

# Developing Question Asking Skills through Collaboration

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In order to ask questions, one has to know enough to know what to ask (Miyake & Norman, 1979). This could create a problem in learning situations because the novices who need information tend not to be able to identify what to ask. In this paper we demonstrate that a small group discussion could circumvent this problem. It raises both the number and the quality of questions by novice learners. We will also discuss its implications for college level curriculum design.

## Procedure

Eighteen juniors of cognitive science major were asked to watch a series of video lectures of 45 minutes each on the learning sciences, and to ask questions, either with or without discussion after the video. After the open question asking session, they wrote down questions they could not ask during the open session on a sheet of paper individually. They watched the video once a week, for six weeks. Same set of the students alternated the two conditions, starting with the “without discussion” condition in the first week, then “with discussion” the second week, and so on. When they discussed, the discussion session lasted about five minutes. The students formed groups of two to three on their own. The open questioning session was about 10 minutes. All the questions, spoken and written, and the protocols of the discussions were collected and categorized into types of questions and exchanges.

## Results

When the students had the chance to discuss after the video, they asked 143 questions, both spoken and written. In addition they asked 91 questions during the discussions. In contrast, when they did not discuss, they asked 82 questions in total. Adding a five minute small group discussion contributed to raise the number of questions.

To examine the quality of the questions, we categorized them into three types, clarification questions, content confirmation questions, and critiquing questions. A clarification question is a question to clarify some ambiguous points, or ask for explanation of the terms used, or the points made in the lecture. In that sense it is a “passive” question. A content confirmation question is a question to confirm whether the viewer’s own interpretation fit the logic of the lecture. Asking a content confirmation question requires some positive understanding by the students. A critiquing question is to examine the points made in the lecture and give an alternative interpretation to it. It is the most positive question we observed in the data. We assume clarifying is the simplest and the easiest, while critiquing is the hardest. For the questions asked during the discussions, some were “solved” while some others remained unsolved but “elaborated” and asked during the open questioning session.

Table 1 summarizes the number of questions according to these categories. More than 71% of the clarifying questions were solved during the discussion, but the students on their own could solve only 1 out of 6 critiquing questions.

Table 1: Number of questions per category

	Clarify	Confirm	Critique
During disc.	63	74	6
Solved	45	36	1
Elaborated	6	28	14
Open w/disc.	11	62	18
Without disc.	26	51	5

Table 1 also shows that many questions tentatively asked during the discussion were elaborated and asked in the open session. The pattern indicates that the discussion facilitated positive questioning.

In order to examine the effects of the amount of discussion, we examined the frequency of turn taking, or shifting of speakers, as an indicator of the chances of getting exposed to others’ comments and opinions. We divided the groups into three according to the turn taking frequency, High, Middle, and Low, with the average turn taking frequencies of 106, 37, and 4 respectively. Table 2 shows the average number of questions per frequency.

Table 2: Question quality by turn taking frequency

	Clarify	Confirm	Critique
High	4.2	8.5	1.0
Middle	4.7	3.0	0
Low	0.8	0.2	0

The higher turn taking appears to be related to higher order question asking. This may indicate the experience of asking good questions through discussion could help develop question asking skills.

## Discussion

Having just a short discussion appears to help students ask questions, experience raising the quality of their own questions. To see the relevance of this result in real classroom, we examined the styles of questions students ask in a series of collaborative college classes. Eighty-six students majoring in cognitive science engaged in small group discussions in 8 classes in two years, from 2004 to 2005 (Miyake, 2005; Miyake & Shirouzu, 2006). We have examined and compared the styles of questioning for different semesters.

As they accumulated experiences of asking questions during discussions, we could identify the increase in sophistication in questioning styles, which often resulted in more scientific interaction. It also indicates that the process takes time. Detailed analyses of this kind of data would help model the effective collaborative learning.

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