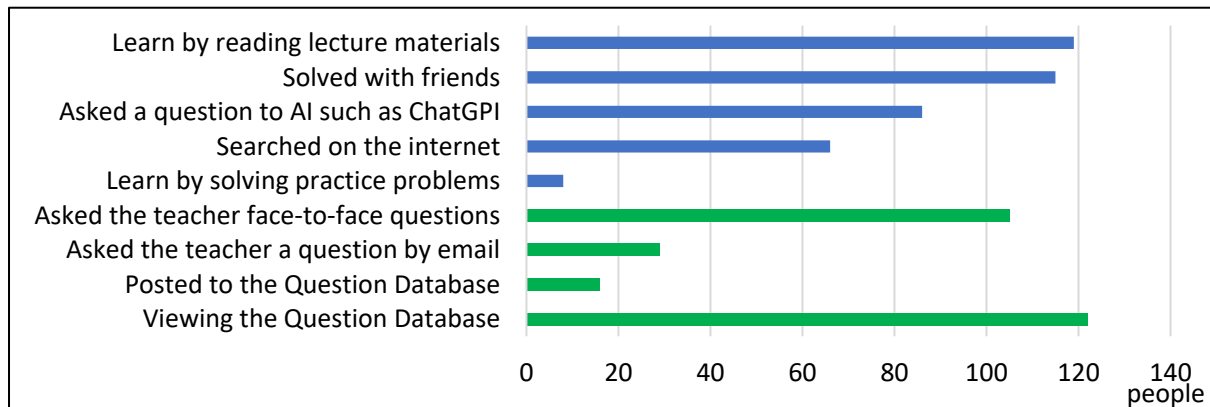


Figure 1. Student behavior toward difficult lectures and assignments

Figure 1 summarizes students' reported behaviors when they encountered difficulties during the lecture. The items on the vertical axis of the graph represent the actions taken by the students. Among these items, the first five items indicate the number of student responses obtained from the questionnaire, whereas the last four items represent the aggregated counts of actual users derived from the usage records.

The results indicate that students employed a wide range of learning strategies, including reviewing the lecture materials, searching online resources, using AI-based tools, collaborating with peers, and asking questions in other inquiry channels. Although face to face questioning is subject to time constraints, we conclude that it remained the most accessible

inquiry method for students, as it allows for direct verbal interaction and immediate inspection of the student's device screen.

The main categories of the questions were as follows: 142 inquiries concerned computer setup and the installation of software required for learning, 105 related to the lecture content, and 99 addressed assignment-related issues. In addition, the number of face-to-face questions was concentrated in the first half of the lecture period, with 338 questions recorded by the seventh session out of fifteen, whereas only 71 questions were recorded from the eighth session onward.

## 5. Effect of face-to-face Q&A sessions

In the face-to-face Q&A sessions, students asked not only questions related to the lecture content and assignments but also many questions concerning the installation of the required tools, including text editors, Linux virtual environments, and program development environments. These types of questions represent a barrier that students encounter prior to engaging in substantive learning.

When these types of questions are addressed through asynchronous support methods such as a question database or email, providing an immediate response is difficult. As a result, students are often unable to make any progress in their learning until they receive a response.

The mean overall assignment completion rate was 95.8% among students who engaged in face-to-face questioning, compared with 90.0% among those who did not. Students who asked questions demonstrated a slightly higher completion rate. We argue that stagnation at this pre-learning stage can not only reduce students' opportunities for learning but also diminish their motivation to engage in asynchronous lectures.

On this basis, we evaluate the face-to-face Q&A sessions as having functioned effectively as a support mechanism that helped students become accustomed to the learning processes of the asynchronous course. In the latter part of the course, when the configuration of the computing environments had been largely completed, the number of questions decreased substantially.

When assignments required procedural integration or troubleshooting, immediate face-to-face interaction appeared particularly valuable. This implies that the role of Q&A sessions varies according to the nature of the learning challenges.

## 6. Conclusion

This study examined how students used different inquiry methods in an asynchronous lecture supplemented with face-to-face Q&A sessions. The findings suggest that face-to-face Q&A sessions were used extensively during the first half of the course as a means of supporting students until they became accustomed to the learning process.

A slight difference was observed in the overall assignment completion rates between students who engaged in face-to-face questioning and those who did not. However, whether this difference can be attributed to the effects of face-to-face Q&A sessions remains unclear. In future studies, we plan to examine the learning behaviors of students who were supported through Q&A interactions. Drawing on these findings, our goal is to design and implement support mechanisms that facilitate the efficient resolution of students' learning difficulties.

## References

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