

8-1-2011

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UNIVERSITY OF NORTHERN COLORADO

Greeley, Colorado

The Graduate School

INSTRUCTOR-INITIATED QUESTIONS AND STUDENT PARTICIPATION
IN COLLEGE CLASSROOM DISCUSSION

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

Christopher A. Hill

College of Education and Behavioral Sciences
School of Applied Psychology and Counselor Education
Program of School Counseling

August, 2011

This Dissertation by: Christopher A. Hill

Entitled: *Instructor-Initiated Questions and Student Participation in College Classroom Discussion*

has been approved as meeting the requirement for the Degree of Doctor of Philosophy in the College of Education and Behavioral Sciences in School of Psychological Sciences

Accepted by the Doctoral Committee

Steven Pulos, Ph.D., Chair

Teresa McDevitt, Ph.D., Committee Member

Michael Allen, Ph.D., Committee Member

Vishwanathan Iyer, Ph.D., Faculty Representative

Date of Doctoral Defense April 20, 2011

Accepted by the Graduate School

Robyn R. Wacker, Ph.D
Assistant Vice President for Research
Dean of the Graduate School & International Admissions

ABSTRACT

Hill, Christopher A. *Instructor-Initiated Questions and Student Participation in College Classroom Discussion*. Published Doctor of Philosophy dissertation, University of Northern Colorado, 2011.

Active student participation in college classroom discussion has been shown to have a positive impact on learning outcomes. Asking questions represents one way for instructors to encourage students to participate in class. This study explored college students' preferences for instructor questions and their experience of the way their instructors used questions in class. At a small public university, 232 undergraduate college students and eight instructors from three (e.g., Business, Nursing, Psychological Sciences) schools were surveyed. Analysis of the survey data revealed no significant differences between student preferences for instructor questions across the three schools, although there were some significant ($p < 0.0025$) differences between schools in students' experience of their instructors' use of questions. Students had preferences for questions that encouraged learning, but appeared sensitive to being embarrassed in front of their classmates. Students discriminated between those types of instructor question or questioning technique that promoted learning and those instructor behaviors that they associated with the risk of embarrassment. Instructors who use questions to encourage student participation should recognize that students have preferences for certain types of instructor question and for certain questioning techniques. Students' preferences may represent a factor of their willingness to respond to questions and actively participate in class

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CHAPTER 1

INTRODUCTION

Many instructors have probably experienced those occasional highlights in classroom discussion when student participation becomes self-sustaining. The focus of the classroom shifts from the front of the room and, as a group, the students pick up the conversation and move it forward. Experiences are shared, ideas are expressed and analyzed, questions are asked and answered, and the instructor steps back from driving the learning to simply supporting it. However, instructors are more likely to have experience with the opposite; students are unresponsive, appear checked out, or a predictable few provide occasional short answers to direct questions. The instructor talks to fill the awkward silences until his or her voice is the only sound which fills the room until the class period is ended.

Statement of the Problem

Asking questions of students would seem to be a simple and very direct way to encourage students to talk in class. Yet there is little research to explain why some instructor questions stimulate the kind of vigorous dialog described above, while others do the opposite. How do students and instructors experience instructor questions, and how may the experience on both sides relate to students' willingness to speak out in class?

Background of the Problem

According to researchers, such as Howard (2002) and Rocca (2010), there is strong evidence that student participation has a positive impact on learning outcomes. The use of discussion helps students to develop: (a) critical understanding, (b) self-awareness, (c) appreciation for diverse perspectives, and (d) the ability to take action (Brookfield & Preskill, 1999). In addition, students learn better (Weaver & Qi, 2005), are more motivated (McKeachie, 2006), and active student engagement promotes deep learning (Kember & Gow, 1994). Also, the use of discussion develops higher-level cognitive skills (Delaney, 1991; Ewens, 2000; Gilmore & Schall, 1996; Wade, 1994). Nevertheless, research findings (Howard, Short, & Clark, 1996; Lammers, 2002; Nunn, 1996) suggest that actual student participation in classroom discussion is low, and it is the instructors rather than the students who do most of the talking. Nunn found that, in an early study conducted by Karp and Yoels (1976), 4-6 students accounted for 75% of the total interaction in classes of more than 40 students. Howard and Henney (1998) found that, in an average of 31 interactions per session, over 29 (90%+) were made by roughly 5 talkers, and over half of the students observed did not contribute a single interaction in the observed class discussions. Typically, the amount of class time devoted to student discussion is small.

Researchers, like Fassinger (1995a) and Nunn (1996), vary widely in their opinions about the real influence of instructors in the classroom, and the instructor-related factor is only one of a number of notable influences associated with classroom participation (Nunn). How these factors influence classroom participation is not

completely understood; however, what is becoming clear throughout much of the research is how they interact dynamically and interdependently to produce their effects. In addition, the perceptions and perspectives of both students and instructors are not monolithic. Students vary in their level of classroom anxiety (McCroskey, Richmond, & Bennett, 2006), and instructors vary in their beliefs about teaching, even though their teaching methods may appear similar (Burkill, Dyer, & Stone, 2008). Such variety should be taken into account wherever possible.

Dallimore, Hertenstein, and Platt (2004) identified the use of effective questions as a vital instructor behavior that promotes college classroom interaction. However, no researcher has explored the different types of instructor questions and the way that instructors use them from the perspective of both students and their instructors. Within the context of other influences on participation, in this study, the researcher examined both instructor questions and the way they were used by instructors.

Purpose of the Study

With the use of a survey instrument developed for this study, this researcher explored the use of instructor questions from the perspective of both students and instructors. How do instructors use questions in the classroom, and how are questions experienced by students and instructors?

Research Questions

The following research questions guided this study.

- Q1 What kinds of questions do instructors ask, and how do students experience them?

Q2 What kind of instructor questions do instructors and students prefer?

Q3 How do students' and instructors' experiences affect their preferences?

Rationale

It is hoped that the findings from this study will provide insights for classroom instructors about the factors that influence their students to respond to questions in class. These insights may help instructors to increase the number of students who participate in the classroom and increase the learning outcomes of their teaching.

Definition of Terms

Instructor: a classroom teacher in a postsecondary college or university, including full, associate, adjunct professors, and teaching assistants.

Instructor Questions: verbal inquiries made by college classroom instructors, directed to individual students or the whole class.

Student Participation: topic-related verbalizations by students, either responding to questions addressed to them individually by the instructor, responding to questions addressed to whole class group, or volunteering comments as a part of classroom discussion.

Class Discussion: a topic-related conversation between students and the instructor in a college classroom.

Chapter Summary

Despite evidence, which shows that active participation by students in classrooms is associated with a number of positive learning outcomes, student participation remains low, both in terms of the amount of class time devoted to discussion and the number of

students who participate regularly. Instructor questions appear to represent an invitation for students to speak in class, and research (Dallimore et al., 2004; Weaver & Qi, 2005) suggests they are one instructor behavior that has an influence on student participation. However, there has been no research on how different questions are perceived by students and instructors, and which types of instructors' questions are more likely to stimulate student participation.

As presented in Chapter 2, this researcher explored a range of potential factors that seem to be associated with student participation in college and university classrooms. In addition, the topic of instructor questions are addressed, as one of these interacting factors, which may operate both directly and indirectly to produce an increase in classroom participation.

CHAPTER 2

REVIEW OF LITERATURE

In this study, the author examined how instructor questions are used and experienced from the perspective of both students and instructors. Although the topic of instructor questions has received little research attention at the higher education level, student participation in college and university classrooms has been the focus of several recent studies. Summarized in the following review of the literature are the classroom, student, and instructor-related factors that seem to be associated with participation. Within this context, this researcher examined the findings of those studies related to instructor question types, recognizing that most of this research is from elementary and high school classrooms. Finally, the research into the particular association between instructor questions and student participation is described.

Definition of Classroom Participation

As Rocca (2010) noted, although all professors tend to recognize the term, class participation, and many use it in the calculation of student grades, the specific determination of what does and does not count as participation varies slightly between instructors and researchers. Student preparation, contribution to discussion, group skills, and attendance are some of the interpretations used in practice. In this review, classroom participation is defined as the overt verbal comments, responses, and questions that students make during class that, generally, are related to the topic under consideration

(Fassinger, 1995b). In the context of instructor questions, student participation would be demonstrated in a range of different responses to questions. Responding to questions addressed to them individually by the instructor would represent the lowest level of student participation. Responding to questions addressed to whole class group and volunteering comments in a classroom discussion would represent the highest levels of student participation.

Factors Related to Student Participation in College Classrooms

There have been attempts made to identify the factors that promote or inhibit the amount of participation in classroom discussion. The research scope has varied from the deliberately general (Christensen, Curley, Marquez, & Menzel, 1995; Nunn, 1996) to a tightly-defined research focus (Fassinger, 2000). The findings from these studies are useful, not only to better understand the important operating variables that influence student participation, but also to identify those factors over which instructors have direct control or indirect influence.

The research methodology has differed in these studies, as well as the research tools employed to collect the data. The methods, which have been employed, have included the use of: (a) student surveys (Auster & MacRone, 1994; Christensen et al., 1995; Fassinger, 2000; Myers et al., 2009; Weaver & Qi, 2005); (b) trained student observers (Auster & MacRone; Christensen et al.; Fassinger, 2000; Howard, 2000; Howard & Henney, 1998; Howard, Short, & Clark, 1996; Myers et al.); and (c) surveys and interviews with instructors (Fassinger, 1995a; Fritschner, 2000). Although different researchers have identified a wide range of contributing factors and varying levels of

influence for different factors, it will be made clear that student participation in classroom discussion is associated with a relatively small number of closely related and interacting factors. In addition, a number of factors appear to demonstrate a notable association with student participation, although their association is less clearly integrated. Most may be grouped into three areas: (a) classroom, (b) student, and (c) instructor factors (Rocca, 2010).

Classroom Factors

Repeatedly, class size has been shown to be a notable influence, which affects the frequency of student participation (Fassinger, 1995a, 2000; Fritschner, 2000; Gleason, 1986; Howard & Henney, 1998; Hyde & Ruth, 2002; Myers et al., 2009; Weaver & Qi, 2005). Crawford and Macleod (1990) found that students in smaller classes participated more than students in larger classes. In smaller classes, students appeared to be less anxious about speaking in front of their peers (Horton Smith, 1992) and participated more when they were physically closer to the instructor (Gleason, 1986). In Nunn's (1996) study, there was a marked decrease in student participation, as well as the percentage of students who participated, when the number in the class was higher than 35. In the Myers et al. study, participation showed a significant ($p < 0.01$) decline when the class size was greater than 50. Weaver and Qi did not find that class size notably shaped participation, but suggested that student reports may misrepresent the importance of this factor. Howard and Henney found that large class size inhibited female students' participation more than males as well as for traditional students (i.e., students less than 25 years of age) more than nontraditional students (i.e., students more than 25 years of age).

Although classroom participation becomes more difficult as the class size increases (Gleason, 1986), some researchers have specific reasons for the differences in participation between large and small classes. Weaver and Qi suggested that there is more lecturing in large classes and fewer opportunities for interaction. Also, students in smaller classes cannot hide as easily.

Certain seating arrangements are more conducive to student participation; the use of traditional row and column seating allows for less participation than U-shaped, circular, or semicircular arrangements (Fassinger, 1995b; Fritschner, 2000). Also, participation increases when it is assessed as part of the students' grades (Christensen et al., 1995; Dallimore et al., 2004; Fassinger, 1995b).

Thus, instructors may seem to have little control over the size of class they teach. However, they may be able to influence student participation through their grading policies (Dallimore et al., 2004; Fassinger, 1995a, 2000; Horton Smith, 1992).

Student Factors

It is a challenge to examine the research about student factors related to classroom participation, because it is difficult to differentiate the influence of any one particular factor from another (Rocca, 2010). Student factors, which appear to be associated with classroom participation, may originate in individual students or from the combination of students in groups. An examination of both is relevant to an understanding of this critical element in classroom participation and the related potential influence of the instructor. Also, Allen, Long, O'Mara, and Judd (2008) suggested that, in addition to transient or situational student factors, there are more permanent student characteristics and traits that

are associated with certain students' willingness to participate in class. Such factors include gender and age, communication apprehension, as well as others.

Gender and Age

According to Rocca (2010), a substantial number of researchers (Bowers, 1986; Howard & Henney, 1998; Karp & Yoels, 1976) have looked for an association between: (a) classroom participation and gender of the students, (b) gender of the instructor, or (c) the interaction of the genders for both. Although some researchers (Fassinger, 1995a; Howard et al., 1996) have found that female students participated more than males, others have found data which supported such a difference was not pervasive or robust (Constantinople, Cornelius, & Gray, 1988), or that student gender had only a small association (Weaver & Qi, 2005).

For Constantinople et al. (1988), the gender of the instructor was a stronger indicator of the amount of student participation than the gender of the student. In their study, female instructors were associated with more participation by students of both genders, although this may have been because the male instructors taught larger classes more frequently, where formal lectures were more common. Brooks (1982) found that, with female instructors, male students spoke and interrupted more often, and this researcher suggested that the reason for this was that female instructors encouraged participation more than male instructors. Howard and Henney (1998) found that students were more likely to participate more frequently in male instructor classes, but a higher percentage of students was more likely to participate with female instructors. Overall, it seems that the effect of instructor gender related differences on student participation may

be associated with the ability of female instructors to create a more comfortable classroom environment (Rocca, 2010).

However, there are other more important factors associated with participation than gender, primarily, student age. Older, nontraditional students were more likely to participate than traditional aged students (Fritschner, 2000; Howard et al., 1996; Weaver & Qi, 2005). Fritschner suggested that this may be because traditional students are concerned about what their peers think, whereas nontraditional students are more concerned about what their instructors think.

Communication Apprehension

In the Allen et al. (2008) study, the researchers placed student communication apprehension (CA) within the context of classroom interaction. It has been recognized for some time that not all students in a classroom are equally likely to participate, and some 20% of college students can be classified with CA (McCroskey, 1977b, 1983; Richmond, 1984, 1998). McCroskey (1977a) defined CA as “an individual’s level of fear or anxiety associated with either real or anticipated communication with another person or persons” (p. 27). The condition, CA, fits into the temperament genre, and it is inherently trait based. According to McCroskey, it was suggested that some individuals inherit a neurotic, introverted temperament and possess lower thresholds for anxiety activation. When they are confronted with novel stimuli, perceived threat of punishment, or cessation of reward, these individuals are predisposed toward anxiety manifested as CA. Further, the CA may manifest itself as avoidant classroom behavior, which was broadly

classified by Mehrabian (1972), as nonverbal immediacy, the degree of perceived physical or psychological closeness between communicators.

Allen et al. (2008) tested the proposition that individuals, who scored high in CA, in comparison to other individuals who scored lower in CA, would not only be less immediate in their own interactions with classroom instructors, but would perceive their instructors as less immediate in their behaviors. That is, they would exhibit fewer of those behaviors (e.g., smiling, eye contact) that might encourage psychological closeness and perceive their instructors' nonverbal behavior as less immediate also. Based on data collected from 265 students in communication classes at three medium-size universities in the northeast, the researchers looked for interactions between a number of surveyed factors, which included: (a) CA, (b) nonverbal immediacy, (c) students' and instructors' socio-communicative learning style, and (d) learning outcomes. Socio-communicative style refers to the extent to which an individual is assertive (i.e., speaks for one's self) and responsive (i.e., sensitive to others) in his or her communications with students. Essentially, this is the extent to which the communication addresses the speaker's own feelings and the feelings of the audience.

The Allen et al. (2008) findings showed that high CA students reported significantly ($p > 0.001$) lower levels of teacher immediacy than either moderate or low CAs. Also, high CA students: (a) perceived their instructors as less responsive than moderate or low CAs, (b) expected to receive lower grades than low CA students, (c) indicated they were less likely to use the behaviors taught in the course, and (d) were less satisfied with their instructors than low CAs. Interestingly, student perceptions of

instructor immediacy ($p < 0.001$), assertiveness ($p < 0.01$), and responsiveness ($p < 0.05$) were significantly and positively correlated with the students' perceptions of their own immediacy, assertiveness, and responsiveness.

Based on the Allen et al. (2008) results, these students came to class with a range of temperamental inclinations that influenced their interactions with students and instructors. Instructors should be aware of this issue and recognize that some students, potentially those with high CA, may not show the same willingness to participate in class discussion as those with less CA. However, awareness of students' low immediacy behaviors may not be helpful, since these same students are already inclined to attribute their own lack of participation to their instructor's intentional distancing. In short, instructors must work harder to reach their more apprehensive students than they do with their less apprehensive students. Instructors still appear to have an important influence on participatory behavior, but they must apply their influence carefully.

Confidence

While the effects of CA on participation may persist across a student's classes and instructors, there is evidence that more short-lived situational classroom confidence has a notable association with a student's decision to participate in class (Fritschner, 2000; Howard & Henney, 1998; Hyde & Ruth, 2002; Weaver & Qi, 2005). Students, who may not be particularly high in CA as a trait, may be anxious frequently in certain public situations (Rocca, 2010). Bowers (1986) found that 70% of students in his study reported feelings of CA at least occasionally, and approximately 30% of the students reported feeling it more than once per week.

Participation

A number of related student factors may interact with feelings of confidence and participation in the classroom (Rocca, 2010). Preparation for class has been a factor identified in some studies (Christensen et al., 1995; Weaver & Qi, 2005).

Students' level of confidence in the class has been found in several studies (Fassinger, 1995b, 2000; Howard et al., 1996; Weaver & Qi, 2005), as have the related factors of: (a) feeling prepared (Christensen et al., 1995; Weaver & Qi); (b) being interested in the class (Christensen et al.; Fassinger, 1995a); and (c) liking the topic (Christensen et al.). In addition to their influence at the individual level, affective factors seem to operate at the classroom level in the way that the students perceive the classroom climate.

Classroom Climate

How students feel they appear in the eyes of their classmates has been shown to influence class participation (Howard & Henney, 1998). A climate where the students and the instructor respect each other, where the students respect one another, and where the instructor cares about the students is conducive to participation (Crombie, Pyke, Silverthorn, Jones, & Piccinin, 2003; Dallimore et al., 2004; Fassinger, 1995b; Wade, 1994).

Although individual student factors, as described earlier, would appear to contribute directly to the amount and nature of classroom participation, seemingly, the overall classroom climate represents a factor that is accessible to other influences during the class itself (Fassinger, 2000). Central to this context would be the influence of the instructor.

Instructor Factors

There is no complete agreement about the extent of instructor influence or the way it operates. Karp and Yoels (1976), as already noted, found that teacher actions were a crucial influence in participation. Unsurprisingly, overtly aggressive instructor behaviors would be associated with reduced contributions by students (Wade, 1994). However, beyond these instructor behaviors where the impact on students is so clear and direct, there may be other instructor actions that influence participation in more indirect or subtle ways.

Nunn (1996) found a significant relationship ($p < 0.05$) between the amount of time spent in student participation and teaching techniques. Frequent student responses were that the teacher: (a) praises student, (b) questions, (c) asks for elaboration of student question/answer, (d) repeats student answer, (e) uses student name, and (f) corrects wrong answers. Nunn suggested that teaching techniques are strongly related to classroom participation. In fact, 96% of the students surveyed reported that instructors' use of praise encouraged or greatly encouraged student participation in discussion, whereas the use of criticism discouraged or greatly discouraged participation. Also, 95% indicated that the presence of a supportive environment encouraged or greatly encouraged discussion. The factors, which have been found to increase student participation, include: (a) know and use student names; (b) praise and encourage students (Auster & MacRone, 1994; Nunn); (c) call on students when they volunteer and call on them by name; (d) ask analytical rather than factual questions; and (e) give students ample time to answer (Auster & MacRone).

Although instructor factors did not remain in her final list of significant variables, Fassinger (1995a) did not reject the idea that instructors have no impact on class participation. Instead, she suggested that their influence is indirect, such as in course design. For example, instructors might include opportunities for group work in class so students receive support from each other. Also, Fassinger (1995a) suggested that instructors might indirectly increase their impact by the development of activities to improve student confidence.

Question Types and Learning Outcomes

Asking questions represents a traditional and predominant teaching technique at all levels of education, and questions are used extensively in classroom discourse at all levels (Dillon, 1982). Much of the research into questions and questioning techniques comes from elementary and high school classrooms (Gayle, Preiss, & Allen, 2006). The insights that these research findings offer are useful, but the interaction between instructors and students in colleges and universities is quite different from the interactions between teachers and students in Grades K-12. For example, college and university teachers were found to ask 18.50 questions in a 40 minute period, which is much less than what is found in both elementary and secondary classrooms (Dillon, 1990).

Gayle et al. (2006) identified numerous published studies in this area of teacher questions, assessed their methodological strengths and weaknesses, and attempted to draw some overall conclusions about the efficacy of teacher-initiated classroom questions. They described 40 years of quantitative and qualitative research as well as the key recommendations from articles of general pedagogical advice on the use of questions

with students. Although they observed that scholarly interest in the topic appeared to decrease in the 1990s, they reviewed the existing research and organized the research studies according to four relationships associated with instructor questions:

1. the relationship between oral questions and student learning,
2. the relationship between the level of oral question and student achievement,
3. the relationship between the level of oral questioning and the level of response, and
4. the relationship between the level of oral questioning and the amount of wait time required or provided.

Gayle et al. (2006) converted the summary statistics of each study into correlations, in order to quantify the magnitude of outcomes attributable to oral question asking procedures. The correlations were weighted for sample size and then averaged; each average correlation was assessed to determine if the variance of the observed sample correlations was larger than expected by random error. To detect a moderator variable, the sum of squared error was tested with use of a Chi-square test. A non-significant Chi-square indicated that the amount of variability was probably the result of chance, whereas a significant Chi-square indicated the result of some moderating variable. Their key findings were:

1. oral questioning had a moderate, positive effect on student achievement, although the presence of a moderating variable was indicated;

2. the use of higher order questions produced a significant ($p < 0.01$) increase in student achievement, in addition to the benefit of questions in general, as described above;
3. higher order questions were associated with higher order responses; and
4. higher order questions required only slightly more wait time than lower order questions.

Higher order questions are those that would be expected to stimulate a deeper level of intellectual behavior by the person being asked the question. The different question levels are associated with learning taxonomies that organize intellectual behaviors according to the complexity they require of the learner, “with remember being less complex than understand, which is less complex than apply, and so on” (Krathwohl, 2002). The original, and perhaps most widely known organizing taxonomy was initially proposed by Benjamin S. Bloom, then Associate Director of the Board of Examinations of the University of Chicago in 1956. In it, six major categories were defined in the cognitive domain, Knowledge, Comprehension, Application, Analysis, Synthesis, and Application; each were broken down into sub-categories. The categories were organized from simple to complex and represented a cumulative hierarchy; that is, mastery of each intellectual process was a prerequisite for the next. Many research studies have been conducted within the framework of the original taxonomy, although it has since undergone a major revision (Krathwohl). In its latest revision, the original six categories have undergone modification and now form one dimension, Knowledge. The revised taxonomy, organized in table form is shown in Table 1. In the revised table, this

dimension, represented in the table columns, describes what is being learned. Consistent with the original taxonomy, the categories describe content of ascending complexity; Factual Knowledge, Conceptual Knowledge, Procedural Knowledge, and Metacognitive Knowledge. Metacognitive Knowledge is new to the revised taxonomy and involves knowledge about cognition in general as well as awareness of and knowledge of one's own cognition (Krathwohl).

The other dimension of the table represents the Cognitive Process, the action performed on the Knowledge categories or “what is done with or to the content” (Krathwohl, 2002, p. 214). In ascending order of complexity, the categories are Remember, Understand, Apply, Analyze, Evaluate, and Create (see Table 1).

Table 1

The Revised Taxonomy Table with Question Examples

The Knowledge Dimension	The Cognitive Process Dimension					
	1 Remember	2 Understand	3 Apply	4 Analyze	5 Evaluate	6 Create
A. Factual Knowledge	Question 1					
B. Conceptual Knowledge		Question 2				Question 3
C. Procedural Knowledge						
D. Metacognitive Knowledge						

Different questions would be constructed to test what the learner is doing (e.g., Cognitive Process Dimension) with different levels of content (e.g., Knowledge Dimension), so questions might intersect the two dimensions in a specific cell, as shown in Table 1. For example, Question 1 in Table 1, “Which organs in the human alimentary canal produce enzymes that digest proteins?” tests the simple recall (e.g., Remember) of Factual Knowledge and is shown in cell A1. The question, “Why does the liver store glycogen and not glucose?” would be asked to test the learner’s ability to Apply the appropriate Conceptual Knowledge. It would represent a higher-order question and is shown in cell B3. The higher-order question, “How would you create a meal plan for a pregnant woman to meet her daily needs?” would be intended to test the Create process with Conceptual Knowledge and would occupy cell B6.

The Gayle et al. (2006) summary supports the instructional practice of asking a variety of different questions to students, and asking particular questions for particular instructional purposes. Table 1 shows examples of questions that explore students’ knowledge at different levels which require varying levels of cognitive processing. As the questions fill cells moving down and right on Table 1, they are expected to engage knowledge and processes of increasing complexity, and from the research, elicit answers of correspondingly higher orders. The presumption is that the use of higher-order questions stimulates higher-order thinking.

Although it appears that higher-order questions appear to stimulate higher-order thinking, in terms of student participation as defined earlier, it is not immediately clear from the literature whether the use of higher-order questions necessarily produce more

student participation. In the Gayle et al. (2006) research summary, it was noted that higher-order questions were associated with higher-order responses, and it might be assumed that higher order answers require more talking on the part of students.

However, the association between the complexity of the answer to a question and the number of words required to express it may not be the only factor in the relationship between the type of instructor question and amount of student participation. In addition to the potential to engage different levels of students thinking, also, different types of instructor question may be associated with student-related factors, including those described earlier, that have an affective rather than a cognitive origin.

Instructor Questions and Student Participation

In the research (Bowers, 1986; Fritschner, 2000; Weaver & Qi, 2005) described previously, it was suggested that students come to class with different levels of anxiety about interaction with their classmates and the instructor, and the class, itself, may provide different affective environments that may encourage or dissuade individuals to participate. Answering instructor questions would seem to have the potential for increased student anxiety. Bligh (2000) speculated about the stress that students experience when they are questioned by the instructor in front of a lecture audience. Bligh reported that the heart rate of students in a tutorial group increased by 5-10 beats per minute in the first 30 seconds after a tutor asked a question. Numerous students, not just those with CA (McCroskey & Beatty, 2000), may feel uncomfortable when asked a question by any instructor. Such discomfort will probably result in reduced participation.

Higher-level questions are perhaps more likely to be open-ended questions, that is, questions that have more than one correct answer (Blosser, 1973), compared to low-level questions, such as those that require simple remembering, that require a simpler, more defined, right or wrong answers. Auster and MacRone (1994) found that increased student participation was associated with instructors who ask analytical rather than factual questions and give students ample time to answer. Also, they found that students were more likely to participate if their instructors demonstrated behaviors that showed students that their vocal responses were important and encouraged students when they did respond.

The students' perceived discomfort associated with speaking in front of the class appears to be a recurring and closely inter-related factor related to the types of question instructors use and how they manage the instructor-student interaction. In an analysis of approximately 50,000 words of classroom discourse, Neal (2008) found that the kind of instructor/student interaction that instructors characterized as discussion was often little more than lecturing in disguise. Neal identified the Initiation, Response, and Evaluation (IRE) sequence as a common feature of college classroom discourse. Originally, this question-and-answer sequence was described and characterized by Mehan (1985) in an elementary school context. It begins with an instructor's known answer question, the Initiation, which is followed by the student's Response, and this sets up the instructor's Evaluation in the form of a judgment or commentary. Neal noted that, in the college classroom version of this interactive pattern, often, the known answer question that begins it has a positive and well-intentioned purpose, that is, to refresh students' basic

knowledge, to create rapport, and to invite student participation. Unfortunately, the evaluative end stage does much to cancel the potentially constructive opening. Neal noted the following:

The IRE pattern generates academic authority for the instructor, primarily because the evaluative segment of the pattern allows the instructor the opportunity to judge, gloss, or recast student response and thus to display a differential in knowledge or expertise. (p. 276)

According to Neal, after study of the class transcripts, the IRE sequence, although its use provided an opportunity for interactive discussion, usually, it had the opposite effect. Students, in the face of the instructor's judgment, may become less and less likely to participate, and what appears to be dynamic classroom conversation devolves into an increasingly stilted, instructor focused quizzing session.

Such work as Neal's (2008) would suggest that the instructor, who attempts to redress the balance of classroom interaction in favor of the students, should explore the use of more open-ended questions. Similarly, closed-ended questions might be used carefully to avoid the risks to interaction of repetitive IRE cycles. However, the practical implication for an instructor who reconsiders how he or she uses questions is clear. How the questions are asked seems to be as important as what questions are asked, and poorly executed questions are no guarantee of increased learning or student participation. This was demonstrated by Barnes (1983), who found that 89.3% of questions asked by instructors required only recall of the answer, not comprehension of concepts. Despite a ratio of 47 students to 1 professor, professors talked four times more frequently than students.

*Using Questions to Facilitate
Active Student Participation*

Neal's (2008) observations suggested that, while the use of certain types of questions offers the potential for more student participation, the way that instructors ask questions is worth consideration as well. Here again, research on specific questioning techniques is limited, but a change in the instructional purpose of questions is quite evident. In this new functional context, questions are asked, not to elicit a particular response, but to initiate, sustain, and direct an instructional conversation.

Herbel-Eisenmann and Breyfogle (2005) described an interactive approach for use in middle school mathematics classes that promoted focusing rather than funneling. In a focusing approach, the teacher asks a question and listens carefully to the student's answer. If the answer is not correct, the teacher then follows up with further comments or open questions to encourage the student to explain and develop those initial ideas that may relate to the key concept under discussion. This is the focus aspect of the strategy. Eventually, with the right questions, the student discovers the key concept for him or herself. This is in contrast to a funneling discussion where the teacher offers closed questions and short yes/no feedback until the student matches the instructor's correct answer.

Erdogan and Campbell (2008) investigated the impact of teacher questions, question types, and interaction patterns that coincided with high and low levels of constructivist teaching practices. With the use of qualitative and quantitative methods, they found that teachers who facilitated classrooms with high levels of constructivist teaching practices were very active, and they asked notably more questions than teachers

who facilitated classrooms with low levels of constructivist teaching practices. Also, the teachers who facilitated with high levels of constructivist teaching practices used a greater number of open-ended questions than other types of questions, such as closed-ended or task-oriented questions. Closed-ended questions were used by teachers in the classrooms with high levels of constructivist teaching practices to help students complete investigations, but open-ended questions were used more often to promote student actions that are associated with knowledge construction.

Dallimore et al. (2004) wanted to identify the factors that contribute to quality student participation and discussion effectiveness and the instructors' use of questions was an important feature in their study. Their first research question was, "What instructor behaviors are associated with quality student participation?" The second was, "What instructor behaviors are associated with effective discussion?" Their qualitative analysis of the responses from 68 participants in two graduate management accounting courses produced responses that clustered into six categories:

1. required and graded participation,
2. incorporation of instructor and students' ideas and experiences,
3. active facilitation,
4. asking effective questions,
5. creating a supportive classroom environment, and
6. affirming student contributions and provide constructive feedback.

They found that the technique of cold calling, that is, calling on individual students without waiting for them to voluntarily offer an answer or raise their hand, produced notably more participation.

The Dallimore et al. (2004) findings represented an integration of those from previous studies (Christiansen et al., 1995; Fassinger, 1995a; Nunn, 1996) described earlier in this review as they related to the use of instructor questions and student participation and may suggest two important considerations for instructors attempting to promote student participation. First, the instructor must ask the right questions; choosing those questions that reduce the risk to students of answering incorrectly in front of the class and provide the maximum opportunity for further instructor-student interaction. Second, the instructor must ask the question in the right way; building on the participation opportunities provided by “asking effective questions,” he or she should demonstrate those behaviors that “affirm student contributions” and “create a supportive classroom environment” (Dallimore et al., p. 107).

Chapter Summary

Student participation in college classrooms is associated with a number of interacting factors. Instructors represent one of these factors, although the size of this influence has not been clarified. Instructors may ask a number of different types of question, each associated with producing a particular learning outcome, and having differing potential for student participation.

The research would suggest that the influence of instructor questions cannot be considered in isolation from other factors, notably student factors. Different types of

instructor questions may be asked to engage students at different cognitive levels, but their effect on students' willingness to participate is associated, also, with a number of temperamental and situational affective influences, such as students' individual confidence levels and their assessment of the supportiveness of the classroom climate.

CHAPTER 3

METHODOLOGY

In December 2008, this researcher conducted an initial study with 98 undergraduate students enrolled in educational psychology classes at a small public university. In the final part of this current study, the researcher used the same instrument and methodology developed for the initial study. However, for the current study: (a) the sample was larger, (b) it was conducted with students from a university college and two schools, and (c) instructors were surveyed as well as undergraduates.

Procedures

Initial Study

In the first part of the study, two questionnaires and a set of demographic questions were administered to the 98 undergraduate students in the university School of Psychological Sciences during a class period in the fall semester. The first questionnaire consisted of 20 items, which were used to explore the students' personal preferences about the use of questions in the classroom. In the second questionnaire, the focus was on instructor questioning behavior in the classroom, and it consisted of 20 questions. The factor structure of the two questionnaires (i.e., Student Preferences, Instructor Questions) were first examined separately, then a correlation analysis was conducted between the extracted factors from the two questionnaires to explore any potential relationship

between: (a) the students' experience of instructor questions, (b) instructor questioning, and (c) students' preferences.

Factor analysis of the responses for each of the two questionnaires revealed two factors for each. For the Student Preferences questionnaire, the items, which loaded most clearly on Factor 1, represented positive affect with learning or answering questions, whereas the items that loaded most strongly on Factor 2 indicated strong negative affect related to being called on by the instructor. Although the instructor question items loaded on two factors, also, the identification of the underlying two factors was much less clear. The items that loaded on Factor 1 appeared to relate to effective instructor questions and instructor behaviors (e.g., "Instructors ask questions that encourage discussion," "Instructors ask questions that make students think"). In contrast, the items, which loaded on Factor 2, were related to ineffective questions and questioning practices (e.g., "Instructors ask questions with no clear answer," "Instructors intimidate students with their questions"). A correlational analysis of the relationship between the two questionnaires revealed a statistically significant Pearson correlation value of 0.39 ($p < 0.01$) between Factor 1 of the student preferences items (i.e., positive perception of questions) and Factor 1 of the instructor questions items (i.e., effective instructor questioning).

This relationship suggested that the respondents had a preference for questions and appreciated the effect of questions on their learning when the instructors used questions in an effective way. Students perceived the benefits of answering questions in

class, but the instructor must choose those questions and those questioning techniques to take account of students' feelings about answering questions in front of the class.

The results from the initial study were interesting and confirmed an interaction between the instructor behavior of asking questions, and the student factor, their comfort in answering questions. Statistical analysis of the two scales confirmed that their reliability was acceptable (Field, 2000); reliability analysis of the Student Preference items returned a value of .86 and .73. Generalization of the results is difficult, in that, the sample was drawn from only one university school, and no instructor data were collected.

Research Design

In the current study, this researcher used the items from the initial study, but a larger sample was drawn from the university. The College of Business and the Schools of Nursing and Psychological Sciences were chosen to provide a variety of students and teaching methods. In addition, the sample comprised students as well as instructors. In the choice of the college and the two schools from which the student samples were drawn, some consideration was given to general curricular emphasis and class content of the groups to be surveyed. The original survey was developed with students from the School of Psychological Sciences so that students from this same school were included in the final study sample. In both the initial and final studies, the classes in the School of Psychological Sciences were offered to students planning careers as teachers in elementary, middle, and high schools. Students from the School of Nursing were included to represent another group with a pre-professional curricular emphasis, but with class content based in the natural rather than the social sciences. Students from the

College of Business were chosen after initial faculty contact revealed that many of undergraduate classes are offered to include students with a general rather than a professional interest in the subject.

The primary source of quantitative data in the study was collected from a survey conducted with both the students and the instructors. However, given the relatively small number of instructors who completed surveys, interviews were conducted with instructors to provide additional rich qualitative data on their perspective regarding student preferences and instructor questions.

Sample

The study sample comprised 232 undergraduate students from the College of Business, the School of Nursing, and the School of Psychological Sciences at a small public university. All instructors in the college and the two schools (i.e., approximately 20 from the School of Psychological Sciences, 50 from the College of Business, 20 from the School of Nursing), who taught undergraduate classes during the Fall semester, 2010, were: (a) contacted by email, (b) informed of the study area of interest, and (c) invited to participate in the study. Instructors from the School of Psychological Sciences also included two graduate student teaching assistants. From those instructors who agreed to participate, instructors were selected who taught classes with a mix of teaching methods (e.g., lecture, small group work, student presentations) and used a classroom format amenable to student-to-student and instructor-student interaction. For this reason, classes with 35 or more students and classes where instruction was conducted almost exclusively

by lecture were excluded from the study, as were classes where students were engaged mostly in individual work, class research projects, and lab classes.

Of the instructors contacted in the college and the two schools, eight instructors, who conducted a total of nine classes, were surveyed, and 232 student surveys were collected. The eight instructors included: (a) two from the College of Business (i.e., 63 student surveys); (b) three from the School of Nursing (i.e., 65 student surveys); and (c) three from the School of Psychological Sciences (i.e., 104 student surveys). The respondents included: (a) 1 freshman, (b) 30 sophomores, (c) 99 juniors, (d) 97 seniors, and (e) 5 graduate students ($N = 232$). Of the respondents, there were 65 males and 167 females; the female respondents were in the majority by a factor of approximately 2.6:1.

The students from the college and the two schools varied in composition according to their gender and student level. The College of Business classes were split almost evenly by gender (54:46%, male:female), while nursing (12:88%, male:female) and psychology (22:78%, male:female) class students were predominantly female. Over half of the Business students were juniors, over half of the Psychology students were sophomores, and over 80% of the Nursing students were juniors and seniors. Only one freshman student was represented in a Nursing class. One graduate student was recorded in a Nursing class and four in Psychology classes.

Quantitative Instrument

The original group of items for the Student Preference and Instructor Behavior surveys was developed following a review of the literature. The items were constructed to explore the student (Dallimore et al., 2004; Fassinger, 1995a) and instructor factors

(Auster & MacRone, 1994; Nunn, 1996) identified as relevant by researchers in the context of asking and answering instructor questions. Graduate students in the School of Psychological Sciences reviewed the items for face validity, clarity, and readability, and a final 20 items were developed for each survey with this feedback taken in account.

The two 20 item questionnaires used in the initial study were used again in this study (see Appendix A). The purpose of the first 20 items was to examine student preferences for instructor questions, and the second 20 items were used to examine instructor question behaviors. Although the student survey items were unchanged from the initial study, the items for instructors required appropriate changes in wording. The item, “Instructors intimidate students with their questions,” on page 2 of the STUDENT survey the item was changed to “I intimidate students with my questions” on the INSTRUCTOR survey. In addition to basic demographic information (e.g., Gender, Student Level, Department or School, etc.) in the survey, also, the students were asked what fraction of instructors teaching classes in the college or school (e.g., Business, Nursing, Psychology) asked questions in their classes.

The proposed questionnaires, student consent form, and study design were submitted to the members of the University Institutional Review Board (IRB) for their acceptance and approval. After some minor modifications to the questionnaires, the IRB approval was granted via email on October 2010 (see Appendix B).

Qualitative Instrument

For the interviews, the instructors were asked to respond to four open-ended questions:

1. How do you use questions in your classroom?
2. What kinds of questions do you ask?
3. What influences which students answer your questions?
4. What influences the answers they give?

The responses were recorded and transcribed for further analysis.

Data Collection

Quantitative Data

The survey was conducted during approximately 15 minutes of one class period during the fall semester, 2010. Each student received: (a) a Research Participant Consent Form (see Appendix B), (b) a copy of the survey questionnaire (see Appendix A), and (c) a Scantron Answer Form. At the same time, the eight instructors received Instructor Surveys (see Appendix A).

Qualitative Data

At the beginning of the spring semester, 2011, all of the surveyed instructors were asked to participate in a short interview to provide additional context to the quantitative data collected in the surveys (see Appendix C). Of the eight instructors surveyed, five instructors represented the three schools (i.e., one Business instructor, two Educational Psychology instructors, and two Nursing instructors) and were interviewed. The interviews were recorded and transcribed (see Appendix D), and the data were analyzed.

The following questions were asked in the interviews: (a) How do you use questions in your classroom? (b) What kinds of questions do you ask? (c) What influences which students answer your questions? (d) What influences the answers they give?

Data Analysis

Quantitative Data

The survey data were analyzed using SPSS Version 12 for Windows (2003). After an initial analysis of the demographics, the responses from each of the two questionnaires (i.e., Student Preferences, Instructor Question Behaviors) for both students and instructors were examined separately. The internal consistency of each set of items was examined.

The same factor analytic procedure was applied to each 20 item set. The Kaiser-Meyer-Olkin measure of sampling accuracy and Bartlett's test of sphericity were calculated for each item set to determine whether the collected data were suitable for factor analysis. The number of factors in each scale was determined by the application of the Minimum Average Partial Test on the data from the combined groups as well as the data from individual schools. Then a principal component factor analysis was conducted. If more than one factor was obtained, then the factors were rotated with an oblique rotation (i.e., Promax).

The data analysis generated over 60 tables. The tables that describe the most relevant findings are presented within the body of the text in Chapter 4. The rest of the data tables are presented in Appendix D. In addition, 2 tables (see Appendix D, Tables D7 and D8), which describe the results of the one-way analysis of variance (ANOVA)

and post-hoc tests for the combined groups, were placed in this Appendix because of their length and detail. The prominent findings are summarized in the body of the text in Chapter 4.

Qualitative Data

The qualitative data were analyzed in a systematic process of organization, classification, identification, and reduction, based on what Creswell (1998) described as a *spiral of analysis*. The interview transcripts were read carefully for the emergence of identifiable categories by the researcher and an independent assistant. Both individuals read and re-read the transcripts to recognize those words or phrases that were similar in the data from different questions and different instructors. Often, the same words and phrases occurred in answers to different questions. For example, instructors would answer the question of “How do you use questions?” with answers to describe the kinds of question they asked (i.e., Question 2). As the transcripts were processed, independent categories began to emerge as the data were compared and contrasted by the two readers. In the final analysis, the two readers compared categories and identified a final category list. Subsequently, they grouped the categories into domains related to each of the four interview questions.

Chapter Summary

Presented in this chapter was the methodology used to explore instructors’ and students’ experience of and preferences for instructor questions. The initial study produced some interesting interactions between students’ experience of different types of questions and their preferences.

However, the relatively small size of the sample and its selection from only one university school made generalization of the initial study findings speculative.

In the current study, a larger sample was utilized which involved both students and instructors. This study was conducted in three schools of the university. In addition to the quantitative survey data collected from the students and their instructors, qualitative data were collected from the instructors to provide additional rich data. These analyses are provided in Chapter 4.

CHAPTER 4

RESULTS

The purpose of this study was to explore how students and instructors experience instructor questions, and how the experience on both sides relates to students' willingness to participate in classroom discussion. The 232 students, who were enrolled in one college and two university schools, as well as eight instructors were surveyed, and five of the eight instructors were interviewed to supplement their survey data.

Quantitative Findings

Instructor Question Frequency

In Table 2, the data for Instructor Question Frequency are displayed. For the combined student groups, more than half of the respondents reported that 75% of the instructors in their school asked questions during class. Almost 90% reported that 50% or more of their instructors asked questions during class (see Table 2).

Table 2

Instructor Question Frequency, Combined Groups

Percent of Instructors Asking Questions	Frequency	Percent
Less than 25%	6	2.6
Less than 50%	22	9.5
More than 50%	82	35.5
More than 75%	121	52.4
Total	231	100.00

By College or School

From the college and two schools, the Nursing students reported the highest percentage of instructors who asked questions. The Psychology students reported the lowest percentage of the three groups (see Tables 3-5).

Table 3

Instructor Question Frequency by College or School, College of Business

Percent of Instructors Asking Questions	Frequency	Percent
Less than 25%	1	1.6
Less than 50%	6	9.5
More than 50%	23	36.5
More than 75%	33	52.4
Total	63	100.00

Table 4

Instructor Question Frequency by College or School, School of Nursing

Percent of Instructors Asking Questions	Frequency	Percent
Less than 25%	1	1.5
Less than 50%	4	6.2
More than 50%	18	27.7
More than 75%	42	64.6
Total	65	100.0

Table 5

Instructor Question Frequency by College or School, School of Psychological Sciences

Percent of Instructors Asking Questions	Frequency	Percent
Less than 25%	4	3.9
Less than 50%	12	11.7
More than 50%	41	39.8
More than 75%	46	44.7
Total	103	100.0

The difference between the Nursing and Psychology students' responses was statistically significant at the 0.05 level (see Tables 6 and 7).

Table 6

Instructor Question Frequency, Combined Groups, One Way ANOVA

		<i>Df</i>	Mean Square	<i>F</i>	Sig.
Fraction of Instructors asking Questions	Between Groups.	2	1.83	3.19	.04
	Within Groups	228	.57		
	Total	230			

Table 7

Instructor Question Frequency by College or School, Post Hoc Tests, One Way ANOVA

	School	<i>N</i>	Subset for alpha = 0.05	
Student-Newman-Keuls	Psychology	103	3.25	
	Business	63	3.40	3.40
	Nursing	65		3.55
	Sig.		.249	.211
Tukey HSD	Psychology	103	3.25	
	Business	63	3.40	3.40
	Nursing	65		3.55
	Sig.		.482	.422

*Student Preferences,
Combined Groups,
Descriptive
Statistics*

Based on the mean scores for the Student Preference items as a group (see Table 8), the respondents reported no strong agreement, nor disagreement. The item with the highest mean score, “I am interested in knowing why my answers are wrong,” had a

mean score of 3.43, and the items with the lowest means were, “I hate being called on by name,” and “I don’t worry about getting the answer wrong,” for which the mean score was 2.19.

Table 8

Student Preferences, Combined Groups, Descriptive Statistics

	Mean	SD
I like instructors who ask questions in class	3.29	.64
Instructor questions keep me interested	3.23	.64
I learn more when the instructor asks a question	3.21	.70
I try to think of the answer when an instructor asks a question	3.34	.65
I avoid answering questions asked to the whole class	2.35	.87
I dislike sharing personal experience with the class	2.33	.81
I am interested in knowing why my answers are wrong	3.43	.71
I try to answer when the instructor calls on me	3.39	.72
I hate being called on by name	2.19	.94
I learn when questions are asked of me	3.10	.67
I learn from questions I get wrong	3.32	.65
I find it hard to think when the instructor calls on me	2.53	.82
I learn from questions when I think of the correct answer	3.16	.65
I like questions that have a definite answer	3.13	.78
I am afraid of saying the wrong answer	2.83	.80
I get very nervous when the instructor calls on me	2.59	.90
I don't worry about getting the answer wrong	2.19	.78
I like to answer the instructor's questions	2.70	.78
I dislike questions answered with a question	2.92	.85
I like questions with more than one answer	2.56	.91

Note: Min:1.00; Max: 5.00.

There was more variability among the respondents for those items, which related to feelings and included words such as: (a) “like,” (b) “hate,” (c) “nervous,” and (d) “worry.” There was less variability in the items related to learning, such as, “I learn from questions I get wrong.”

*Student Preferences, Descriptive
Statistics by
College or
School*

Between schools, the Nursing students reported the strongest agreement for the learning value of instructor questions, and stronger feelings in regard to getting the questions wrong. However, a one way ANOVA analysis of the survey data from each of the Student Preference items revealed no significant differences between the three groups for any item at the 0.05 level (see Table 9).

Table 9

Student Preferences, Combined Groups, One Way ANOVA

		<i>Df</i>	Mean Square	<i>F</i>	Sig.
I like instructors who ask questions in class	Between Groups	2	.91	2.21	.11
	Within Groups	229	.41		
	Total	231			
Instructor questions keep me interested	Between Groups	2	.25	.61	.55
	Within Groups	229	.41		
	Total	231			
I learn more when the instructor asks a question	Between Groups	2	.57	1.16	.31
	Within Groups	229	.49		
	Total	231			
I try to think of the answer when an instructor asks a question	Between Groups	2	.01	.03	.97
	Within Groups	229	.43		
	Total	231			
I avoid answering questions asked to the whole class	Between Groups	2	1.16	1.56	.21
	Within Groups	229	.75		
	Total	231			
I dislike sharing personal experience with the class	Between Groups	2	.60	.91	.40
	Within Groups	229	.65		
	Total	231			
I am interested in knowing why my answers are wrong	Between Groups	2	.07	.13	.88
	Within Groups	229	.51		
	Total	231			
I try to answer when the instructor calls on me	Between Groups	2	.32	.61	.54
	Within Groups	229	.52		
	Total	231			
I hate being called on by name	Between Groups	2	.82	.93	.40
	Within Groups	229	.88		
	Total	231			
I learn when questions are asked of me	Between Groups	2	.06	.13	.87
	Within Groups	229	.45		
	Total	231			
I learn from questions I get wrong	Between Groups	2	.01	.03	.97
	Within Groups	229	.42		
	Total	231			
I find it hard to think when the instructor calls on me	Between Groups	2	1.01	1.51	.22
	Within Groups	229	.67		
	Total	231			
I learn from questions when I think of the correct answer	Between Groups	2	.06	.15	.86
	Within Groups	229	.42		
	Total	231			
I like questions that have a definite answer	Between Groups	2	.22	.35	.70
	Within Groups	229	.61		
	Total	231			

Table 9 (cont.)

		<i>Df</i>	Mean Square	<i>F</i>	Sig.
I am afraid of saying the wrong answer	Between Groups	2	.19	.29	.75
	Within Groups	229	.65		
	Total	231			
I get very nervous when the instructor calls on me	Between Groups	2	.13	.16	.85
	Within Groups	229	.81		
	Total	231			
I don't worry about getting the answer wrong	Between Groups	2	.04	.06	.94
	Within Groups	229	.62		
	Total	231			
I like to answer the instructor's questions	Between Groups	2	1.09	1.82	.16
	Within Groups	229	.60		
	Total	231			
I dislike questions answered with a question	Between Groups	2	1.35	1.87	.16
	Within Groups	229	.72		
	Total	231			
I like questions with more than one answer	Between Groups	2	1.41	1.69	.19
	Within Groups	229	.83		
	Total	231			

*Student Preferences,
Combined Groups,
Reliability*

The 20 Student Preference items were tested for internal consistency. Following the re-coding of negatively worded items, the Student Preference items returned a Cronbach's alpha value of 0.86. Alpha values of between 0.7 and 0.8 are considered acceptable for research purposes (Field, 2009).

*Student Preferences,
Combined Groups,
KMO and
Bartlett's
Test*

The results from the Kaiser-Meyer-Olkin (KMO) measure verified that the sampling adequacy for the analysis was great (KMO = 0.83; Field, (2009). Bartlett's test

of sphericity ($\chi^2 (190) = 1755.85, p < 0.001$) indicated that the correlations between the items were sufficiently large for factor analysis.

*Student Preferences,
Combined Groups,
MAP Analysis*

A Minimum Average Partial Test (MAP) was conducted on the student preference items, and the results are shown in Table 10. The lowest Averaged Partial value of 0.02302, at Dimension 2, suggested that two factors should be retained.

Table 10

Student Preferences, Combined Groups, Minimum Average Partial Test (MAP)

<i>Dimensions</i>	<i>Averaged Partial</i>
1	0.04335
2	0.02302*
3	0.03044
4	0.06541
5	0.18150
6	0.9999

Note: *Advised number of dimensions.

*Student Preferences,
Combined Groups,
Factor Analysis*

Based on the initial results from the MAP analysis, a Principal Components Factor analysis of the 20 Student Preference items was conducted to extract two factors. After extraction, the two factors accounted for 26.33% and 16.46%, respectively, and 42.79% of the variance with the 20 Student Preference items in total. The items that loaded most clearly on Factor 1 (see Table 11) represented positive affect for answering questions and learning, although the items that loaded most strongly on Factor 2 (see

Table 11) indicated negative affect related to speaking out in front of the class and responding incorrectly to the instructor's questions.

Table 11

Student Preferences, Combined Groups, Pattern Matrix

	Factor	
	1	2
I learn more when the instructor asks a question	.75	
I like instructors who ask questions in class	.72	
I learn when questions are asked of me	.71	-.13
I try to think of the answer when an instructor asks a question	.68	
I learn from questions I get wrong	.68	.14
Instructor questions keep me interested	.68	
I am interested in knowing why my answers are wrong	.67	.16
I learn from questions when I think of the correct answer	.60	
I try to answer when the instructor calls on me	.59	
I like to answer the instructor's questions	.50	-.42
I like questions that have a definite answer	.32	.29
I am afraid of saying the wrong answer	.25	.81
I get very nervous when the instructor calls on me		.78
I find it hard to think when the instructor calls on me	.11	.76
I avoid answering questions asked to the whole class	-.11	.71
I hate being called on by name	-.15	.60
I dislike sharing personal experience with the class		.59
I don't worry about getting the answer wrong		-.51
I dislike questions answered with a question		.43
I like questions with more than one answer		-.40

*Instructor Behaviors,
Combined Groups,
Descriptive
Statistics*

The mean scores for Instructor Question Behaviors represented a wide range from a low mean score of 1.57 to a high mean of 3.95. The respondents reported that, overall, instructors used questions in a variety of ways in their interaction with students (see Table 12). The respondents reported that, most of the time: (a) instructors asked questions of the class, (b) asked questions that made students think, and (c) listened carefully to students' answers. Almost never did the students report the use of questions in ways that were less supportive, such as intimidating students with questions or ignoring students' answers. However, there was variability in the mean scores, particularly for the more positive applications of instructor questions.

Table 12

Instructor Behaviors, Combined Groups, Descriptive Statistics

	Mean	SD
My instructor asks questions to the whole class	3.89	1.02
My instructor calls on students by name	2.55	1.35
My instructor asks questions about personal experience	2.77	1.05
My instructor refers to students' previous answers	3.05	.95
My instructor asks questions with no clear answers	2.10	.96
My instructor asks questions that test knowledge of facts	3.33	.95
My instructor asks questions about students' opinions	3.19	1.09
My instructor asks questions that make students think	3.81	.92
My instructor asks questions that encourage discussion	3.47	1.18
My instructor listens carefully to students' questions	3.95	1.02
My instructor explains why incorrect answers are wrong	3.70	1.10
My instructor asks follow-up questions	3.38	1.01
My instructor calls on the same students in every class	1.94	.91
My instructor asks questions that keep students interested	3.33	.97
My instructor varies the kinds of questions he or she asks	3.22	.99
My instructor listens carefully to students' answers	3.86	1.12
My instructor ignores students' answers	1.37	.76
My instructor builds upon students' answers	3.45	.97
My instructor give students enough time to answer	3.71	1.01
My instructor intimidates students with his or her questions	1.57	.77

Note: Min:1:00; Max:5:00.

*Instructor Behaviors, Descriptive
Statistics by School*

A series of one way ANOVAs was conducted on the instructor question behavior items between Schools (see Tables D7 and D8 in Appendix D). The initial post-hoc tests revealed differences between schools on some items, and when a Bonferroni correction was conducted for the number of statistical tests, significant differences ($p < 0.0025$) were found between the three schools on the following six items:

- Item 25. My instructor calls on students by name
- Item 26. My instructor asks questions about personal experience
- Item 27. My instructor refers to students' previous answers
- Item 30. My instructor asks questions about students' opinions
- Item 32. My instructor asks questions that encourage discussion
- Item 41. My instructor builds upon students' answers

As noted earlier, there were no differences between the college and the two schools in Student Preferences, so these differences were notable, in terms of students' experience of instructor questions. In subsequent post hoc tests (see Table E8), where there was a significant difference between college or school groups, it was always the Nursing respondents who reported a difference in their instructors' behaviors in comparison to Business respondents, Psychology respondents, or both.

*Instructor Behaviors,
Combined Groups,
Reliability*

The 20 Instructor Behavior items were tested for internal consistency. Following the re-coding of negatively worded items, the Instructor Behavior items returned a

Cronbach's alpha value of 0.88. Alpha values of between 0.7 and 0.8 are considered acceptable for research purposes (Field, 2009).

*Instructor Behaviors,
Combined Groups,
KMO and
Bartlett's
Test*

The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis (KMO = 0.90) as great, according to Field (2009). Bartlett's test of sphericity (χ^2 (190) = 2105.80, $p < 0.001$) indicated that the correlations between items were sufficiently large for factor analysis.

*Instructor, Combined Groups,
Minimum Average Partial
Test*

A Minimum Average Partial Test (MAP; see Table 13) was conducted with the Instructor Behavior items. The lowest Averaged Partial value, 0.01871 at Dimension 2, suggested that two factors be retained.

Table 13

Instructor Behaviors, Combined Groups, Minimum Average Partial Test (MAP)

Dimensions	Averaged Partial
1	0.03151
2	0.01871*
3	0.03134
4	0.06834
5	0.18121
6	0.99999

Note: *Advised number of dimensions = 2.

*Instructor Behaviors,
Combined Groups,
Factor Analysis*

Based on the results from the MAP test, a principal components factor analysis was conducted on the instructor behavior items to extract two factors. After extraction, the two factors accounted for 35.30% and 13.65%, respectively, and 48.95% of variance within the 20 Instructor Behavior items, in total.

The items, which loaded most strongly on Factor 1 (see Table 14), related to the ways instructors used questions to encourage learning and interaction. Also, most of the other items, which loaded on Factor 1, were related to the type of questions the instructor asked such as, “My instructor asks questions that make students think.” Most of the items, which loaded on Factor 2, were related to how instructors use questions instead of the questions themselves.

Also, the items were associated with the ways that the use of certain questions may produce an emotional response in students. The three items with the three highest loadings were related to instructor behaviors that students reported as negative: (a) “My instructor calls on the same students in every class,” (b) “My instructor ignores students’ answers,” and (c) “My instructor intimidates students with his or her questions.” The items with the next two highest loadings were, “My instructor gives students enough time to answer” and “My instructor listens carefully to students’ answers,” although the loadings, unlike the first three, were positive.

Table 14

Instructor Behaviors, Combined Groups, Pattern Matrix

	Factor	
	1	2
My instructor asks questions that encourage discussion	.84	
My instructor asks questions about students' opinions	.82	-.32
My instructor asks questions about personal experience	.81	-.37
My instructor asks questions that keep students interested	.70	.20
My instructor refers to students' previous answers	.70	-.18
My instructor asks questions that make students think	.67	.15
My instructor calls on students by name	.67	-.39
My instructor builds upon students' answers	.67	.15
My instructor asks follow-up questions	.61	.30
My instructor asks questions that test knowledge of facts	.59	
My instructor varies the kinds of questions he or she asks	.54	.28
My instructor listens carefully to students' questions	.52	.45
My instructor asks questions to the whole class	.38	
My instructor calls on the same students in every class	.36	-.69
My instructor ignores students' answers	.13	-.68
My instructor intimidates students with his or her questions		-.64
My instructor give students enough time to answer	.27	.63
My instructor listens carefully to students' answers	.35	.60
My instructor asks questions with no clear answers	.19	-.60
My instructor explains why incorrect answers are wrong	.34	.46

*Student Preferences, Reliability
by College or School*

The 20 Student Preference items were tested for internal consistency by college or school. The Student Preference item responses from surveys in the College of Business, the School of Psychological Sciences, and the School of Nursing returned Cronbach's alpha values of 0.63, 0.62, and 0.67, respectively. As reported by Field (2009), alpha values of between 0.7 and 0.8 are considered acceptable for research purposes.

*Student Preferences,
Factor Analysis
by College
or School*

Factor analysis was conducted on the individual school data. Similar to the analysis of the combined group data, the results from MAP tests identified two factors in the student data from each school. Across the college and two schools, the items loaded in a very similar pattern to that described in the combined group analysis. The student survey responses from the Schools of Psychological Sciences (see Table 15) and Nursing (see Table 16) loaded on to the same two factors described earlier. These were: (a) appreciation of questions and (b) anxiety about speaking in front of the class.

Table 15

Student Preferences, School of Psychological Sciences, Pattern Matrix

	Factor	
	1	2
I learn more when the instructor asks a question	.79	
I try to think of the answer when an instructor asks a question	.77	
I learn from questions I get wrong	.75	.12
I like instructors who ask questions in class	.71	
I learn from questions when I think of the correct answer	.68	.27
I am interested in knowing why my answers are wrong	.66	.14
Instructor questions keep me interested	.66	-.16
I learn when questions are asked of me	.64	-.21
I try to answer when the instructor calls on me	.55	-.23
I like to answer the instructor's questions	.55	-.39
I like questions that have a definite answer	.29	.13
I like questions with more than one answer	.18	-.17
I am afraid of saying the wrong answer	.37	.84
I get very nervous when the instructor calls on me		.76
I find it hard to think when the instructor calls on me		.76
I avoid answering questions asked to the whole class	-.19	.64
I hate being called on by name	-.18	.58
I dislike sharing personal experience with the class		.54
I don't worry about getting the answer wrong		-.50
I dislike questions answered with a question		.35

Table 16

Student Preferences, School of Nursing, Pattern Matrix

	Factor	
	1	2
I am afraid of saying the wrong answer	.86	.11
I get very nervous when the instructor calls on me	.82	
I avoid answering questions asked to the whole class	.79	
I find it hard to think when the instructor calls on me	.75	.18
I hate being called on by name	.69	.11
I don't worry about getting the answer wrong	-.59	.23
I dislike sharing personal experience with the class	.57	-.12
I dislike questions answered with a question	.55	
I like questions with more than one answer	-.52	
Instructor questions keep me interested		.74
I learn when questions are asked of me	-.16	.73
I like instructors who ask questions in class		.68
I learn more when the instructor asks a question	-.17	.68
I try to think of the answer when an instructor asks a question	.20	.65
I am interested in knowing why my answers are wrong	.23	.64
I like to answer the instructor's questions	-.39	.59
I try to answer when the instructor calls on me		.58
I learn from questions when I think of the correct answer	-.13	.54
I learn from questions I get wrong	.12	.53
I like questions that have a definite answer	.30	.30

For the College of Business survey data (see Table 17), there were more items in regard to preference types. The response, such as “I like questions with more than one answer,” loaded inversely on Factor 2.

Table 17

Student Preferences, College of Business, Pattern Matrix

	Factor	
	1	2
I learn more when the instructor asks a question	.83	
I learn when questions are asked of me	.80	
I like instructors who ask questions in class	.76	
I am interested in knowing why my answers are wrong	.73	.11
I learn from questions I get wrong	.72	.25
Instructor questions keep me interested	.63	-.12
I learn from questions when I think of the correct answer	.60	.15
I try to answer when the instructor calls on me	.57	
I try to think of the answer when an instructor asks a question	.56	-.13
I find it hard to think when the instructor calls on me		.79
I get very nervous when the instructor calls on me		.73
I avoid answering questions asked to the whole class		.73
I am afraid of saying the wrong answer	.22	.70
I dislike sharing personal experience with the class	-.13	.68
I hate being called on by name	-.40	.52
I like to answer the instructor's questions	.35	-.50
I like questions that have a definite answer	.32	.47
I like questions with more than one answer		-.46
I don't worry about getting the answer wrong		-.43
I dislike questions answered with a question	.10	.32

*Instructor Behaviors, Reliability
by College or School*

The 20 Instructor Behavior items were tested for internal consistency by school.

The Instructor Behavior items, from the survey responses for the College of Business, the School of Psychological Sciences, and the School of Nursing, produced Cronbach's alpha

values of 0.89, 0.84, and 0.76, respectively. Alpha values of between 0.7 and 0.8 are considered acceptable for research purposes (Field, 2009).

*Instructor Behaviors,
Factor Analysis
by College
or School*

The loading patterns of the Instructor Behavior items for the separate schools demonstrated a similar pattern to that of the combined groups. That is, there was a separation between factors when the items were related more to the questions asked by the instructor and the way the instructors' behaviors might produce an emotional response in students. There was some variety in the loading of specific items for the three schools, but the overall pattern was the same. For the School of Nursing survey responses, there were fewer items that loaded on Factor 2, but the difference between the factors was not obvious.

*Correlation between Extracted
Factors, Student Preferences,
Instructor Behaviors,
Combined Groups
Correlation*

The relationship between the two factors in the Student Preference and Instructor Behavior items from all surveys was examined (see Table 18). There were several statistically significant correlations between the two factors in each survey and significant cross-correlations between the factors in opposite survey pairs.

Table 18
*Student Preferences, Instructor Behaviors, Combined
 Groups, Factor Correlation Matrix*

	Student Preference Factor 1	Student Preference Factor 2	Instructor Behavior Factor 1	Instructor Behavior Factor 2
Student Preference Factor 1				
Pearson Correlation	1.00	-.23**	.29**	.23**
Sig. (2-tailed)	.	.00	.00	.00
N	232.00	232.00	232.00	232.00
Student Preference Factor 2				
Pearson Correlation	-.23**	1.00	-.15*	.03
Sig. (2 –tailed)	.00	.	.02	.60
N	232.00	232.00	232.00	232.00
Instructor Behavior Factor 1				
Pearson Correlation	.29**	-.15*	1.00	.37**
Sig. (2 –tailed)	.00	.02	.	.00
N	232.00	232.00	232.00	232.00
Instructor Behavior Factor 2				
Pearson Correlation	.23**	.03	.37**	1.00
Sig. (2-tailed)	.00	.60	.00	.
N	232.00	232.00	232.00	232.00

Note: **Correlation is significant at the 0.01 level, 2-tailed; *correlation is significant at the 0.05 level, 2-tailed.

*Correlation between Extracted
 Factors, Student Preferences,
 Instructor Behaviors,
 Combined Groups
 Correlation*

The relationship between the two factors in the Student Preference and Instructor Behavior items from all surveys was examined (see Table 18). There were several statistically significant correlations between the two factors in each survey and significant cross-correlations between the factors in opposite survey pairs.

Between Student Preference Factor 1 and 2, there was a statistically significant inverse correlation (Pearson Correlation = $-.23$, significant at the 0.01 level, two-tailed). There was a significant positive correlation between Instructor Behavior Factor 1 and 2 (Pearson Correlation = $.37$, significant at the 0.01 level, two-tailed).

Between factors, there was a positive correlation (Pearson Correlation = $.29$, significant at the 0.01 level, two-tailed) between Student Preference Factor 1 and Instructor Behavior Factor 1). There was a positive correlation (Pearson Correlation = $.23$, significant at the 0.01 level, two-tailed) between Student Preference Factor 1 and Instructor Behavior Factor 2.

In addition, there was a significant inverse relationship (Pearson Correlation = $-.15$, significant at the .05 level, two-tailed) between Student Preference Factor 2 and Instructor Behavior Factor 1. While the strongest correlation was between Instructor Behavior Factor 1 and 2 (Pearson Correlation = $.37$, significant at the 0.01 level, two-tailed), the most significant cross-factor correlation was between Student Preference Factor 1 and Instructor Behavior Factor 1 (Pearson Correlation = $.29$ significant at the 0.01 level, two-tailed).

Student Preferences, Instructor Behaviors, Correlations by College or School

For the separate college and schools (see Tables 19, 20, and 21), there were no significant cross-factor correlations between Student Preference and Instructor Behavior factors.

Table 19
*Student Preferences, Instructor Behaviors, College of Business,
 Factor Correlation Matrix*

	Student Preference Factor 1	Student Preference Factor 2	Instructor Behavior Factor 1	Instructor Behavior Factor 2
Student Preference Factor 1				
Pearson Correlation	1	-.17	.24	.23
Sig. (2-tailed)	.	.18	.05	.07
N	63	63	63	63
Student Preference Factor 2				
Pearson Correlation	-.17	1	-.26*	.07
Sig. (2 –tailed)	.18	.	.04	.56
N	63	63	63	63
Instructor Behavior Factor 1				
Pearson Correlation	.24	-.26*	1	.22
Sig. (2 –tailed)	.05	.04	.	.08
N	63	63	63	63
Instructor Behavior Factor 2				
Pearson Correlation	.23	.07	.22	1
Sig. (2-tailed)	.07	.56	.08	.
N	63	63	63	63

Note: *Correlation is significant at the 0.05 level, 2-tailed

Table 20
Student Preferences, Instructor Behaviors, School of Psychological Sciences,
Factor Correlation Matrix

	Student Preference Factor 1	Student Preference Factor 2	Instructor Behavior Factor 1	Instructor Behavior Factor 2
Student Preference Factor 1				
Pearson Correlation	.1	-.31	.36	.26
Sig. (2-tailed)	.	.00	.00	.01
N	104	104	104	104
Student Preference Factor 2				
Pearson Correlation	-.31	1	-.18	.02
Sig. (2 –tailed)	.00	.	.07	.81
N	104	104	104	104
Instructor Behavior Factor 1				
Pearson Correlation	.36	-.18	1	.54
Sig. (2 –tailed)	.00	.07	.	.00
N	104	104	104	104
Instructor Behavior Factor 2				
Pearson Correlation	.26	.02	.54	1
Sig. (2-tailed)	.01	.81	.00	.
N	104	104	104	104

Table 21

*Student Preferences, Instructor Behaviors, School of Nursing,
Factor Correlation Matrix*

	Student Preference Factor 1	Student Preference Factor 2	Instructor Behavior Factor 1	Instructor Behavior Factor 2
Student Preference Factor 1				
Pearson Correlation	1	-.18	.23	.20
Sig. (2-tailed)	.	.15	.07	.10
N	65	65	65	65
Student Preference Factor 2				
Pearson Correlation	-.18	1	-.05	.03
Sig. (2 –tailed)	.15	.	.68	.80
N	65	65	65	65
Instructor Behavior Factor 1				
Pearson Correlation	.23	-.05	1	.44**
Sig. (2 –tailed)	.07	.68	.	.00
N	65	65	65	65
Instructor Behavior Factor 2				
Pearson Correlation	.20	.03	.44**	1
Sig. (2-tailed)	.10	.80	.00	.
N	65	65	65	65

Note: **Correlation is significant at the 0.01 level, 2-tailed; *correlation is significant at the 0.05 level, 2-tailed.

*Instructor Surveys, Student
Preferences, Instructor
Behaviors, Descriptive
Statistics*

The descriptive statistics from the data collected from the instructor surveys are shown in Tables 22 and 23. Although the small number of surveys did not justify much detailed statistical analysis, the similarity of the instructor-item mean scores to those from the student survey data (i.e., displayed in column 1) is notable.

Table 22

Student Preferences, Instructors, Descriptive Statistics

	Stud. Mn.	Mn.	SD
Students like instructors who ask questions in class	3.29	2.88	.99
Instructor questions keep students interested	3.23	3.13	.83
Students learn more when the instructor asks questions	3.21	3.62	.52
Students try to think of the answer when an instructor asks a question	3.34	3.13	.64
Students avoid answering questions to the whole class	2.35	2.75	.89
Students dislike sharing personal experience with the class	2.33	2.50	.93
Students are interested in knowing why their answers are wrong	3.43	3.00	.53
Students try to answer when the instructor calls on them	3.39	3.25	.71
Students hate being called on by name	2.19	2.38	1.06
Students learn when questions are asked of them	3.10	3.50	.53
Students learn from questions they get wrong	3.32	3.38	.52
Students find it hard to think when the instructor calls on them	2.53	2.75	.46
Students learn from questions when they think of the correct answer	3.16	2.88	.83
Students like questions that have a definite answer	3.13	3.25	.46
Students are afraid of saying the wrong answer	2.83	3.00	.53
Students get very nervous when the instructor calls on them	2.59	2.63	.74
Students don't worry about getting the answer wrong	2.19	2.25	.89
Students like to answer the instructors' questions	2.70	2.50	.76
Students dislike questions answered with a question	2.92	3.00	.76
Students like questions with more than one right answer	2.56	2.00	.53

Table 23

Instructor Behaviors, Instructors, Descriptive Statistics

	Stud. Mean	Mean	SD
I ask questions to the whole class	3.89	3.75	1.16
I call on students by name	2.55	2.25	1.04
I ask questions about students' personal experience	2.77	2.62	1.30
I refer to students' previous answers	3.05	3.00	.93
I ask questions with no clear answers	2.10	2.50	.93
I ask questions that test knowledge of facts	3.33	2.75	.89
I ask questions about students' opinions	3.19	2.75	1.16
I ask questions that make students think	3.81	3.88	.64
I ask questions that encourage discussion	3.47	3.50	.93
I listen carefully to students' questions	3.95	3.87	.64
I explain why incorrect answers are wrong	3.70	3.75	.89
I ask follow-up questions	3.38	3.50	.76
I call on the same students in every class	1.94	1.75	.71
I ask questions that keep students interested	3.33	3.50	.53
I vary the kinds of questions I ask	3.22	3.38	.52
I listen carefully to students' answers	3.86	4.00	.76
I ignore students' answers	1.37	1.13	.35
I build upon students' answers	3.45	3.25	.71
I give students enough time to answer	3.71	3.63	.92
I intimidate students with my questions	1.57	1.88	.35

Qualitative Findings

Q1 How do you use questions in your classroom?

The key categories that emerged in the instructors' answers are displayed in Table 24. The participants reported a variety of ways that they use questions, associated with a particular educational purpose, including to: (a) find out what students think, (b) stimulate students to think, (c) integrate knowledge, and (d) encourage discussion.

Q2 What kinds of questions do you ask?

A number of different categories emerged related to this question including: (a) recall of facts and concepts, (b) personal experience, (c) personal opinions, and (d) relationships between concepts.

Q3 What influences which students answer your questions?

Seven categories were identified in the data related to this question. The categories included fear of saying the wrong answer, knowledge of material, such as confidence in the class content, motivation to do well in the class, social confidence, and class size.

Q4 What influences the answers they give?

Only one category was identified that related to this question, knowledge of the class content.

Table 24

Qualitative Data, Key Categories in Interview Answer Domains

Question	Categories
1. How do you use questions in your classroom?	1. To find out what students know 2. To stimulate students to think 3. To make connections – integrate knowledge 4. Stimulate interaction and discussion
2. What kinds of questions do you ask?	1. Recall facts and concepts 2. Personal experience 3. Personal opinions 4. Relationships between concepts
3. What influences which students answer your questions?	1. Fear of saying the wrong answer. 2. Knowledge of material – confidence in the class content. 3. Motivation to do well in the class. 4. Social confidence. 5. Class size 6. Life experience 7. Gender
4. What influences the answers they give?	1. Knowledge of the class content

Chapter Summary

The findings from this current study were consistent with those from the initial study. The results from the combined student groups showed a consistent pattern of preferences for instructors' use of questions, but some significant differences were reported in regard to their experience of instructors' use of questions across the three schools. Also, instructor question frequency was significantly different between schools. Analysis of the combined group Student Preference and Instructor Behavior items revealed two related factors associated with the items on each survey. Factor analyses of the surveys from the separate school revealed a similar pattern of factors as seen in the combined groups.

Instructors' quantitative data were limited, although the qualitative data provided by instructor interviews provided some support for the differences in instructors' choice of questions and questioning techniques seen in the student data. Discussion of these findings is provided in Chapter 5.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

The purpose of this study was to explore the use of instructor questions in college classrooms and to obtain additional insight into: (a) student preferences for instructor questions and (b) how instructors used questions. The following research questions guided this study:

- Q1 What kinds of questions do instructors ask, and how do students experience them?
- Q2 What kind of instructor questions do instructors and students prefer?
- Q3 How do students' and instructors' experiences affect their preferences?

In this current study, the findings from the initial study were extended and drew upon a larger sample of students. The sample for the current study consisted of students from three different schools in the university and their instructors. In addition to the students' completion of a survey, the instructors completed a survey, and a selection of instructors was interviewed.

Quantitative Findings

Instructor Question Frequency

According to the student responses, most of their instructors used questions in class, although it was not clear from the responses to this survey item what types of questions the instructors asked or how the questions were asked. Based on the student responses, there were significant differences between schools in the frequency that

instructors asked questions. Nursing students reported the highest percentage of instructors who asked questions.

Student Preferences, Combined Group

Overall, according to the responses, the students were positive in their preferences for instructor questions, and they appeared to see the value of questions in learning. They appeared to be uncomfortable about saying the wrong answer and disagreed with the statement, “I don’t worry about getting the answer wrong.”

Student Preferences, Combined Group vs. School Group

As a group, the students surveyed reported similar preferences for the use of questions by instructors. That is, there was no significant difference between any of the schools in the Student Preference items. Whatever other variability there might have been between schools, the students had consistent preferences across the three groups.

Student Preferences, Factor Analysis

Overall, compared to the initial study, the findings for this current study were similar in regard to the number of factors around which the items on the two surveys loaded. For students in both studies, preferences were associated with either questions that promoted learning and discussion or questions that put them at risk in front of their peers. These students appreciated the value of instructor questions to their learning and appreciated instructor questions, but expressed anxiety about speaking out before the class, disclosing personal information or answering incorrectly.

*Instructor Behaviors, Combined Group
vs. School Group*

There were statistically significant differences between the schools on 6 of the 20 Instructor Behavior items. This finding suggested that, while students had similar preferences for instructor questions, their experience of instructors in terms of the types of question they asked and the way they asked them may have varied. That is, instructors' question behavior is not the same. Also, the findings from the post-hoc tests showed that, for those items where there were differences, it was the responses from the School of Nursing students that were significantly different from one or both of the College of Business and School Psychological Sciences. The instructors in the School of Nursing not only asked more questions than instructors in other schools, but they asked questions differently from their colleagues in the Schools of Psychological Sciences and College of Business.

Instructor Behaviors, Factor Analysis

Consistent with this finding for the Student Preference survey items, Instructor Behaviors were associated with two factors related to what students experienced as the positive and instructionally supportive use of questions and the use of questions that was less positive and did not take student discomfort in answering questions into account. These two Instructor Behavior factors reflected the two factors in the Student Preference survey. This finding was consistent with the findings from the initial study.

*Correlation between Student Preference
and Instructor Behavior Factors*

The factor pairs, which emerged from the two surveys, appeared to complement or reflect each other. The students reported preferences for questions that encouraged learning, but appeared sensitive to the chance of being embarrassed in front of their classmates. Also, they discriminated between those types of instructor question or questioning technique that promoted learning and those instructor behaviors that potentially produced a personal reaction beyond the benefit to learning.

The correlations between factor pairs from the same survey items and cross-correlations between factor pairs from different surveys were notable. In addition, they complemented the apparent organization of instructor questions around their instructional and affective aspects.

The largest correlation was found for Instructor Behavior Factors 1 and 2. In the students' perspective, instructor questions, both in type and in the way they were used, had both an instructional and an affective association, and for the students, the two may be linked together. Between Student Preference Factor 1 and 2, there was a smaller inverse correlation, which suggested that students preferred instructor questions that promoted learning but they felt the opposite about the risk of embarrassment. From the cross-correlation of factors extracted from the two surveys for all students, there was a relationship between the way that students preferred questions to be asked and those instructor behaviors that were consistent with these preferences. Students preferred instructors who asked the type of questions that encouraged discussion and promoted student interest and involvement (e.g., Student Preference Factor 1, Instructor Behavior

Factor 1). The correlation between Student Preference Factor 1 and Instructor Behavior Factor 2 (Pearson Correlation = .29, significant at the 0.01 level, two-tailed) suggested that, for students, there was an association between their preferences for questions that promoted learning and the emotional response, which instructors' questions promoted.

Instructor Surveys

The number of instructor surveys collected was small and limited the generalizability of any findings. However, the instructors surveyed appeared to understand their students' preference for questions and their own behaviors. When they asked questions, generally, they mirrored their students' experience.

Qualitative Findings

Identification of Categories and Answer Domains

Question 1. How do you use questions in your classroom?

The categories that were identified that most closely related to this question also addressed the question of the purpose for which instructors use questions. The categories suggested that instructors used questions to meet a number of purposes in their classrooms, which ranged from simple recall of facts to the promotion of discussion. However, not all instructors used questions for a full range of these potential functions.

Question 2. What kinds of question do you ask?

The identified categories that were related to this question suggested that most questions are of the traditional type, that is to test knowledge related to the class content.

Some instructors used questions about personal experience and personal opinions for specific purposes related to the encouragement of reticent students to participate. One School of Nursing instructor commented that she would often ask a non-participant a question such as, “Well, So & So, you have some experience with this. Why don't you share, you know, what your experience has been?”

Question 3. What influences which students answer your questions?

There was a long list of categories related to this question, which reflected a wide range of instructor explanations for the relative minority of students who answered most of the questions. For one instructor, it was simply a matter of motivation, “the others just don’t care.” Other instructors, who also actively encouraged discussion, were more likely to suggest that fear of speaking up in front of a large class size was the reason, and they would engineer ways to reduce student anxiety. One instructor stated, “The group that I have right now with a hundred students, a hundred plus students, are very interactive which is really interesting because they'll take a stab in the dark and if they don't know the right answer I'll just say, ‘No. Great guess! Let's try and see if someone else has got it.’”

Question 4. What influences the answers the students give?

The instructor interviews provided only one explanation for the influence on answers. This explanation was the students’ knowledge of the material.

Research Questions

The quantitative and qualitative findings provided a useful picture of the perspective of instructor questions from both the student and instructor perspective. In particular, they provided some answers to the research questions originally posed for this study.

Question 1. What kinds of questions do instructors ask, and how do students experience them?

From the perspective of students, instructors asked a variety of question types, including: (a) questions about facts and data, (b) questions that encouraged students to think, and (c) questions that encouraged discussion. Although all instructors asked questions associated with the mental processing of the class material (i.e., recall and thinking), only some instructors asked questions specifically to engage students and encourage discussion.

Students appeared to experience instructor questions in the context of two important factors. The first was related to how the type of question or the way it was asked promoted student learning. The second related to the type of question that does not consider students' feeling of discomfort when speaking in front of the class.

The findings from this current study suggested that students were consistent in their preference for the types of instructor questions and the way that instructors asked them. However, their experience of the way instructors used questions was not.

Question 2. What kind of instructor questions do instructors and students prefer?

This question of instructor preference for questions was not addressed by the instructor surveys, although the interviews suggested that instructors preferred to use questions that test recall and understanding of covered facts and topics and questions that stimulate thinking. Some instructors preferred to use various types of question, including those questions that encouraged student participation and discussion. The findings suggested that, while students' preferences were consistent overall, there were differences in their experience of their instructors' use of questions.

Students preferred questions that helped them learn. but did not cause them discomfort in front of the class. They did not prefer questions with the potential to get the answer wrong.

Question 3. How do students' and instructors' experiences affect their preferences?

Students' preferences for questions that helped them learn were associated with instructors' use of questions that supported learning. Students recognized instructors' use of questions, in the type of question asked and the way the instructor asked it, that promoted learning, and they recognized instructors' use of question that put them at risk.

Again, the small number of instructors, who participated, did not permit any strong conclusions to be drawn concerning instructor preferences. However, based on the instructor responses, it appeared that there were differences between the way that instructors considered student preferences in their choice of question and the way they

asked them. Some instructors reported that they considered student preferences more than others.

Limitations of the Study

In this current study, the small sample size of the initial study was addressed, and the collection of data from three different schools provided some interesting comparisons. The existence of the two factors, which underlay the student preferences, was probably generalizable to a wider undergraduate student population in university and college classrooms.

The primary limitation of the study was that few instructor surveys were collected, which resulted in an incomplete picture of the: (a) instructors' preferences, (b) types of question they asked, and (c) way they asked questions in class. The findings from the qualitative interviews provided some perspective and some interesting speculations, but the study conclusions would have been strengthened if a larger sample of instructors had been surveyed.

Finally, it should be noted that the survey items produced self-reported data. In particular, the use classroom observation might have provided a useful corroborative perspective on the accuracy of the students' reports of instructors' use of questions.

Conclusion

The findings from this current study provided additional perspective on the association between instructor questions, instructor questioning techniques, and the emotional impact that both may have (i.e., positive and negative) on students in classrooms. Students appreciated the learning value of their instructors' questions, but

any resulting interaction between the instructor and the student can have an emotional association that the instructor should consider, and if the instructor hopes to build the interaction into wider discussion, he or she must avoid those questions and questioning techniques that increase the risk of students' embarrassment in front of their classmates. Conversely, instructors may consider the use of those questions and questioning techniques that reinforce a classroom climate, which is conducive to students' contribution and participation.

The current findings have confirmed a number of separate research findings (Allen et al., 2008; Howard & Henney, 1998; Weaver & Qi, 2005) in which the researchers reported that student participation in classrooms has an important association with their feelings of apprehension for speaking out in front of their classmates. Also, the current findings showed that students notice those instructor question behaviors that consider their feelings.

It is probably unsurprising to many college classroom instructors that some students do not choose to speak out in class. However, what may be new to the same instructors is the finding that, while students may feel uncomfortable speaking out in front of the class, they still recognize the instructional value of instructor questions and those types of questions and question asking techniques that do not put them at risk. With the right question, students may choose to participate if the risk is reduced. Also, this finding would confirm those studies described in the literature (Dallimore et al., 2004; Nunn, 1996), in which it was found that there was an association between student participation and certain instructor behaviors. Specifically, behavior that might cause

students potential discomfort (Nunn) in speaking and/or promote a more supportive classroom climate (Fassinger, 1995a). This study does not refute the research that recognizes the importance of other cognitive factors in instructors' use of certain types of question (Gayle et al., 2006). What the study suggests, however, is that, in addition to choosing questions to engage specific cognitive functions, instructors may also consider questions with the particular purpose of encouraging students to speak (Fassinger, 2000). While students were generally consistent in their preferences for instructor questions, they reported some important variation in: (a) the frequency that instructors ask questions, (b) the types of question instructors ask, and (c) the way they ask them. Although the instructor data, both quantitative and qualitative, cannot provide a generalizable reason for this difference, although it permits the reasonable speculation that some instructors ask certain types of question and use questions in certain ways that go beyond the tradition instructional function of engaging students' mental processing of the classroom content under consideration. Some instructors encourage not only student thinking, but also student talking. They choose and use their questions in a way that encourages students to respond while reducing the students' discomfort about speaking in front of their peers.

Recommendations for Future Research

A logical follow-on study would be to explore, more completely, the factors that instructors consider in their use of classroom questions with a larger sample. Other techniques, such as a change in classroom practice to reduce the number of recall questions (Barnes, 1983), or to promote questioning techniques that reward student

participation (Nunn, 1996) might require more research to provide instructors with simple questioning protocols as well as a clear assessment of their value to the learning outcomes. Ultimately, it may be only the experience of increased student participation and its collateral improvements in learning outcomes that will convince instructors who would prefer more student participation in their classes to change the questions they use and the way they use them. In the meantime, exploration of the outcomes from the respective questioning methods could have useful practical value in the improvement of the following aspects of classroom practice.

Ask Different Types of Question

The findings related to student preference suggested an important consideration for instructors to reflect on their own classroom practice in regard to asking questions. Although all students appear to appreciate how questions promote their learning, it may be a mistake for instructors to assume that the failure of a majority of students in a class to respond to a particular question is automatically a result of their lack of motivation or knowledge and give up with these students. At the same time, instructors should keep in mind the potential anxiety that students may experience in regard to answering any question and avoid those questions that, in a certain situation, may create discomfort. What may be required, for this initially uncooperative group, is a more flexible questioning approach that recognizes that different questions may carry with them a combination of cognitive challenges and affective associations that should be taken into consideration. A flexible approach based on a variety of question types may be effective; at times with particular students, the instructor may ask questions designed to encourage

thinking, at other times or with other students, the instructor may use the type of questions which are asked with the single intention to encourage a student to participate. The use of closed questions to check the simple recall of specific facts or information may be occupy a well-established place in classroom practice (Barnes, 1983), but the use of open-ended, higher order questions provide the opportunity for a student to think more critically while simultaneously the risk of getting the answer wrong is reduced. Reducing the risk of embarrassment might involve asking a question with no wrong answer, such as a personal anecdote or opinion, and some of the instructors interviewed reported that they have developed a repertoire of such questions that they use to draw in otherwise disengaged students. The instructor interviews revealed that two of the instructors from the School of Nursing routinely adapt their questions in this way. One instructor described how she would ask easy questions of students who she notices have not participated in class discussion for some time. However, this approach is not typical, at least among the instructors interviewed in this study. The results from the instructor behavior surveys showed differences between schools, that is, instructors, from the students' perspective, differ in the frequency they ask certain types of question and in the way they ask them.

Earlier, this author noted the large number of studies, in which the role of instructor questions in the promotion of learning, was explored. Gayle's (2006) summary of this research suggested that classroom teachers at all levels may encourage their students to think differently by asking different questions. The findings from the instructor interviews suggested that some instructors are familiar with this strategy and

are comfortable in the use of a variety of questions to meet a number of specific learning objectives as they teach their classes. However, also, the interview responses suggested that such a practice is by no means universal.

Promote a Supportive Classroom Environment

The literature review presented earlier described some of the student factors that are supposed to be related to classroom participation. It was suggested by Allen et al. (2008) that students bring to the classroom a number of individual and group orientations that may influence the nature of classroom participation. Student confidence was described as a contributing factor, not only with those students who demonstrate the trait of Communication Apprehension (CA), but also for those students who experience a situational and short-lived lack in their confidence in class and an associated effect on their level of participation (Fritschner, 2000; Howard & Henney, 1998; Hyde & Ruth, 2002; Weaver & Qi, 2005). Researchers have suggested that students, who may not be particularly high in CA as a trait, may still be anxious frequently in certain public situations (Rocca, 2010) and that a substantially greater number of students experience occasional apprehension in class (Bowers, 1986). The finding in this study of a factor related to anxiety in speaking out in front of the class would appear consistent with the literature. Further, the consistency of the student preferences across the three schools would appear to suggest that instructors should consider students' potential apprehension as a predictable factor to consider when they encourage participation with questions. Fassinger (2000) identified the social support that students feel in a class as one contributing factor to the level of student participation and suggested that instructors may

increase the student involvement by “building an atmosphere conducive to participation” (p. 46). She found that “higher participation classes have more cooperative, supportive, and respectful class dynamics” (p. 45), and they utilize norms that are more inclusive, less teacher-centered, and more tolerant.

The flexible and student-sensitive use of different types of question may be one way in which instructors might promote a more student-centered classroom climate, and in addition to the types of question, there are questioning approaches that may be useful for this purpose. For some of the instructors in the study, the questioning techniques that would foster such an atmosphere, such as the use of names to personalize questions, asking open-ended questions, and asking for opinions and personal examples, might be worth consideration by the other instructors who may prefer to see more students involved in classroom interaction.

In addition, the findings from this current study supported the research of Nunn (1996) discussed earlier, which suggested that certain teaching techniques are strongly related to classroom participation. In fact, 96% of the students surveyed in this study reported that instructors’ use of praise encouraged or greatly encouraged their participation in discussion, whereas the use of criticism discouraged or greatly discouraged participation. Also, 95% indicated that the presence of a supportive environment encouraged or greatly encouraged discussion. The factors, which were found to increase student participation, included: (a) know and use student names; (b) praise and encourage students (Auster & MacRone, 1994; Nunn); (c) call on students when they volunteer and call on them by name; (d) ask analytical rather than factual

questions; and (e) give students ample time to answer (Auster & MacRone). In addition, Auster and MacRone found that students were more likely to participate if their instructors demonstrated behaviors that showed students that their verbal responses were important and encouraged students when they did respond.

Promotion of Whole-Class Participation

Also, the literature supports the common observation in the instructor interviews that only a small minority of the students in a class answer most of the instructor's questions (Howard et al., 1996). Given the possibility that the reticence of the majority to participate may be related to apprehension, instructors should be cautious and not attribute a lack of participation by the majority of students in a class to a lack of motivation, interest, or knowledge of the material; this was a recurring observation in the instructor interviews in this current study. The literature suggests that the division of labor in answering the instructor's questions between the four or five students, who regularly participate and the rest, forms quite early, but once formed is quite resistant to change. Instructors who would prefer that more of the class is actively involved in discussion might get better results, overall, if they attempt to engage their students earlier in the semester rather than later.

Promotion of Participation in Large Classes

The notable influence of class size in student participation was discussed earlier, and the students' discomfort in answering questions in front of the class would suggest a

reasonable explanation for the reduction in students' participation as the group size increases. However, while it may be reasonable and convenient for an instructor to assume that a large class will automatically reduce the willingness of students to contribute and participate, such an assumption will probably guarantee that this expectation will become a reality. Yet, again, knowing that students can separate the learning value of questions from the potential discomfort they may cause is vital for change in classroom practice. It may be harder for an instructor to engage a large group of students with questions, but their effort early in the course may be worthwhile in order to produce more interaction, if the questions are of the right kind and are asked in the right way to minimize discomfort. In the interviews, one instructor described how she does this with a class of over 100. She would break up the lectures and assign exercises to small groups (i.e., 5 or 6 students) and allow the students to become comfortable interacting with each other in these groups as they collaborated on completing the exercises. In the lectures that followed, even students in large classes participated more readily.

*Avoid Initiation, Response, and Evaluation
(IRE): Promote Authentic Participation*

Neal's (2008) description of the way Mehan's (1979) Initiation, Response, and Evaluation (IRE) pattern of interaction may stifle student participation as it appears to promote the opposite provides a caution for instructors looking to stimulate authentic classroom discussion. First, these instructors should realize that their students recognize the difference between those questions that demonstrate a real interest in their contributions, and those questions that simply set up an opportunity for more instructor

lecture. Second, instructors might consider that an apparent unwillingness of students to respond to questions may originate not only in their lack of knowledge or motivation, but also in their discomfort about answering in error in front of their classmates.

Chapter Summary

The findings from this current study confirm those from those studies in the literature that suggest student apprehension is an important factor associated with class participation. Students recognize the potential of instructor questions to improve their learning and increase their participation, but they prefer those questions, and those questioning techniques reduce the risk of potential embarrassment in responding incorrectly in front of the class.

Instructors use different types of questions and ask questions in different ways. While most instructors use questions to engage student thinking, some instructors use questions specifically to stimulate discussion. Students recognize these differences and differentiate between them according to their preferences.

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APPENDIX A

Instructor Question Survey for STUDENTS
Instructor Question Survey for INSTRUCTORS

Instructor Question Survey for STUDENTS Page One

Instructions:

For item #1 - #3 please provide the following basic information using SIDE 1 of the SCANTRON answer sheet.

Please Note: No other personal information (Name, Course number, etc.) is required

1. School or Dept. (Select by shading the appropriate letter on the SCANTRON answer sheet)

A. Psychology B. Business C. Nursing

2. Gender:

A. Male B. Female

3. Overall, what fraction of the instructors in your classes ask questions?

A. Less than 25% B. Less than 50% C. More than 50% D. More than 75%

Now, read statement #4 – #23 carefully as the STUDENT taking this class. For each statement, using the SCANTRON answer sheet, shade the letter (A, B, C, D) which matches how much you agree or disagree with the following statements about instructors' questions in this class:

A. Strongly Disagree B. Disagree C. Agree D. Strongly Agree

4. I like instructors who ask questions in class

5. Instructor questions keep me interested

6. I learn more when the instructor asks questions

7. I try to think of the answer when an instructor asks a question

8. I avoid answering questions asked to the whole class

9. I dislike sharing personal experience with the class

10. I am interested in knowing why my answers are wrong

11. I try to answer when the instructor calls on me

12. I hate being called on by name

13. I learn when questions are asked of me

14. I learn from questions I get wrong

15. I find it hard to think when the instructor calls on me

16. I learn from questions when I think of the correct answer

17. I like questions that have a definite answer

18. I am afraid of saying the wrong answer

19. I get very nervous when the instructor calls on me

20. I don't worry about getting the answer wrong

21. I like to answer the instructor's questions

22. I dislike questions answered with a question

23. I like questions with more than one right answer

NOW COMPLETE PAGE TWO

Instructor Question Survey for STUDENTS Page Two

Instructions:

Now, read statement #24 – #43 carefully as a STUDENT taking this class. For each statement, using the SCANTRON answer sheet, shade the letter (A, B, C, D, E) which matches the frequency you experience each instructor action.

A. Never B. Sometimes C. Often D. Most of the time E. Always

Example:

In item 25, if it is your experience that your instructor sometimes calls on students by name, shade B for #25 on the SCANTRON answer sheet.

- 24. My instructor asks questions to the whole class
- 25. My instructor calls on students by name
- 26. My instructor asks questions about personal experience
- 27. My instructor refers to students' previous answers
- 28. My instructor asks questions with no clear answers
- 29. My instructor asks questions that test knowledge of facts
- 30. My instructor asks questions about students' opinions
- 31. My instructor asks questions that make students think
- 32. My instructor asks questions that encourage discussion
- 33. My instructor listens carefully to students' questions
- 34. My instructor explains why incorrect answers are wrong
- 35. My instructor asks follow-up questions
- 36. My instructor calls on the same students in every class
- 37. My instructor asks questions that keep students interested
- 38. My instructor varies the kinds of questions they ask
- 39. My instructor listens carefully to students' answers
- 40. My instructor ignores students' answers
- 41. My instructor builds upon students' answers
- 42. My instructor gives students enough time to answer
- 43. My instructor intimidates students with their questions

Instructor Question Survey for INSTRUCTORS Page One

Instructions:

For item #1 - #3 please provide the following basic information using SIDE 1 of the SCANTRON answer sheet.

Please Note: No other personal information (Name, Course number, etc.) is required

4. School or Dept (Select by shading the appropriate letter on the SCANTRON answer sheet)

A. Psychology B. Business C. Nursing

5. Gender:

A. Male B. Female

6. Overall, what fraction of the students in your classes answers questions?

A. Less than 25% B. Less than 50% C. More than 50% D. More than 75%

Now, read statement #4 – #24 carefully as the INSTRUCTOR teaching this class. For each statement, using the SCANTRON answer sheet, shade the letter (A, B, C, D) which matches how much you agree or disagree with the following statements about instructors' questions in this class:

A. Strongly Disagree B. Disagree C. Agree D. Strongly Agree

4. Students like instructors who ask questions in class

5. Instructor questions keep students interested

6. Students learn more when the instructor asks questions

7. Students try to think of the answer when an instructor asks a question

8. Students avoid answering questions to the whole class

9. Students dislike sharing personal experience with the class

10. Students are interested in knowing why their answers are wrong

11. Students try to answer when the instructor calls on them

12. Students hate being called on by name

13. Students learn when questions are asked of them

14. Students learn from questions they get wrong

15. Students find it hard to think when the instructor calls on them

16. Students learn from questions when they think of the correct answer

17. Students like questions that have a definite answer

18. Students are afraid of saying the wrong answer

19. Students get very nervous when the instructor calls on them

20. Students don't worry about getting the answer wrong

21. Students like to answer the instructors' questions

22. Students dislike questions answered with a question

23. Students like questions with more than one right answer

NOW COMPLETE PAGE TWO

Instructions:

Now, read statement #24 – #43 carefully as the INSTRUCTOR teaching this class. For each statement, using the SCANTRON answer sheet, shade the letter (A, B, C, D, E) which matches the frequency you demonstrate each action.

A. Never B. Sometimes C. Often D. Most of the time E. Always

- 24. I ask questions to the whole class
- 25. I call on students by name
- 26. I ask questions about students' personal experience
- 27. I refer to students' previous answers
- 28. I ask questions with no clear answers
- 29. I ask questions that test knowledge of facts
- 30. I ask questions about students' opinions
- 31. I ask questions that make students think
- 32. I ask questions that encourage discussion
- 33. I listen carefully to students' questions
- 34. I explain why incorrect answers are wrong
- 35. I ask follow-up questions
- 36. I call on the same students in every class
- 37. I ask questions that keep students interested
- 38. I vary the kinds of questions I ask
- 39. I listen carefully to students' answers
- 40. I ignore students' answers
- 41. I build upon students' answers
- 42. I give students enough time to answer
- 43. I intimidate students with my questions

APPENDIX B

Consent Form for Human Participants in Research IRB Permission

CONSENT FORM FOR HUMAN PARTICIPANTS IN RESEARCH
UNIVERSITY OF NORTHERN COLORADO

By reading the following consent form and completing the questionnaire you consent to be a part of this study

Project Title: Instructor-initiated questions and their influence on student participation in class

Researcher: Christopher Hill, PhD student School of Psychological Sciences
Phone Number: 303-530-7176 E-mail: hill0435@bears.unco.edu

Research Advisor: Dr. Steven Pulos, Faculty School of Psychological Sciences
Phone Number: 970-351-2527 E-mail: Steven.pulos@unco.edu

I am researching how instructor questions in the undergraduate classroom influence student participation in discussion. As a participant in this study you will be asked to complete a short questionnaire in a regularly scheduled class during this semester. The questionnaire will assess the frequency with which you experience different kinds of instructor questions in class, how your instructors ask questions in class, and your attitude towards different types of instructor questions and different ways they are asked. The questionnaire will take approximately 20 minutes of class time.

For the questionnaire, you will not be asked to submit your name, but you will be asked to provide your class section, age, gender, and student type (freshman, sophomore, junior, senior, etc.). Your responses will be completely anonymous. In no case will responses from individual participants be identified. All data will be pooled and published in group form only. All paperwork will be kept in a locked cabinet at a secure, off-campus location.

Risks to you are minimal. Taking the questionnaire has no bearing on your grade. There will be no compensation for your participation in this study. However, your participation will provide valuable information that will provide a better understanding on good teaching and may ultimately improve the quality of classroom teaching for future students.

Participation is voluntary. You may decide not to participate in the survey and your decision will be respected and involve no penalty or loss of benefits to which you may be otherwise entitled.

If you have any concerns about your selection or treatment as a research participant, please contact the Office of Sponsored Programs, 25 Kepner Hall, University of Northern Colorado, Greeley, CO 80639.

IRB PERMISSION

From: Lahman, Maria [Maria.Lahman@unco.edu]

Sent: Thurs 10/21/11 8:55 AM

To: Christopher Hill

Cc: Pulos, Steven [Steven.Pulos@unco.edu]

RE: IRB Request

Thanks Chris. I have approved your IRB request. In a few days Dr. Pulos will receive a letter from RIB confirming this. In the meantime you may start the study.

Best Wishes,

Maria K. E. Lahman

Associate Professor

Applied Statistics and

Research Methods

University of Northern Colorado

970-351-1603

From: Christopher Hill [mailto:hill0435@bears.unco.edu]

Sent: Wed 10/20/2010 3:40 PM

To: Lahman, Maria

Subject: RE: IRB Request

Dear Dr. Lahman,

I have attached the Instructor Survey and an updated Student survey. I have changed them to accommodate Scantron answer sheets. Hopefully, using Scantrons will save paper and improve reporting accuracy.

Kind regards,

Chris

-----Original Message-----

From: Lahman, Maria [mailto:Maria.Lahman@unco.edu]

Sent: Monday, October 18, 2010 7:57 AM

To: Christopher Hill

Cc: Pulos, Steven

Subject: IRB Request

Dear Chris,

Thanks so much for such a well written IRB request. Sorry I am running behind in reviewing.

Please address the following.

1. I suggest taking the signature off of the consent form. For surveys such as this you can make the consent a letter of information and put a line at the top of the survey that says something like, I understand that by filling out this survey I have consented to be in the study.
2. Add Dr. Pulos' information under yours at the top of the consent form.
3. Through email explain to me what you need to know what class they are in as indicated at the bottom of the survey.
4. I need the instructors survey unless it is under development. If it is I need you to send it to me when it is done.

Best Wishes,

Maria K. E. Lahman
Associate Professor
Applied Statistics and
Research Methods
University of Northern Colorado
970-351-1603

APPENDIX C

Instructor Interviews

Instructor Interviews

Interview One:

February 15, 2011 Business Instructor

Researcher: So thank you. If you can tell me how you use questions in your classroom.

Instructor: Okay I usually ask them about formulas, concepts that they are supposed to know. Concepts, formulas that have been discussed previously. That's my typical question.

Researcher: Okay.

Instructor: We're working on a problem and then we come across a situation where we have to we have to use certain (inaudible) We have to apply certain concepts which results in a formula and we have to calculate, let's say, certain probability and that's when I asked questions. Those are my typical questions.

Researcher: Thank you.

Instructor: Occasionally, I ask questions for general knowledge, I guess to show (inaudible) to them extra relevant information, or extra information, that comes with certain data that we use in class, we tend to use data that are fairly close to reality. If not, you know, numbers that (inaudible), numbers that I get from the Federal Reserve Bank, from the American Bar Association, from the Department of Labor Statistics, the OEACD, etc. and I get some questions as to, for instance, the other day we were talking about whiskey consumption - which country has the highest whiskey consumption? They have no idea, but that was just to show you that there are institutions, there are issues related this value that were going to discuss in class that are beyond the analysis we do in class.

Researcher: Okay, thank you, and I think you've answered my next question: the kinds of questions that you ask are the questions around formulas to make sure they understand the concepts and formulas that they need to understand before you can go into the next step. And also sometimes questions around the outside world to give context to what you're discussing in class.

Instructor: Yes, for instance, at the end of last semester, we were going to discuss the constative correlation and I was relating medical expenditures (inaudible) and I asked them which country spends the most in healthcare? Some of them kind of suspected it was the US but most of them had no clue, they had no idea. What was our income? They had no idea. I just to show them that there are concepts here, that we discuss concepts in class that could be used for statistical meaning and there are institutions that study those concepts, those numbers for other reasons. We show them numbers for Canada, for England, actually for Great Britain, Canada, France and Australia.

Researcher: OK, good, good, thank you. And how do your students generally and specifically react or respond to the kinds of questions that you ask?

Instructor: The questions I ask relate to formulas and concepts, and there is usually is a core group of five to six students who always answer the others, never.
(Transcript ends because of recorder malfunction)

Interview Two:

February 15, 2011 Educational Psychology Instructor

Researcher: So how do you use questions in your classroom?

Instructor: That's a very open-ended question! (chuckle) I feel like I'm in an interview now. I always try to use questions to get my students to think, to process and sort of be, the primary purpose is, instead of having them be passive, absorbing information at best, passively thinking, looking at me, writing down notes but possibly thinking about dinner or their next day or whatnot trying to get them to process the information I am presenting to them and to think about the material more deeply versus superficially. So, the general answer to why use questions to my purpose would be to process deeply, to get the students to think, and to make their own connections. So, this is a little more specific now, but questions that ask them about their own lives, or their own experiences. . . For an example, today we did (inaudible) conditioning so what's your own example in your own life? Don't worry about the classroom right now; your own example of negative reinforcement? For me, speaking to them, give them things to think about that they can connect to in their own life. I feel that those questions, things that ask about their life is going to get them speaking more than if I asked questions about the content where they're afraid to get the wrong answer, or they don't know the answer, so just starting with getting them to think about in relation to their own personal lives - that's the first step that I use questions.

Researcher: So let me just check what I heard. So you use questions to get the students actively involved in processing the information that you present.

Instructor: Correct.

Researcher: So you want them to think about it. Is talking about it? Is that something you hope they'll do also? Is that part of the process? Is it mental or do you want them to . . . ?

Instructor: For me, it's more important if they just think about it. If they're talking about it, that's an indication that that they are thinking about it to me. But a lot of the students do not answer, do not engage but I hope that setting the question before them gets them to think, maybe even if only three people comment, that more of the students that aren't commenting are considering how this material applies to their life and just, just taking some level of active processing versus just kind of writing down the words on paper. So thinking is more important than actually speaking about the material.

Researcher: So you kind of answered part of this next question already. The next question is, "How do students respond to your questions?"

Instructor: Depends upon on how good my questions are! (chuckle) If I asked them for a term or definition (sometimes I will because I want them to think that I do expect them to read the material), I get a lot of more tentative responses and I get the top performing students to respond so you're really limiting the range of the students participating,

students answering by asking content driven or specific definitions or terms. But I do a little bit of that. How I expect them to answer questions when I ask them more broad questions, then I have really no idea where they're going to go. It's not looking for a piece of a definition or a part of an answer and usually you just get pieces that you kind of piece, that you pull into the lecture that I'm giving. But if students. . . , I mean, they think of, they comment on things I would never think of, directions in places I cannot expect. If I asked questions that are broad enough, that allows them to see a connection of some sort, and then. . . I think you asked what kind of answers do I expect from my students? Usually I don't know what to expect and you just have really, possibly rich, directions to pull content from. I have been given more examples to use, and to refer to, and sometimes they head me in a direction that I can go and other times they put me in a stopping block because I can't relate, and I don't know what to do with it, but I. . . And at some points because they misunderstand the concept, and at other times it's because I just can't connect so I don't see the relationship, even if one is there.

Researcher: So the students respond differently depending on the kind of questions you ask?

Instructor: Exactly, yes, absolutely.

Researcher: So, and again. . . So the next question, and I think you've already answered some of it is, "What kind of questions do you ask?" You've already said that you ask kind of real world questions about their experience, is that right?

Instructor: Mmm hmm, yes, that is right, I try to, yes.

Researcher: And then also, kind of, factual questions that you expect them to know, that they've read, or that they need to know (inaudible).

Instructor: Correct.

Researcher: Do the same. . . ? First of all, are there any other kinds of questions?

Instructor: Well I'm sure there are. . . I just could think about the lecture I gave today and those are the kinds that pop out in my mind. The other one that comes up probably not as often as asking about personal examples or connections is trying to integrate two different pieces of material from the course and how those might relate. For example, in Intro to Psych, they learn about sleep, and then they learn about the nervous system, and I ask them to think about how, what do you think is happening with the sympathetic nervous system or the parasympathetic nervous system when one is sleeping, and have them try to pull information that they already know and pull it together and try to connect. The third area of content would be integrating pieces of information so they're not bits of floating, isolated knowledge that they can. . . I always see the connections when I teach one lecture to another but I know a lot of times, the students don't. They see them as isolated so I try very hard to integrate questions by having them, instead of just telling them, asking them to consider how these two pieces might be related.

Researcher: Do you send? Students respond differently depending upon the questions. If it's a facts and data-type question, do you get a more tentative response, whereas if you're asking somebody about their personal experience or something like that?

Instructor: Mmm hmm, they share a story.

Researcher: They share a story. What about the actual students that respond? Earlier, you said that not everybody really talks. (Instructor agrees). It's just a group within the group. Is that the same students every time?

Instructor: There's more variation in the students that respond when you ask question examples. You might hear from someone you haven't heard from in a while. From the more factual questions, when I'm looking for more specific content, it tends to be the same students. Out of my 20 students now, it tends to be the same 3 or 4, at best, and, they, partly, they've done the reading, they know the answer; and then they feel, they sit there, and you can tell that they are thinking that "I feel responsible for answering this because I know it and then, and no one else knows it," and they eventually raise their hands and answer it. But, there's still, I think, a subset of students that very rarely speak, and when I'm asking questions in front of the whole class, it's different than when they're in small groups.

Researcher: What do you think are the influences behind who responds and who does not speak?

Instructor: Partly it's just how confident they are with the material, how confident they are just in social settings, how assertive they are versus. . . I don't know anything about extraversion or introversion, I don't know anything about the things that make people more gregarious and they're going to be more likely. . .

Researcher: Just playing it back. . . So the students that tend to answer the questions are typically more gregarious, they're more extroverted?

Instructor: Yes. Yes, they comment when you don't ask questions sometimes, or they ask questions to you, which is great, but those students are speaking more, in general. There's some students that don't raise their hands to ask you and don't ever add to something without being prompted so I think it has absolutely something to do with their level of. . .

Researcher: Do you ever go outside of that group?

Instructor: I usually know my students' names so that helps because then, I don't know, it helps at some level. If I feel like a student knows, has something to contribute and I can tell that they're thinking they have something that they kinda' wish to share but there's a little hesitation, a little inhibition, if I feel that way, then I'll say, "What do you think, Shane?" "What do you think, Tina?" I mean, "Have you ever experienced this?" In those cases, I don't ask, I don't try to ask someone who doesn't want to speak a content-driven question. I would try to ask them something that I really feel confident that they can relate to on some level. And sometimes they still don't really respond, they still don't say anything, and then that is kind of, it doesn't reinforce what I'm trying to do. But because the outcome isn't always very good, unless. . . , I don't do it as often as I think that I you know is that I think that I reflect on whether or not I should or ought to is different, but what I actually do is, I would say, 5 or 10% of the time I do.

Researcher: But it sounds like you have a plan. It sounds like if you are concerned that somebody doesn't want to answer because they don't have the confidence, they don't have the answer, (inaudible) the answer.

Instructor: I would ask them in a certain setting the type of question, sure,.mmm hmm. And I, usually in my notes, in my PowerPoint (my PowerPoint is my notes) when I get up and just talk without PowerPoint and have a talk, just talk with my hand or whatnot, I always have in yellow, I have highlighted all the questions I want to ask and that's the only content I have highlighted usually I have terms underlined but because I don't want to. It's a stopping point for me to stop and try to make a point of asking. I think I try to think through those questions. I'm not very good at thinking of questions on the spur of the moment. The material is too content-driven; I don't stop enough if I don't already have a stopping point where I planned to pause.

Researcher: OK, so the questions that you ask tend to be related to the content at a given point; they come out of the information or the topic or whatever?

Instructor: Yes, and not as. . . I wish it was more flexible like that but I'm not yet. (chuckles) I'm not very flexible when it's planned.

Researcher: You know, everybody has an approach in the classroom. . .

Instructor: And my approach called (inaudible). (chuckles)

Interview Three:

February 16, 2011 Nursing Instructor

Researcher: So the first question is, how do you use questions in the classroom?

Instructor: OK. Usually, I think I use, I use them as a learning tool, or I hope to use questions as a learning tool so when I ask a question, it's a chance for the students to tell me what they know, maybe tell me what they don't know, you know, kinda give me some information about where they're at. Sometimes it's in relation to something new that they're learning, and I'll say, "Okay, so tell me about this process." You know maybe it's pathophysiology that I'm explaining; wanting them to know background to be able to understand the drug were talking about, specifically, in the class that you came to. So that would be the first thing. The second thing is just for interaction. Especially in this class, pharmacology is a lot of lecture which I don't like. I don't like being that lecturer up there, and so it's a way to get them involved in the class. We almost always do something interactive but I can't even stand for an hour, just sitting there talking, so it's a way to interact with them and get them involved in that kind of thing.

Researcher: Right. So what kind of interaction are you looking for?

Instructor: Well, you know, I really want to find out what they know, a lot of times. Obviously, I'm looking for the right answer but that's not always what I get. I think that's a good thing, though, too because there's a huge learning. . . You know, I try, especially with the students when we have a smaller class, I like for them to be very interactive because it gives me an idea of what they know, what they don't know, and really what I should focus on then. I know some students kind of get intimidated by that; right now the class that I have has 107 students. So that's different because it's much more difficult to get them to interact. Now the group that I have right now with a hundred students, a

hundred plus students, are very interactive which is really interesting because they'll take a stab in the dark and if they don't know the right answer I'll just say, "No. Great guess! Let's try and see if someone else has got it." So hopefully it's meant to be an encouraging situation.

Researcher: So let me follow up on that. You ask certain questions just to check where they are, what they know, so that you can kind of fit in the new stuff.

Instructor: Right.

Researcher: So I'm guessing there's kind of factual questions?

Instructor: A lot of times.

Researcher: And then there's these questions that you ask that are really just to get the interaction going?

Instructor: Uh huh.

Researcher: How are those two types of question different or are they the same?

Instructor: I don't know if they're really different at all. I think interaction can be a learning mechanism but I think it can also just be a thing that keeps them awake. Because sometimes you ask a question and you can just tell that they are all sitting there, you know? And I thought, "Oh, I've lost them!" and that kind of thing, so for me it's a chance to find out, again, what they know but also if they're paying attention, if I still have them mentally, and if I don't, then maybe it's time for a break, or it's time for them to have them stand up, at least, and get something circulated beyond in their bum, I guess.

Researcher: Sure, okay, so let me flip the question. This is all kind of running into the same thing. How do they respond to the questions that you ask? Just what are your observations about that?

Instructor: It seems to me that you have a majority of the students that sit quietly and then you've got a minority that answer the questions. I try really hard to interact with everybody but when you have a class of a hundred that's really hard. But when you have a class of 30 or 40, there's no excuse that not everybody can at least answer one question every couple weeks. I know some people are more extroverted and that kind of thing, but I tend to see that it's a lot of the same students again and again, and it tends to be my front row students. At some point, you just want to say, "Someone in the back row, answer this question!" One of the things we're going to do today, which is one of the reasons why I'm doing this, is to interact with everybody. So I'm going to hand out questions for each group of like three or four, and we'll see how it works with a group of a hundred. But it's a chance to interact with the people in the back row and whatever, because I don't want people to feel like just because you sit in the front row you interact, and just because you sit in the back, and maybe that's why they sit in the back?; I don't know. In a class of a hundred, you can get lost, for sure. And I don't like that feeling; I don't like having classes quite that big.

Researcher: So there are certainly things that you're going to do to kind of mix it up?

Instructor: Mmm hmm, yes, we do, I try and do interactive exercises every class regardless of the size.

Researcher: Tell me about those, please.

Instructor: Well, sometimes they fail. We do things like (I'm trying to think of what we've done this semester) I will give them an envelope with 20 pieces of paper in it. In

five of those pieces of paper will have drug names on there and (it must be more than that) the other 20 pieces of paper will have what we consider the major aspects of that drug. For the one activity, it was pretty common drugs like Tylenol and Motrin and things you would think they would know but then when they were starting to really look at them they don't understand it, so it's a really good problem solving thing for them to figure out, does Tylenol have anti-inflammatory properties? - which it does not and most people assume it does. It's a great chance and they get in on the floor usually. They sit down on the floor, and they take and they spread them across, and put them all together and they have to work in groups of between 6 and 8 at a time. In a small class, it works great; in a big class, we just did it with a 100 people, a 105. It worked fine. It was really good and it was a great eye-opener for them to see and I made them keep them on the floor, wherever they had them laid out so that when we went through the lecture, then I could say, "Okay did you get that right?" you know, with everyone.

Researcher: Okay, so you could draw more people in when you got to the lecture part? And that worked pretty well?

Instructor: It did. You know, again, when you come back to interacting with them in a classroom it's then again the same people who are answering questions. But when I walked around the classroom, it took them about 20, 30 minutes but then I could interact individually with people that never say a word.

Researcher: Sure sure. What do you think it is? What's different about that group, that minority that answers the questions all the time?

Instructor: Well, I think, maybe confidence. It could be knowledge; just knowledge base, as well, too. I think definitely in a group that big, we definitely have students that have a sense of knowledge base versus students that don't. You know, again, they're all coming in from the same prerequisite level but a lot of them have life experiences; you know, they work as certified nursing assistants or they work as medical assistants, and they have a huge knowledge base, as compared to the other students. And they're willing to be, they're smart extroverts. I really think that's the case. You know, it's not necessarily that they don't know, it's that, even if they knew it, they wouldn't share it.

Researcher: I see. So the two things are: the level of the knowledge and just how willing they are to just speak up.

Instructor: I would think. That's a guess.

Researcher: That's fine and that's all I need; just interested in your perspective.

Instructor: I can't think of anything else that would. . . you know, I hope it's not that anyone ever feels intimidated, you know, at all, I mean that would be your (inaudible).

Researcher: Okay, do you think that happens? If not in your class?

Instructor: Oh for sure! And with 100 students, I think that they're afraid to be wrong. And again, we'll were talking about some of the content we're talking about, they're going to be wrong a lot. You know, they're going to have to have guesses. I'll say, "What you think about this? What do you think is going to happen as soon as this person takes this drug?" And they'll give me a guess and I'm like, "No, great guess, I hadn't thought of that, now. . ." Or sometimes it's something that is correct and I haven't even thought about it and that's really good, too.

Researcher: So you make it okay to be wrong. It's not a big deal to be wrong.

Instructor: Yeah, I hope so. I think there's too much of being wrong to make them feel badly about it. Because there are going to be so many topics that we'll talk about where they're not going to have the right answers, nor could they. My goal is to have them think about it so I hope it's never, I mean, like that would be the worst-case scenario to have them be uncomfortable.

Researcher: There are certain questions you can ask that you can't get wrong. Like, if you asked them about their life experience, that's theirs; they can't get that wrong. Do you use those kinds of questions?

Instructor: Yeah, we do. We'll say things like, "How many people have never taken Tylenol?" You know, that's an interesting conversation when you're looking at a course that's all about drugs. Almost every person in that class has taken Tylenol, or antibiotics is another one. You know, that's a great one: "So how many of you have not taken every dose of your antibiotics, like you're supposed to?" That's, again, probably half of them, you know, and it's a big problem for developing anti-drug-resistant strains of bacteria, and that kind of thing, and it's a great realization that, jeez, I'm part of the problem! You know, and we all are! It's an interesting perspective so. Yes, and that perspective, that's just answering the question by raising their hand or whatever, you know.

Researcher: Alright.

Interview Four:

February 16, 2011 Nursing Instructor

Researcher: So you know my topic of interest is questions that instructors ask in the classroom, okay?

Instructor: Mmm hmm.

Researcher: So how do you use questions in your classroom?

Instructor: Probably, there is a couple of different ways. One way would be to evaluate, you know, if they're getting it. So maybe I've given them a review, like a quiz review. We are going to have a quiz or we're preparing for a quiz; I'll throw questions out and see, you know, are they kind of on track? So that's one way. A lot of what I do, though, with questions is try to stimulate discussion, so I'll throw something out there that I know is going to be. . . not inflammatory but you know...?

Researcher: Do you have an example?

Instructor: Yeah, like I would say, "How do you feel about. . .," like I will say, "There have been groups of people who have proposed that Medicare should not be, should be according to income instead of according to just over the age of 65."

Researcher: Okay.

Instructor: "How do you feel about that?" And that would be, that usually opens up a big. . .

Researcher: I'll bet! (chuckles)

Instructor: . . . a big discussion. Or you know, related to pain medication, how we medicate people for pain. That's always a hot topic.

Researcher: So you ask questions that just check what they know?

Instructor: Uh huh.

Researcher: And you also asked questions just to, kind of, get them talking?

Instructor: Right.

Researcher: Now in that latter category, those discussion-opening questions: where are you doing after that? What's your plan?

Instructor: Well, a lot of times, it'll be, I'll see what comes up and I'll kind of maybe jot down a few things as we're going. Sometimes I'm looking, I'm kind of assessing, are they critically thinking? I'm looking for critical thinking. Are they just falling into their assumptions? Are they challenging their own assumptions? And other people's assumptions? And then are they able to then bring it back to, "Okay, maybe this is something that I need to think about." "Maybe I'm just assuming this is because this is what I know." So I'm kind of looking for critical thinking. We have a lot of content on critical thinking and so I can bring it back to "What were your assumptions in this discussion?" and "How did you feel when they were challenged?" and "How would you, if you were in a clinical situation, how would you prove or disprove your own assumptions?" you know? "How would you make the best decision?" So I'm looking for those kinds of critical decisions. But then also saying okay these are all the things that came up when we opened up this big can of worms. This is very much like the discussion that happens on a larger scale in the community in a healthcare setting. These are the opinions that you are going to hear from people: doctors, nurses whatever when you get out there so you need to be prepared for this kind of discussion. So sometimes it's that, saying this is a micro-example of the big discussion that's happening nationally.

Researcher: So two kinds of questions then. Questions that obviously are just testing their knowledge, making sure they know all they should know or they don't know, and then just getting them sort of to think out loud and. . . ? Okay.

Instructor: Another thing that I'll sometimes do which is kind of mean, if I think someone is not particularly engaged, I'll ask them a question, of that person, using their name. So I will also use it as a tool to keep people engaged.

Researcher: Okay. That's interesting. Okay. So that kind of ties to my next question which is: how do students respond to these different types of questions and the way you use questions?

Instructor: It depends on the student a lot. Some people, you just cannot get them to speak in class, you know, for anything.

Researcher: Sure.

Instructor: But I think, you know, I wouldn't throw something, some inflammatory thing out there in the first week. I mean, this is after we have built some camaraderie as a group that I would do that.

Researcher: Okay.

Instructor: I really try to get them to build collegiality between me and them and then between each other so that they feel, you know. . . there needs to be a culture of safety in a classroom so that people feel comfortable responding and expressing their opinion about things.

Researcher: And what do you do to promote that?

Instructor: Well, we do a lot of group work. They hate it at first but I think that the reason they hate so much. . . it's not so much that they don't want to work with the group

but because they don't see themselves as having time to coordinate with the group. So we'll use class time for that. We'll let them use the class to coordinate with their group.

Researcher: How big is the class?

Instructor: 36 usually.

Researcher: Is that pretty typical?

Instructor: Mmm hmm. Yup, our cohorts are either 32 or 36.

Researcher: And your class? What kind of class is this?

Instructor: This is their foundation, their first foundations course. So it's the first class they get in their sink (sync?) school. And they don't always like it because they're nursing, their pre-nursing activities have been pathophysiology, biochemistry, you know, pharmacology, very hard science, where they can memorize, regurgitate on the test. So then they come to me and I talk about communication and culture, nursing process, nursing history, nursing theory, you know, all these other kinds of, you know, how do you talk therapeutically to a patient? And they see it as fluffy, you know?

Researcher: Right. Because there's not the same answer every time?

Instructor: Right, everything depends on the patient; everything depends on your interaction with the patient, and so they don't always see. We talk about ethics, a lot about ethics and the legal aspects of nursing, you know, just that kind of stuff?

Researcher: Sure.

Instructor: The image of nursing, we spent a big, a lot of time talking about who do the public see as nurses? So they don't always appreciate that content. And they are so competitive getting into the program, they are really competing with one another, and then they get in and we want them to work in groups. (chuckle) So that transition is sometimes hard.

Researcher: Who is answering the questions?

Instructor: You know what I find, and we've found more and more in our traditional program even, in the secondary student, because in our second degree program they have a previous degree, so they've been through this before.

Researcher: Okay.

Instructor: They've had a previous occupation. Some of them or older than me, many of them are. Because they've had a whole life of something else so now they're coming into nursing. And so they seem to be very much more willing to be a leader in that discussion.

Researcher: The secondary student?

Instructor: Yes, right. Instead of the 18-year-old, who feels like "I can't say anything because this person next to me is like my mom," you know? So that's an interesting dynamic when you have them both in the same room. But in the traditional program now, we've gotten more and older students who have a previous degree in something and they just are in the traditional program. So I try not to always have them take the lead, those.

Researcher: But they would, if you. . . ?

Instructor: Mmm hmm. A lot of times, they will be the ones because they have life experience and, you know, they're more comfortable with stating their opinion. But I try to draw out some of the quiet ones, too.

Researcher: You said already sometimes you'll just throw question at somebody in particular.

Instructor: Right. And I really make an effort to get to know my students as individuals so I have, by the middle or the end of the semester, I pretty well have a good idea of what their situation is and where they work, what is their work history, where are they right now, and so then I can kind of say, "Well, So & So, you have some experience with this. Why don't you share, you know, what your experience has been?" You know? And I think, also, I make huge effort to learn all their names very quickly.

Researcher: You use that when you're asking questions?

Instructor: Yes, and that makes them, that is just such a simple thing and it's just so remarkable the impact that it has, just knowing their name, all when you call on them. So that helps, I think, build that feeling.

Researcher: Anything about the kinds of questions you ask to do that same thing? To get people to participate?

Instructor: Yes, sometimes. I pretty much know where they are in terms of their knowledge base, after they've had a quiz or two. So I may ask a question that I know they know the answer to, you know, just to increase their confidence. If somebody has had a question that they have come to me, personally with, I may say I'm going to have you asked that in front of the class because I'm sure that others have the same question. And I'll say, "So & So has a really good question that probably others of you have. I'm going to have her ask that question." Because a lot of times they have questions but they come to me at break with them, rather than raise them during class.

Researcher: So you mentioned, I don't know what you call it, maturity, life experience, as a variable in whether or how a student might respond to questions. Are there any other factors in there that (affect response)?

Instructor: I think there's probably some gender stuff.

Researcher: Really?

Instructor: Although not so much. But sometimes, because we're so predominantly female, sometimes the boys in the class will tend to be a little more quiet.

Researcher: Okay.

Instructor: Like they're afraid to speak up with 32 women in the room. (Chuckles) I guess I can understand that.

Researcher: It's pretty smart thing.

Instructor: So sometimes there's that but I think a lot of times it's how much clinical experience they have. So if they have worked as a CNA, or they've been a medical assistant or they may have taken care of a sick grandmother, even, they have worked in a psych unit, whatever, you know, if they have clinical experience, that makes a big difference in their comfort level.

Researcher: Okay, okay. All right.

Interview Five:

February 22, 2011 Educational Psychology Instructor

Researcher: Okay, (Name), so here's question one: how do you use questions in your classroom?

Instructor: I use questions pretty spontaneously. I would say, I don't really. . . I plan some that are more just a review kind of questions; I plan some at the beginning of class to review what we did last time; and I plan some throughout lecture that just review, kinda to sum up what I just talked about in lecture. But then other questions just come up while I'm talking.

I would say, I would like to learn how to ask deeper questions. They're usually pretty surface level, or relating a topic to their own lives. That's about it.

Researcher: So usually, you're using questions to check their recall, or check their understanding or, kind of, check how they're doing as you go?

Instructor: Yeah, and as a tool for them, realizing that if I ask a question, they can't sum up what I just talked about, they might not know it, and they might need to study that material.

Researcher: I see. Okay, okay. That's question 1. Question 2 is sort of similar. So, given the way you use questions, what kinds of questions do you use? Do you have examples, or. . . ? What kinds of questions?

Instructor: Do you have categories you want?

Researcher: Well, if you're reviewing, what would those kinds of questions sound like?

Instructor: Well, I might ask, like when I am talking about genetics, I might have them recall what the sex chromosome disorders are that we talked about, and what would a genotype look like for those disorders. Or, what are the errors in thinking in piaget's (?) preoperational period, and come up with examples of each error in thinking. Mostly questions like that.

Researcher: Okay. So, usually in the classroom, in your class domain. Okay. And how do they, how do the students respond to these questions? What are your impressions of how students respond to questions you ask?

Instructor: I try to have them work in groups or pairs as much as possible. So I walk around and a lot of time they are discussing the answer, or, you know, if it's a question where I am asking them to come up with examples from their own life, they are discussing things that have happened to them that relate to the topic.

Researcher: So let me just check: so when you use questions, they are not necessarily just questions you will ask to the whole class as you are moving through your material. You might, like, assign questions to groups?

Instructor: Yeah, I do that, too but I do ask questions to the whole class sometimes and it's usually the same few people that answer them. (chuckles)

Researcher: How big of a sample is it inside the class?

Instructor: Right now, I have 70 but last semester when I did this I had 18 because I was teaching Ed. Psych, of course. So with my class of 18, I certainly got most of the class to talk. Because I think they felt they could not hide as much. I had them sitting in a circle, you know?

Researcher: Sure, sure.

Instructor: Whereas in my class of 70, it's usually the same 5 people who talk.

Researcher: It's funny. That number 5 comes up over and over again.

Instructor: Oh really?

Researcher: Five or 6, 5 or 6. . . it's what I hear all over. And, so given those differences between those classes, I mean, the implication there is class size, is a factor in how many in the group will participate, will answer questions? Anything else that you think influences who's going to volunteer an answer or not?

Instructor: Well, it probably has something to do with the type of question I ask but. . .

Researcher: Tell me more about that.

Instructor: I don't know. . . I just feel like I struggle a lot. For instance, I was sitting in the lecture on Wednesday, from a professor who I love (he's a really great teacher) and he just asked a question that just made something click; that we'd been reading about and talking about but I didn't really get it until the moment he asked the question. So I want to learn how to teach with my questions like that, that have my students make connections because of what I am asking. But I don't know how to go about doing that.

Researcher: That's fine. Any other. . . ? So the types of questions? Any other student factors, do you think are relevant?

Instructor: Yeah, the ones that sit in front talk more.

Researcher: And who sits in front?

Instructor: The ones who take more. . . they pay more attention, take notes more versus the ones in the back; I notice they tend to have more side conversations and don't take as many notes.

Researcher: Is there anything else. I don't want to feed you any. . . ?

Instructor: I don't know. I don't know what you are getting at. I'm probably missing something.

Researcher: No, you're not. Just whatever comes to your mind. Ok that's all.

APPENDIX D

Supplemental Tables D1-D43

Supplemental Tables, D1-D43

Table D1

Student Preferences, College of Business, Descriptive Statistics

	Min.	Max.	Mn.	SD
I like instructors who ask questions in class	1.00	4.00	3.21	.65
Instructor questions keep me interested	2.00	4.00	3.16	.60
I learn more when the instructor asks a question	1.00	4.00	3.11	.70
I try to think of the answer when an instructor asks a question	2.00	4.00	3.33	.57
I avoid answering questions asked to the whole class	1.00	4.00	2.51	.80
I dislike sharing personal experience with the class	1.00	4.00	2.41	.73
I am interested in knowing why my answers are wrong	1.00	4.00	3.40	.71
I try to answer when the instructor calls on me	1.00	4.00	3.40	.61
I hate being called on by name	1.00	4.00	2.19	.88
I learn when questions are asked of me	1.00	4.00	3.08	.68
I learn from questions I get wrong	2.00	4.00	3.33	.51
I find it hard to think when the instructor calls on me	1.00	4.00	2.44	.76
I learn from questions when I think of the correct answer	1.00	4.00	3.19	.59
I like questions that have a definite answer	1.00	4.00	3.13	.83
I am afraid of saying the wrong answer	1.00	4.00	2.76	.78
I get very nervous when the instructor calls on me	1.00	4.00	2.54	.84
I don't worry about getting the answer wrong	1.00	4.00	2.19	.82
I like to answer the instructor's questions	1.00	4.00	2.54	.82
I dislike questions answered with a question	2.00	4.00	3.10	.73
I like questions with more than one answer	1.00	4.00	2.40	.87

Table D2

Student Preferences, School of Nursing, Descriptive Statistics

	Mean	SD
I like instructors who ask questions in class	3.43	.61
Instructor questions keep me interested	3.28	.63
I learn more when the instructor asks a question	3.18	.70
I try to think of the answer when an instructor asks a question	3.34	.69
I avoid answering questions asked to the whole class	2.25	.90
I dislike sharing personal experience with the class	2.37	.91
I am interested in knowing why my answers are wrong	3.46	.75
I try to answer when the instructor calls on me	3.31	.88
I hate being called on by name	2.31	1.03
I learn when questions are asked of me	3.14	.70
I learn from questions I get wrong	3.31	.77
I find it hard to think when the instructor calls on me	2.68	.89
I learn from questions when I think of the correct answer	3.15	.73
I like questions that have a definite answer	3.20	.79
I am afraid of saying the wrong answer	2.85	.85
I get very nervous when the instructor calls on me	2.62	1.00
I don't worry about getting the answer wrong	2.22	.86
I like to answer the instructor's questions	2.75	.81
I dislike questions answered with a question	2.89	.87
I like questions with more than one answer	2.54	1.02

Note: Min: 1:00; Max: 4:00.

Table D3

Student Preferences, School of Psychological Sciences, Descriptive Statistics

	Mean	SD
I like instructors who ask questions in class	3.26	.65
Instructor questions keep me interested	3.25	.68
I learn more when the instructor asks a question	3.28	.70
I try to think of the answer when an instructor asks a question	3.36	.68
I avoid answering questions asked to the whole class	2.33	.88
I dislike sharing personal experience with the class	2.25	.79
I am interested in knowing why my answers are wrong	3.43	.69
I try to answer when the instructor calls on me	3.43	.66
I hate being called on by name	2.11	.91
I learn when questions are asked of me	3.10	.65
I learn from questions I get wrong	3.32	.64
I find it hard to think when the instructor calls on me	2.49	.81
I learn from questions when I think of the correct answer	3.13	.62
I like questions that have a definite answer	3.10	.74
I am afraid of saying the wrong answer	2.86	.79
I get very nervous when the instructor calls on me	2.62	.87
I don't worry about getting the answer wrong	2.17	.72
I like to answer the instructor's questions	2.76	.72
I dislike questions answered with a question	2.84	.90

Note: Min: 1:00; Max: 4:00.

Table D4

Student Preferences, Combined Groups, Communalities

	Initial	Extraction
I like instructors who ask questions in class	1.00	.52
Instructor questions keep me interested	1.00	.49
I learn more when the instructor asks a question	1.00	.58
I try to think of the answer when an instructor asks a question	1.00	.44
I avoid answering questions asked to the whole class	1.00	.55
I dislike sharing personal experience with the class	1.00	.38
I am interested in knowing why my answers are wrong	1.00	.42
I try to answer when the instructor calls on me	1.00	.36
I hate being called on by name	1.00	.42
I learn when questions are asked of me	1.00	.56
I learn from questions I get wrong	1.00	.43
I find it hard to think when the instructor calls on me	1.00	.56
I learn from questions when I think of the correct answer	1.00	.34
I like questions that have a definite answer	1.00	.15
I am afraid of saying the wrong answer	1.00	.62
I get very nervous when the instructor calls on me	1.00	.58
I don't worry about getting the answer wrong	1.00	.27
I like to answer the instructor's questions	1.00	.53
I dislike questions answered with a question	1.00	.17
I like questions with more than one answer	1.00	.17

Table D5

Student Preferences, Combined Groups, Component Matrix

	Factor	
	1	2
I like to answer the instructor's questions	.72	
I learn when questions are asked of me	.71	.26
I learn more when the instructor asks a question	.69	.34
Instructor questions keep me interested	.64	.28
I like instructors who ask questions in class	.64	.33
I avoid answering questions asked to the whole class	-.58	.46
I try to think of the answer when an instructor asks a question	.55	.37
I try to answer when the instructor calls on me	.55	.25
I hate being called on by name	-.54	.36
I learn from questions I get wrong	.50	.43
I dislike sharing personal experience with the class	-.49	.39
I am interested in knowing why my answers are wrong	.47	.45
I learn from questions when I think of the correct answer	.46	.36
I don't worry about getting the answer wrong	.37	-.36
I like questions with more than one answer	.32	-.26
I am afraid of saying the wrong answer	-.33	.71
I find it hard to think when the instructor calls on me	-.43	.61
I get very nervous when the instructor calls on me	-.47	.60
I like questions that have a definite answer		.37
I dislike questions answered with a question	-.22	.36

Table D6

Student Preferences, Combined Groups, Structure Matrix

	Factor	
	1	2
I learn more when the instructor asks a question	.76	-.22
I learn when questions are asked of me	.74	-.29
I like instructors who ask questions in class	.72	-.19
Instructor questions keep me interested	.69	-.24
I try to think of the answer when an instructor asks a question	.66	-.10
I learn from questions I get wrong	.65	
I am interested in knowing why my answers are wrong	.63	
I try to answer when the instructor calls on me	.60	-.19
I like to answer the instructor's questions	.60	-.54
I learn from questions when I think of the correct answer	.58	
I like questions that have a definite answer	.25	.22
I get very nervous when the instructor calls on me	-.11	.76
I am afraid of saying the wrong answer		.75
I find it hard to think when the instructor calls on me		.74
I avoid answering questions asked to the whole class	-.28	.73
I hate being called on by name	-.29	.63
I like questions with more than one answer	.15	-.41
I dislike questions answered with a question		.41

Table D7

Instructor Behaviors, Combined Groups, One Way ANOVA

		<i>Df</i>	Mean Square	<i>F</i>	Sig.
My instructor asks questions to the whole class	Between Groups	2	4.18	4.13	.02
	Within Groups	229	1.01		
	Total	231			
My instructor calls on students by name	Between Groups	2	14.98	8.72	.00
	Within Groups	229	1.72		
	Total	231			
My instructor asks questions about personal experience	Between Groups	2	18.38	19.42	.00
	Within Groups	229	.95		
	Total	231			
My instructor refers to students' previous answers	Between Groups	2	7.53	8.83	.00
	Within Groups	229	.85		
	Total	231			
My instructor asks questions with no clear answers	Between Groups	2	4.47	4.98	.01
	Within Groups	229	.90		
	Total	231			
My instructor asks questions that test knowledge of facts	Between Groups	2	1.84	2.06	.13
	Within Groups	229	.89		
	Total	231			
My instructor asks questions about students' opinions	Between Groups	2	11.86	10.89	.00
	Within Groups	229	1.09		
	Total	231			
My instructor asks questions that make students think	Between Groups	2	2.65	3.18	.04
	Within Groups	229	.83		
	Total	231			
My instructor asks questions that encourage discussion	Between Groups	2	18.22	14.62	.00
	Within Groups	229	1.25		
	Total	231			
My instructor listens carefully to students' questions	Between Groups	2	3.80	3.72	.03
	Within Groups	229	1.02		
	Total	231			
My instructor explains why incorrect answers are wrong	Between Groups	2	.06	.05	.95
	Within Groups	229	1.22		
	Total	231			
My instructor asks follow-up questions	Between Group.	2	4.55	4.63	.01
	Within Groups	229	.98		
	Total	231			
My instructor calls on the same students in every class	Between Groups	2	.14	.17	.84
	Within Groups	229	.83		
	Total	231			

Table D7 (cont.)

		Df	Mean Square	F	Sig.
My instructor asks follow-up questions	Between Groups	2	4.55	4.63	.01
	Within Groups	229	.98		
	Total	231			
My instructor asks questions that keep students interested	Between Groups	2	3.64	3.97	.02
	Within Groups	229	.92		
	Total	231			
My instructor varies the kinds of questions he or she asks	Between Groups	2	2.60	2.68	.07
	Within Groups	229	.97		
	Total	231			
My instructor listens carefully to students' answers	Between Groups	2	2.26	1.83	.16
	Within Groups	229	1.24		
	Total	231			
My instructor ignores students' answers	Between Groups	2	.82	1.45	.24
	Within Groups	229	.57		
	Total	231			
My instructor builds upon students' answers	Between Groups	2	4.96	5.53	.00
	Within Groups	229	.90		
	Total	231			
My instructor give students enough time to answer	Between Groups	2	1.50	1.47	.23
	Within Groups	229	1.02		
	Total	231			
My instructor intimidates students with his or her questions	Between Groups	2	1.71	2.93	.06
	Within Groups	229	.58		
	Total	231			

Table D8

Instructor Behaviors, Combined Groups, One Way ANOVA, Post Hoc Tests

			Mean	Std.	Sig.
			Diff.	Error	
My instructor asks questions to the whole class	Business	Nursing	-0.49	0.18	0.02
		Psychology	-0.13	0.16	0.70
	Nursing	Business	0.49	0.18	0.02
		Psychology	0.36	0.16	0.07
	Psychology	Business	0.13	0.16	0.70
		Nursing	-0.36	0.16	0.07
My instructor calls on students by name	Business	Nursing	-0.52	0.23	0.07
		Psychology	0.34	0.21	0.23
	Nursing	Business	0.52	0.23	0.07
		Psychology	0.87	0.21	0.00
	Psychology	Business	-0.34	0.21	0.23
		Nursing	-0.87	0.21	0.00
My instructor asks questions about personal experience	Business	Nursing	-1.04	0.17	0.00
		Psychology	-0.32	0.16	0.10
	Nursing	Business	1.04	0.17	0.00
		Psychology	0.72	0.15	0.00
	Psychology	Business	0.32	0.16	0.10
		Nursing	-0.72	0.15	0.00
My instructor refers to students' previous answers	Business	Nursing	-0.69	0.16	0.00
		Psychology	-0.35	0.15	0.05
	Nursing	Business	0.69	0.16	0.00
		Psychology	0.34	0.15	0.06
	Psychology	Business	0.35	0.15	0.05
		Nursing	-0.34	0.15	0.06
My instructor asks questions with no clear answers	Business	Nursing	-0.53	0.17	0.01
		Psychology	-0.28	0.15	0.16
	Nursing	Business	0.53	0.17	0.01
		Psychology	0.25	0.15	0.22
	Psychology	Business	0.28	0.15	0.16
		Nursing	-0.25	0.15	0.22

Table D8 (cont.)

			Mean Diff.	Std. Error	Sig.
My instructor asks questions that test knowledge of facts	Business	Nursing	0.00	0.17	1.00
		Psychology	0.25	0.15	0.22
	Nursing	Business	0.00	0.17	1.00
		Psychology	0.25	0.15	0.21
	Psychology	Business	-0.25	0.15	0.22
		Nursing	-0.25	0.15	0.21
My instructor asks questions about students' opinions	Business	Nursing	-0.82	0.18	0.00
		Psychology	-0.22	0.17	0.39
	Nursing	Business	0.82	0.18	0.00
		Psychology	0.60	0.16	0.00
	Psychology	Business	0.22	0.17	0.39
		Nursing	-0.60	0.16	0.00
My instructor asks questions that make students think	Business	Nursing	-0.36	0.16	0.06
		Psychology	-0.05	0.15	0.94
	Nursing	Business	0.36	0.16	0.06
		Psychology	0.32	0.14	0.08
	Psychology	Business	0.05	0.15	0.94
		Nursing	-0.32	0.14	0.08
My instructor asks questions that encourage discussion	Business	Nursing	-1.00	0.20	0.00
		Psychology	-0.22	0.18	0.43
	Nursing	Business	1.00	0.20	0.00
		Psychology	0.77	0.18	0.00
	Psychology	Business	0.22	0.18	0.43
		Nursing	-0.77	0.18	0.00
My instructor listens carefully to students' questions	Business	Nursing	-0.49	0.18	0.02
		Psychology	-0.22	0.16	0.37
	Nursing	Business	0.49	0.18	0.02
		Psychology	0.27	0.16	0.22
	Psychology	Business	0.22	0.16	0.37
		Nursing	-0.27	0.16	0.22

Table D8 (cont).

			Mean Diff.	Std. Error	Sig.
My instructor explains why incorrect answers are wrong	Business	Nursing	-0.04	0.19	0.98
		Psychology	0.02	0.18	1.00
	Nursing	Business	0.04	0.19	0.98
		Psychology	0.06	0.17	0.95
	Psychology	Business	-0.02	0.18	1.00
		Nursing	-0.06	0.17	0.95
My instructor asks follow-up questions	Business	Nursing	-0.45	0.18	0.03
		Psychology	-0.02	0.16	0.99
	Nursing	Business	0.45	0.18	0.03
		Psychology	0.43	0.16	0.02
	Psychology	Business	0.02	0.16	0.99
		Nursing	-0.43	0.16	0.02
My instructor calls on the same students in every class	Business	Nursing	-0.08	0.16	0.87
		Psychology	0.00	0.15	1.00
	Nursing	Business	0.08	0.16	0.87
		Psychology	0.08	0.14	0.85
	Psychology	Business	0.00	0.15	1.00
		Nursing	-0.08	0.14	0.85
My instructor asks questions that keep students interested	Business	Nursing	-0.38	0.17	0.07
		Psychology	0.03	0.15	0.98
	Nursing	Business	0.38	0.17	0.07
		Psychology	0.40	0.15	0.02
	Psychology	Business	-0.03	0.15	0.98
		Nursing	-0.40	0.15	0.02
My instructor varies the kinds of questions he or she asks	Business	Nursing	-0.40	0.17	0.06
		Psychology	-0.16	0.16	0.56
	Nursing	Business	0.40	0.17	0.06
		Psychology	0.24	0.16	0.28
	Psychology	Business	0.16	0.16	0.56
		Nursing	-0.24	0.16	0.28

Table D8 (cont.)

			Mean Diff.	Std. Error	Sig.
My instructor listens carefully to students' answers	Business	Nursing	-0.33	0.20	0.21
		Psychology	-0.30	0.18	0.22
	Nursing	Business	0.33	0.20	0.21
		Psychology	0.04	0.18	0.98
	Psychology	Business	0.30	0.18	0.22
		Nursing	-0.04	0.18	0.98
My instructor ignores students' answers	Business	Nursing	-0.08	0.13	0.82
		Psychology	0.12	0.12	0.59
	Nursing	Business	0.08	0.13	0.82
		Psychology	0.20	0.12	0.22
	Psychology	Business	-0.12	0.12	0.59
		Nursing	-0.20	0.12	0.22
My instructor builds upon students' answers	Business	Nursing	-0.55	0.17	0.00
		Psychology	-0.35	0.15	0.06
	Nursing	Business	0.55	0.17	0.00
		Psychology	0.20	0.15	0.37
	Psychology	Business	0.35	0.15	0.06
		Nursing	-0.20	0.15	0.37
My instructor give students enough time to answer	Business	Nursing	-0.31	0.18	0.20
		Psychology	-0.15	0.16	0.64
	Nursing	Business	0.31	0.18	0.20
		Psychology	0.16	0.16	0.58
	Psychology	Business	0.15	0.16	0.64
		Nursing	-0.16	0.16	0.58
My instructor intimidates students with his or her questions	Business	Nursing	0.16	0.13	0.46
		Psychology	0.29	0.12	0.04
	Nursing	Business	-0.16	0.13	0.46
		Psychology	0.13	0.12	0.52
	Psychology	Business	-0.29	0.12	0.04
		Nursing	-0.13	0.12	0.52

Table D9

Instructor Behaviors, College of Business, Descriptive Statistics

	Mn.	Min.	Max.	SD
My instructor asks questions to the whole class	3.70	2.00	5.00	1.07
My instructor calls on students by name	2.56	1.00	5.00	1.30
My instructor asks questions about personal experience	2.33	1.00	5.00	1.12
My instructor refers to students' previous answers	2.70	1.00	5.00	.87
My instructor asks questions with no clear answers	1.83	1.00	5.00	.87
My instructor asks questions that test knowledge of facts	3.44	1.00	5.00	.91
My instructor asks questions about students' opinions	2.86	1.00	5.00	1.24
My instructor asks questions that make students think	3.68	2.00	5.00	.93
My instructor asks questions that encourage discussion	3.10	1.00	5.00	1.25
My instructor listens carefully to students' questions	3.71	2.00	5.00	1.04
My instructor explains why incorrect answers are wrong	3.70	2.00	5.00	1.09
My instructor asks follow-up questions	3.24	1.00	5.00	1.03
My instructor calls on the same students in every class	1.92	1.00	4.00	.94
My instructor asks questions that keep students interested	3.24	1.00	5.00	1.00
My instructor varies the kinds of questions he or she asks	3.03	1.00	5.00	1.02
My instructor listens carefully to students' answers	3.63	1.00	5.00	1.11
My instructor ignores students' answers	1.40	1.00	5.00	.75
My instructor builds upon students' answers	3.14	1.00	5.00	1.05
My instructor give students enough time to answer	3.56	1.00	5.00	1.09
My instructor intimidates students with his or her questions	1.75	1.00	4.00	.90

Table D10

Instructor Behaviors, School of Nursing, Descriptive Statistics

	Mn.	Min.	Max.	SD
My instructor asks questions to the whole class	4.18	2.00	5.00	.88
My instructor calls on students by name	3.08	1.00	5.00	1.35
My instructor asks questions about personal experience	3.37	1.00	5.00	.96
My instructor refers to students' previous answers	3.38	2.00	5.00	.93
My instructor asks questions with no clear answers	2.35	1.00	5.00	.98
My instructor asks questions that test knowledge of facts	3.45	2.00	5.00	.92
My instructor asks questions about students' opinions	3.68	1.00	5.00	.90
My instructor asks questions that make students think	4.05	2.00	5.00	.80
My instructor asks questions that encourage discussion	4.09	2.00	5.00	.88
My instructor listens carefully to students' questions	4.20	1.00	5.00	.96
My instructor explains why incorrect answers are wrong	3.74	2.00	5.00	1.08
My instructor asks follow-up questions	3.69	1.00	5.00	.93
My instructor calls on the same students in every class	2.00	1.00	5.00	.95
My instructor asks questions that keep students interested	3.62	2.00	5.00	.84
My instructor varies the kinds of questions he or she asks	3.43	2.00	5.00	.97
My instructor listens carefully to students' answers	3.97	1.00	5.00	1.16
My instructor ignores students' answers	1.48	1.00	5.00	.94
My instructor builds upon students' answers	3.69	2.00	5.00	.83
My instructor give students enough time to answer	3.86	2.00	5.00	.95
My instructor intimidates students with his or her questions	1.58	1.00	4.00	.70

Table D11

Instructor Behaviors, School of Psychological Sciences, Descriptive Statistics

	Mn.	Min.	Max.	SD
My instructor asks questions to the whole class	3.83	1.00	5.00	1.04
My instructor calls on students by name	2.21	1.00	5.00	1.29
My instructor asks questions about personal experience	2.65	1.00	5.00	.88
My instructor refers to students' previous answers	3.05	1.00	5.00	.95
My instructor asks questions with no clear answers	2.11	1.00	5.00	.97
My instructor asks questions that test knowledge of facts	3.19	1.00	5.00	.98
My instructor asks questions about students' opinions	3.08	1.00	5.00	.99
My instructor asks questions that make students think	3.73	1.00	5.00	.97
My instructor asks questions that encourage discussion	3.32	1.00	5.00	1.16
My instructor listens carefully to students' questions	3.93	2.00	5.00	1.03
My instructor explains why incorrect answers are wrong	3.68	1.00	5.00	1.13
My instructor asks follow-up questions	3.26	1.00	5.00	1.00
My instructor calls on the same students in every class	1.92	1.00	4.00	.87
My instructor asks questions that keep students interested	3.21	1.00	5.00	1.00
My instructor varies the kinds of questions he or she asks	3.19	1.00	5.00	.98
My instructor listens carefully to students' answers	3.93	1.00	5.00	1.08
My instructor ignores students' answers	1.28	1.00	4.00	.61
My instructor builds upon students' answers	3.49	1.00	5.00	.96
My instructor give students enough time to answer	3.70	1.00	5.00	.99
My instructor intimidates students with his or her questions	1.45	1.00	5.00	.71

Table D12

Instructor Behaviors, Combined Groups, Communalities

	Initial	Extraction
My instructor asks questions to the whole class	1.00	.17
My instructor calls on students by name	1.00	.41
My instructor asks questions about personal experience	1.00	.58
My instructor refers to students' previous answers	1.00	.43
My instructor asks questions with no clear answers	1.00	.31
My instructor asks questions that test knowledge of facts	1.00	.34
My instructor asks questions about students' opinions	1.00	.57
My instructor asks questions that make students think	1.00	.55
My instructor asks questions that encourage discussion	1.00	.66
My instructor listens carefully to students' questions	1.00	.64
My instructor explains why incorrect answers are wrong	1.00	.45
My instructor asks follow-up questions	1.00	.60
My instructor calls on the same students in every class	1.00	.42
My instructor asks questions that keep students interested	1.00	.64
My instructor varies the kinds of questions he or she asks	1.00	.48
My instructor listens carefully to students' answers	1.00	.63
My instructor ignores students' answers	1.00	.42
My instructor builds upon students' answers	1.00	.54
My instructor give students enough time to answer	1.00	.59
My instructor intimidates students with his or her questions	1.00	.39

Table D13

Instructor Behaviors, Combined Groups, Component Matrix

	Factor	
	1	2
My instructor asks questions that keep students interested	.80	
My instructor listens carefully to students' questions	.77	-.21
My instructor asks follow-up questions	.77	
My instructor asks questions that encourage discussion	.75	.31
My instructor asks questions that make students think	.74	
My instructor builds upon students' answers	.73	
My instructor listens carefully to students' answers	.70	-.37
My instructor varies the kinds of questions he or she asks	.69	
My instructor give students enough time to answer	.64	-.42
My instructor explains why incorrect answers are wrong	.61	-.27
My instructor asks questions about students' opinions	.58	.48
My instructor refers to students' previous answers	.56	.34
My instructor asks questions that test knowledge of facts	.56	.17
My instructor asks questions about personal experience	.56	.52
My instructor asks questions to the whole class	.41	
My instructor calls on the same students in every class		.65
My instructor ignores students' answers	-.30	.57
My instructor intimidates students with his or her questions	-.33	.53
My instructor asks questions with no clear answers	-.18	.52
My instructor calls on students by name	.40	.49

Table D14

Instructor Behaviors, Combined Groups, Structure Matrix

	Factor	
	1	2
My instructor asks questions that encourage discussion	.81	.22
My instructor asks questions that keep students interested	.78	.46
My instructor asks questions that make students think	.73	.40
My instructor builds upon students' answers	.72	.39
My instructor asks follow-up questions	.72	.52
My instructor asks questions about students' opinions	.69	
My instructor listens carefully to students' questions	.68	.64
My instructor asks questions about personal experience	.68	
My instructor varies the kinds of questions he or she asks	.64	.48
My instructor refers to students' previous answers	.63	
My instructor asks questions that test knowledge of facts	.58	.21
My instructor calls on students by name	.52	-.14
My instructor asks questions to the whole class	.41	.22
My instructor listens carefully to students' answers	.57	.73
My instructor give students enough time to answer	.50	.73
My instructor ignores students' answers	-.13	-.64
My instructor intimidates students with his or her questions	-.17	-.62
My instructor explains why incorrect answers are wrong	.51	.59
My instructor calls on the same students in every class	.10	-.56
My instructor asks questions with no clear answers		-.53

Table D15

Minimum Average Partial Test (MAP), Student Preferences, College of Business

<i>Dimensions</i>	<i>Averaged Partial</i>
1	0.05850
2	0.03107*
3	0.04250
4	0.07398
5	0.17515
6	0.99999

Note: *Advised number of dimensions

Table D16

Student Preferences, College of Business, Communalities

	Initial	Extraction
I like instructors who ask questions in class	1.00	.58
Instructor questions keep me interested	1.00	.44
I learn more when the instructor asks a question	1.00	.69
I try to think of the answer when an instructor asks a question	1.00	.35
I avoid answering questions asked to the whole class	1.00	.55
I dislike sharing personal experience with the class	1.00	.50
I am interested in knowing why my answers are wrong	1.00	.52
I try to answer when the instructor calls on me	1.00	.33
I hate being called on by name	1.00	.49
I learn when questions are asked of me	1.00	.63
I learn from questions I get wrong	1.00	.53
I find it hard to think when the instructor calls on me	1.00	.61
I learn from questions when I think of the correct answer	1.00	.36
I like questions that have a definite answer	1.00	.28
I am afraid of saying the wrong answer	1.00	.50
I get very nervous when the instructor calls on me	1.00	.53
I don't worry about getting the answer wrong	1.00	.19
I like to answer the instructor's questions	1.00	.42
I dislike questions answered with a question	1.00	.10
I like questions with more than one answer	1.00	.22

Table D17

Student Preferences, College of Business, Component Matrix

	Factor	
	1	2
I learn more when the instructor asks a question	.76	.32
I learn when questions are asked of me	.72	.33
I like instructors who ask questions in class	.72	.26
Instructor questions keep me interested	.65	.15
I hate being called on by name	-.64	.29
I am interested in knowing why my answers are wrong	.61	.39
I try to think of the answer when an instructor asks a question	.58	.11
I like to answer the instructor's questions	.58	-.29
I try to answer when the instructor calls on me	.54	.21
I learn from questions I get wrong	.53	.50
I learn from questions when I think of the correct answer	.47	.37
I find it hard to think when the instructor calls on me	-.33	.71
I am afraid of saying the wrong answer	-.17	.69
I get very nervous when the instructor calls on me	-.36	.63
I avoid answering questions asked to the whole class	-.44	.59
I like questions that have a definite answer		.53
I dislike sharing personal experience with the class	-.48	.52
I like questions with more than one answer	.26	-.39
I don't worry about getting the answer wrong	.23	-.36
I dislike questions answered with a question		.31

Table D18

Student Preferences, College of Business, Pattern Matrix

	Factor	
	1	2
I learn more when the instructor asks a question	.83	
I learn when questions are asked of me	.80	
I like instructors who ask questions in class	.76	
I am interested in knowing why my answers are wrong	.73	.11
I learn from questions I get wrong	.72	.25
Instructor questions keep me interested	.63	-.12
I learn from questions when I think of the correct answer	.60	.15
I try to answer when the instructor calls on me	.57	
I try to think of the answer when an instructor asks a question	.56	-.13
I find it hard to think when the instructor calls on me		.79
I get very nervous when the instructor calls on me		.73
I avoid answering questions asked to the whole class		.73
I am afraid of saying the wrong answer	.22	.70
I dislike sharing personal experience with the class	-.13	.68
I hate being called on by name	-.40	.52
I like to answer the instructor's questions	.35	-.50
I like questions that have a definite answer	.32	.47
I like questions with more than one answer		-.46
I don't worry about getting the answer wrong		-.43
I dislike questions answered with a question	.10	.32

Table D19

Student Preferences, College of Business, Structure Matrix

	Factor	
	1	2
I learn more when the instructor asks a question	.83	-.13
I learn when questions are asked of me	.80	
I like instructors who ask questions in class	.76	-.15
I am interested in knowing why my answers are wrong	.71	
I learn from questions I get wrong	.68	.15
Instructor questions keep me interested	.65	-.21
I learn from questions when I think of the correct answer	.58	
I try to think of the answer when an instructor asks a question	.58	-.21
I try to answer when the instructor calls on me	.58	-.11
I find it hard to think when the instructor calls on me		.78
I avoid answering questions asked to the whole class	-.17	.74
I get very nervous when the instructor calls on me		.73
I dislike sharing personal experience with the class	-.23	.69
I am afraid of saying the wrong answer	.12	.67
I hate being called on by name	-.47	.58
I like to answer the instructor's questions	.42	-.55
I like questions with more than one answer		-.46
I don't worry about getting the answer wrong		-.43
I like questions that have a definite answer	.25	.42
I dislike questions answered with a question		.31

Table D20

Minimum Average Partial Test (MAP), Student Preferences, School of Psychological Sciences

<i>Dimensions</i>	<i>Averaged Partial</i>
1	0.04336
2	0.03337*
3	0.03721
4	0.06601
5	0.18677
6	0.99999

Note: *Advised number of dimensions = 2.

Table D21

Student Preferences, School of Psychological Sciences, Communalities

	Initial	Extraction
I like instructors who ask questions in class	1.00	.53
Instructor questions keep me interested	1.00	.53
I learn more when the instructor asks a question	1.00	.60
I try to think of the answer when an instructor asks a question	1.00	.56
I avoid answering questions asked to the whole class	1.00	.53
I dislike sharing personal experience with the class	1.00	.32
I am interested in knowing why my answers are wrong	1.00	.40
I try to answer when the instructor calls on me	1.00	.44
I hate being called on by name	1.00	.44
I learn when questions are asked of me	1.00	.53
I learn from questions I get wrong	1.00	.52
I find it hard to think when the instructor calls on me	1.00	.56
I learn from questions when I think of the correct answer	1.00	.42
I like questions that have a definite answer	1.00	.08
I am afraid of saying the wrong answer	1.00	.65
I get very nervous when the instructor calls on me	1.00	.56
I don't worry about getting the answer wrong	1.00	.23
I like to answer the instructor's questions	1.00	.59
I dislike questions answered with a question	1.00	.11
I like questions with more than one answer	1.00	.08

Table D22

Student Preferences, School of Psychological Sciences, Component Matrix

	Factor	
	1	2
I like to answer the instructor's questions	.76	
I learn when questions are asked of me	.72	
Instructor questions keep me interested	.71	.14
I learn more when the instructor asks a question	.69	.35
I like instructors who ask questions in class	.68	.25
I try to answer when the instructor calls on me	.66	
I try to think of the answer when an instructor asks a question	.65	.36
I learn from questions I get wrong	.61	.39
I avoid answering questions asked to the whole class	-.60	.41
I hate being called on by name	-.55	.36
I am interested in knowing why my answers are wrong	.51	.37
I dislike sharing personal experience with the class	-.42	.37
I like questions with more than one answer	.28	
I am afraid of saying the wrong answer	-.22	.78
I get very nervous when the instructor calls on me	-.44	.60
I find it hard to think when the instructor calls on me	-.45	.59
I learn from questions when I think of the correct answer	.45	.47
I don't worry about getting the answer wrong	.25	-.41
I dislike questions answered with a question	-.16	.29
I like questions that have a definite answer	.18	.21

Table D23

Student Preferences, School of Psychological Sciences, Pattern Matrix

	Factor	
	1	2
I learn more when the instructor asks a question	.79	
I try to think of the answer when an instructor asks a question	.77	
I learn from questions I get wrong	.75	.12
I like instructors who ask questions in class	.71	
I learn from questions when I think of the correct answer	.68	.27
I am interested in knowing why my answers are wrong	.66	.14
Instructor questions keep me interested	.66	-.16
I learn when questions are asked of me	.64	-.21
I try to answer when the instructor calls on me	.55	-.23
I like to answer the instructor's questions	.55	-.39
I like questions that have a definite answer	.29	.13
I like questions with more than one answer	.18	-.17
I am afraid of saying the wrong answer	.37	.84
I get very nervous when the instructor calls on me		.76
I find it hard to think when the instructor calls on me		.76
I avoid answering questions asked to the whole class	-.19	.64
I hate being called on by name	-.18	.58
I dislike sharing personal experience with the class		.54
I don't worry about getting the answer wrong		-.50
I dislike questions answered with a question		.35

Table D24

Student Preferences, School of Psychological Sciences, Structure Matrix

	Factor	
	1	2
I learn more when the instructor asks a question	.77	-.19
I try to think of the answer when an instructor asks a question	.74	-.16
I like instructors who ask questions in class	.72	-.26
I learn from questions I get wrong	.71	-.11
Instructor questions keep me interested	.71	-.37
I learn when questions are asked of me	.70	-.41
I like to answer the instructor's questions	.67	-.56
I try to answer when the instructor calls on me	.62	-.40
I am interested in knowing why my answers are wrong	.62	
I learn from questions when I think of the correct answer	.60	
I like questions that have a definite answer	.25	
I like questions with more than one answer	.24	-.22
I get very nervous when the instructor calls on me	-.17	.74
I find it hard to think when the instructor calls on me	-.18	.74
I am afraid of saying the wrong answer	.11	.73
I avoid answering questions asked to the whole class	-.39	.70
I hate being called on by name	-.36	.64
I dislike sharing personal experience with the class	-.24	.56
I don't worry about getting the answer wrong		-.47
I dislike questions answered with a question		.32

Table D25

Minimum Average Partial Test (MAP), Student Preferences, School of Nursing

<i>Dimensions</i>	<i>Averaged Partial</i>
1	0.06551
2	0.03951*
3	0.04897
4	0.07701
5	0.19041
6	0.99999

Note: *Advised number of dimensions = 2.

Table D26

Student Preferences, School of Nursing, Communalities

	Initial	Extraction
I like instructors who ask questions in class	1.00	.47
Instructor questions keep me interested	1.00	.53
I learn more when the instructor asks a question	1.00	.53
I try to think of the answer when an instructor asks a question	1.00	.41
I avoid answering questions asked to the whole class	1.00	.64
I dislike sharing personal experience with the class	1.00	.37
I am interested in knowing why my answers are wrong	1.00	.40
I try to answer when the instructor calls on me	1.00	.32
I hate being called on by name	1.00	.46
I learn when questions are asked of me	1.00	.60
I learn from questions I get wrong	1.00	.27
I find it hard to think when the instructor calls on me	1.00	.54
I learn from questions when I think of the correct answer	1.00	.33
I like questions that have a definite answer	1.00	.15
I am afraid of saying the wrong answer	1.00	.72
I get very nervous when the instructor calls on me	1.00	.65
I don't worry about getting the answer wrong	1.00	.46
I like to answer the instructor's questions	1.00	.59
I dislike questions answered with a question	1.00	.29
I like questions with more than one answer	1.00	.27

Table D27

Student Preferences, School of Nursing, Component Matrix

	Factor	
	1	2
I like to answer the instructor's questions	.73	.23
I avoid answering questions asked to the whole class	-.71	.37
I am afraid of saying the wrong answer	-.67	.52
I don't worry about getting the answer wrong	.67	-.14
I get very nervous when the instructor calls on me	-.64	.48
I learn when questions are asked of me	.63	.45
I learn more when the instructor asks a question	.60	.41
I dislike sharing personal experience with the class	-.57	.21
I find it hard to think when the instructor calls on me	-.52	.52
I hate being called on by name	-.51	.44
I learn from questions when I think of the correct answer	.47	.33
I like questions with more than one answer	.46	-.24
I dislike questions answered with a question	-.42	.33
I am interested in knowing why my answers are wrong	.23	.59
Instructor questions keep me interested	.43	.58
I try to think of the answer when an instructor asks a question	.27	.58
I like instructors who ask questions in class	.47	.50
I try to answer when the instructor calls on me	.32	.47
I learn from questions I get wrong	.26	.45
I like questions that have a definite answer		.38

Table D28

Student Preferences, School of Nursing, Structure Matrix

	Factor	
	1	2
I am afraid of saying the wrong answer	.84	
I get very nervous when the instructor calls on me	.80	
I avoid answering questions asked to the whole class	.80	-.21
I find it hard to think when the instructor calls on me	.72	
I hate being called on by name	.67	
I don't worry about getting the answer wrong	-.64	.35
I dislike sharing personal experience with the class	.60	-.23
I dislike questions answered with a question	.53	
I like questions with more than one answer	-.52	.13
I learn when questions are asked of me	-.31	.76
Instructor questions keep me interested		.72
I learn more when the instructor asks a question	-.30	.71
I like instructors who ask questions in class	-.14	.69
I like to answer the instructor's questions	-.51	.67
I try to think of the answer when an instructor asks a question		.61
I am interested in knowing why my answers are wrong	.10	.59
I learn from questions when I think of the correct answer	-.23	.56
I try to answer when the instructor calls on me		.56
I learn from questions I get wrong		.51
I like questions that have a definite answer	.24	.24

Table D29

Minimum Average Partial Test (MAP), Instructor Behaviors, College of Business

<i>Dimensions</i>	<i>Averaged Partial</i>
1	0.05076
2	0.02848*
3	0.04332
4	0.07371
5	0.18224
6	0.99999

Note: *Advised number of dimensions = 2.

Table D30

Instructor Behaviors, College of Business, Communalities

	Initial	Extraction
My instructor asks questions to the whole class	1.00	.27
My instructor calls on students by name	1.00	.62
My instructor asks questions about personal experience	1.00	.62
My instructor refers to students' previous answers	1.00	.53
My instructor asks questions with no clear answers	1.00	.24
My instructor asks questions that test knowledge of facts	1.00	.31
My instructor asks questions about students' opinions	1.00	.67
My instructor asks questions that make students think	1.00	.51
My instructor asks questions that encourage discussion	1.00	.72
My instructor listens carefully to students' questions	1.00	.59
My instructor explains why incorrect answers are wrong	1.00	.35
My instructor asks follow-up questions	1.00	.65
My instructor calls on the same students in every class	1.00	.48
My instructor asks questions that keep students interested	1.00	.70
My instructor varies the kinds of questions he or she asks	1.00	.45
My instructor listens carefully to students' answers	1.00	.62
My instructor ignores students' answers	1.00	.58
My instructor builds upon students' answers	1.00	.55
My instructor give students enough time to answer	1.00	.66
My instructor intimidates students with his or her questions	1.00	.59

Table D31

Instructor Behaviors, College of Business, Communalities

	Factor	
	1	2
My instructor asks questions that keep students interested	.84	
My instructor asks questions that encourage discussion	.81	.25
My instructor asks follow-up questions	.81	
My instructor asks questions about personal experience	.75	.24
My instructor builds upon students' answers	.74	
My instructor refers to students' previous answers	.72	.11
My instructor asks questions about students' opinions	.71	.41
My instructor asks questions that make students think	.71	-.12
My instructor calls on students by name	.70	.37
My instructor listens carefully to students' questions	.65	-.41
My instructor varies the kinds of questions he or she asks	.64	-.19
My instructor give students enough time to answer	.61	-.53
My instructor listens carefully to students' answers	.61	-.50
My instructor asks questions that test knowledge of facts	.55	
My instructor explains why incorrect answers are wrong	.49	-.34
My instructor asks questions to the whole class	.42	.31
My instructor ignores students' answers	-.14	.75
My instructor intimidates students with his or her questions	-.20	.74
My instructor calls on the same students in every class	.22	.65
My instructor asks questions with no clear answers		.49

Table D32

Instructor Behaviors, College of Business, Structure Matrix

	Factor	
	1	2
My instructor asks questions that encourage discussion	.87	
My instructor asks questions about students' opinions	.84	-.28
My instructor calls on students by name	.81	-.24
My instructor asks questions about personal experience	.81	
My instructor asks questions that keep students interested	.80	.12
My instructor asks follow-up questions	.78	
My instructor builds upon students' answers	.73	
My instructor refers to students' previous answers	.72	
My instructor asks questions that make students think	.61	.25
My instructor asks questions that test knowledge of facts	.56	
My instructor asks questions to the whole class	.53	-.23
My instructor varies the kinds of questions he or she asks	.52	.32
My instructor intimidates students with his or her questions	.14	-.79
My instructor ignores students' answers	.20	-.79
My instructor give students enough time to answer	.34	.66
My instructor listens carefully to students' answers	.35	.63
My instructor calls on the same students in every class	.50	-.62
My instructor listens carefully to students' questions	.43	.54
My instructor asks questions with no clear answers	.28	-.48
My instructor explains why incorrect answers are wrong	.31	.44

Table D33

Instructor Behaviors, College of Business, Communalities

	Factor	
	1	2
My instructor asks questions that encourage discussion	.84	.12
My instructor asks questions that keep students interested	.83	.32
My instructor asks follow-up questions	.80	.28
My instructor asks questions about personal experience	.78	.11
My instructor asks questions about students' opinions	.77	
My instructor calls on students by name	.75	
My instructor builds upon students' answers	.74	.23
My instructor refers to students' previous answers	.73	.21
My instructor asks questions that make students think	.67	.41
My instructor varies the kinds of questions he or she asks	.60	.45
My instructor asks questions that test knowledge of facts	.56	.15
My instructor asks questions to the whole class	.47	
My instructor intimidates students with his or her questions		-.76
My instructor give students enough time to answer	.50	.74
My instructor ignores students' answers		-.74
My instructor listens carefully to students' answers	.51	.71
My instructor listens carefully to students' questions	.57	.65
My instructor explains why incorrect answers are wrong	.42	.51
My instructor calls on the same students in every class	.34	-.49
My instructor asks questions with no clear answers	.15	-.41

Table D34

Minimum Average Partial Test (MAP), Instructor Behaviors, School of Psychological Sciences

<i>Dimensions</i>	<i>Averaged Partial</i>
1	0.04028
2	0.02445*
3	0.03702
4	0.07211
5	0.18172
6	0.99999

Note: *Advised number of dimensions = 2.

Table D35

Instructor Behaviors, School of Psychological Sciences, Communalities

	Initial	Extraction
My instructor asks questions to the whole class	1.00	.27
My instructor calls on students by name	1.00	.33
My instructor asks questions about personal experience	1.00	.53
My instructor refers to students' previous answers	1.00	.33
My instructor asks questions with no clear answers	1.00	.19
My instructor asks questions that test knowledge of facts	1.00	.40
My instructor asks questions about students' opinions	1.00	.51
My instructor asks questions that make students think	1.00	.53
My instructor asks questions that encourage discussion	1.00	.60
My instructor listens carefully to students' questions	1.00	.61
My instructor explains why incorrect answers are wrong	1.00	.47
My instructor asks follow-up questions	1.00	.61
My instructor calls on the same students in every class	1.00	.43
My instructor asks questions that keep students interested	1.00	.64
My instructor varies the kinds of questions he or she asks	1.00	.56
My instructor listens carefully to students' answers	1.00	.58
My instructor ignores students' answers	1.00	.41
My instructor builds upon students' answers	1.00	.61
My instructor give students enough time to answer	1.00	.49
My instructor intimidates students with his or her questions	1.00	.32

Table D36

Instructor Behaviors, School of Psychological Sciences, Component Matrix

	Factor	
	1	2
My instructor asks questions that keep students interested	.80	
My instructor listens carefully to students' questions	.78	
My instructor builds upon students' answers	.77	.11
My instructor asks follow-up questions	.76	-.16
My instructor varies the kinds of questions he or she asks	.75	
My instructor listens carefully to students' answers	.73	-.20
My instructor asks questions that make students think	.73	
My instructor asks questions that encourage discussion	.69	.34
My instructor explains why incorrect answers are wrong	.66	-.17
My instructor asks questions that test knowledge of facts	.63	.11
My instructor give students enough time to answer	.59	-.37
My instructor asks questions about students' opinions	.50	.50
My instructor refers to students' previous answers	.50	.27
My instructor asks questions to the whole class	.45	-.27
My instructor asks questions with no clear answers	-.32	.30
My instructor calls on the same students in every class	-.20	.63
My instructor asks questions about personal experience	.44	.58
My instructor calls on students by name	.31	.48
My instructor ignores students' answers	-.42	.47
My instructor intimidates students with his or her questions	-.33	.46

Table D37

Instructor Behaviors, School of Psychological Sciences, Pattern Matrix

	Factor	
	1	2
My instructor asks questions about personal experience	.85	-.40
My instructor asks questions about students' opinions	.81	-.28
My instructor asks questions that encourage discussion	.78	
My instructor calls on students by name	.67	-.35
My instructor builds upon students' answers	.61	.27
My instructor asks questions that keep students interested	.60	.31
My instructor refers to students' previous answers	.59	
My instructor asks questions that make students think	.55	.27
My instructor asks questions that test knowledge of facts	.51	.20
My instructor varies the kinds of questions he or she asks	.51	.35
My instructor calls on the same students in every class	.48	-.76
My instructor ignores students' answers	.19	-.71
My instructor give students enough time to answer		.69
My instructor intimidates students with his or her questions	.24	-.65
My instructor listens carefully to students' answers	.28	.58
My instructor asks follow-up questions	.34	.55
My instructor explains why incorrect answers are wrong	.26	.51
My instructor asks questions to the whole class		.50
My instructor asks questions with no clear answers		-.47
My instructor listens carefully to students' questions	.44	.45

Table D38

Instructor Behaviors, School of Psychological Sciences, Structure Matrix

	Factor	
	1	2
My instructor asks questions that encourage discussion	.77	.39
My instructor asks questions that keep students interested	.76	.62
My instructor builds upon students' answers	.75	.58
My instructor asks questions that make students think	.69	.56
My instructor varies the kinds of questions he or she asks	.69	.61
My instructor asks questions about students' opinions	.67	.14
My instructor asks questions about personal experience	.64	
My instructor asks questions that test knowledge of facts	.61	.46
My instructor refers to students' previous answers	.57	.27
My instructor calls on students by name	.49	
My instructor asks follow-up questions	.62	.73
My instructor listens carefully to students' answers	.58	.72
My instructor give students enough time to answer	.38	.70
My instructor listens carefully to students' questions	.68	.68
My instructor explains why incorrect answers are wrong	.52	.65
My instructor ignores students' answers	-.18	-.62
My instructor intimidates students with his or her questions		-.53
My instructor asks questions to the whole class	.29	.52
My instructor calls on the same students in every class		-.51
My instructor asks questions with no clear answers	-.16	-.43

Table D39

Minimum Average Partial Test (MAP), Instructor Behaviors, School of Nursing

<i>Dimensions</i>	<i>Averaged Partial</i>
1	0.03008
2	0.02996*
3	0.03776
4	0.07153
5	0.18998
6	0.99999

Note: *Advised number of dimensions = 2

Table D40

Instructor Behaviors, School of Nursing, Communalities

	Initial	Extraction
My instructor asks questions to the whole class	1.00	.08
My instructor calls on students by name	1.00	.27
My instructor asks questions about personal experience	1.00	.47
My instructor refers to students' previous answers	1.00	.42
My instructor asks questions with no clear answers	1.00	.52
My instructor asks questions that test knowledge of facts	1.00	.45
My instructor asks questions about students' opinions	1.00	.44
My instructor asks questions that make students think	1.00	.64
My instructor asks questions that encourage discussion	1.00	.57
My instructor listens carefully to students' questions	1.00	.69
My instructor explains why incorrect answers are wrong	1.00	.53
My instructor asks follow-up questions	1.00	.56
My instructor calls on the same students in every class	1.00	.43
My instructor asks questions that keep students interested	1.00	.55
My instructor varies the kinds of questions he or she asks	1.00	.34
My instructor listens carefully to students' answers	1.00	.73
My instructor ignores students' answers	1.00	.32
My instructor builds upon students' answers	1.00	.38
My instructor give students enough time to answer	1.00	.68
My instructor intimidates students with his or her questions	1.00	.28

Table D41

Instructor Behaviors, School of Nursing, Component Matrix

	Factor	
	1	2
My instructor listens carefully to students' questions	.83	
My instructor listens carefully to students' answers	.79	-.33
My instructor give students enough time to answer	.76	-.31
My instructor asks follow-up questions	.75	
My instructor asks questions that keep students interested	.74	
My instructor explains why incorrect answers are wrong	.73	
My instructor asks questions that encourage discussion	.71	.26
My instructor asks questions that make students think	.70	.38
My instructor builds upon students' answers	.61	
My instructor varies the kinds of questions he or she asks	.58	
My instructor asks questions with no clear answers	-.51	.51
My instructor intimidates students with his or her questions	-.49	.20
My instructor ignores students' answers	-.43	.37
My instructor asks questions to the whole class	.25	-.11
My instructor asks questions about personal experience	.23	.65
My instructor refers to students' previous answers	.28	.58
My instructor calls on the same students in every class	-.32	.57
My instructor asks questions about students' opinions	.37	.55
My instructor calls on students by name		.52
My instructor asks questions that test knowledge of facts	.44	.50

Table D42

Instructor Behaviors, School of Nursing, Pattern Matrix

	Factor	
	1	2
My instructor listens carefully to students' answers	.89	-.13
My instructor give students enough time to answer	.85	-.12
My instructor asks questions with no clear answers	-.74	.39
My instructor listens carefully to students' questions	.73	.23
My instructor asks follow-up questions	.72	
My instructor asks questions that keep students interested	.65	.21
My instructor explains why incorrect answers are wrong	.64	.21
My instructor calls on the same students in every class	-.60	.50
My instructor ignores students' answers	-.58	.27
My instructor builds upon students' answers	.55	.15
My instructor intimidates students with his or her questions	-.55	
My instructor varies the kinds of questions he or she asks	.50	.18
My instructor asks questions that encourage discussion	.49	.44
My instructor asks questions to the whole class	.28	
My instructor asks questions about personal experience	-.15	.72
My instructor refers to students' previous answers		.67
My instructor asks questions about students' opinions		.66
My instructor asks questions that test knowledge of facts	.12	.63
My instructor asks questions that make students think	.42	.57
My instructor calls on students by name	-.22	.55

Table D43

Instructor Behaviors, School of Nursing, Structure Matrix

	Factor	
	1	2
My instructor listens carefully to students' answers	.85	.13
My instructor give students enough time to answer	.82	.13
My instructor listens carefully to students' questions	.80	.45
My instructor asks follow-up questions	.75	.31
My instructor asks questions that keep students interested	.71	.40
My instructor explains why incorrect answers are wrong	.70	.40
My instructor asks questions that encourage discussion	.62	.59
My instructor asks questions with no clear answers	-.62	.17
My instructor builds upon students' answers	.60	.31
My instructor varies the kinds of questions he or she asks	.55	.33
My instructor intimidates students with his or her questions	-.52	
My instructor ignores students' answers	-.50	
My instructor calls on the same students in every class	-.45	.32
My instructor asks questions to the whole class	.27	
My instructor asks questions that make students think	.59	.69
My instructor asks questions about personal experience		.67
My instructor asks questions about students' opinions	.22	.66
My instructor asks questions that test knowledge of facts	.30	.66
My instructor refers to students' previous answers	.13	.65
My instructor calls on students by name		.48