An Experiential Study of Understanding Business Sophomores' Questioning and Decision-Making Skills

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The paper documents an experiential study that aims to understand business sophomores' questioning and decision-making skill levels. The study is motivated by how to use the figures and facts in business organizations where business students will be employed. The study could add value to sophomore-level business students' knowledge and help improve the skills needed in their careers. A three-step approach is applied to the experience: First, a concise case is provided to students. Second, they participated in the study by responding to the instructions provided. Finally, they participated in a survey to obtain their perceptions of the experience they were involved in. The results are empirically analyzed using qualitative and quantitative statistical techniques. The findings are interesting and encouraging because the experience documented in the study would help students improve questioning and decision-making skills even in the principle-level accounting courses in business schools.

Keywords: accounting education, skill development, learning taxonomy, students' perceptions

INTRODUCTION

Significant developments worldwide in business environments have occurred in the last few decades (Albrecht & Sack, 2000). One of those has been technological developments in preparing financial and non-financial information and distributing it instantly and inexpensively. The second one has been globalization, which has provided faster transportation, made the world a giant marketplace, and created worldwide competition. Some other global developments could be raised. In this environment where changes have pervasively occurred, skill development will be more critical than in the past. An experiential

study was designed and implemented in two different sections of the course Accounting Principles II (Managerial Accounting) to contribute to the skill development process of sophomore-level business students in a middle-level business college of a public university in the U.S. The component of the course content is about five percent of the whole course grade. For the implementation of the course component, the online discussion tool of the CANVAS Learning platform was utilized.

The paper documents an experiential study that aims to understand business sophomores' questioning and decision-making skill levels. The study is motivated by how to use the figures and facts in business organizations where business students will be employed. The study aims to add value to sophomore-level business students' knowledge and help improve the skills needed in their careers. A three-step approach is applied to experience: First, a concise case is provided for students. Second, they participated in the study by responding to the instructions provided. Finally, they participated in a survey to obtain their perceptions of the experience they were involved in. The revised version of Bloom's Taxonomy matrix (Anderson and Krathwohl, 2001) assesses students' questioning and decision-making skill levels.

THE LITERATURE

Many scholarly studies have been conducted on students' learning for years. Bloom et al. (1956) proposed a cognitive taxonomy aligning with educational learning hierarchies and critical thinking. To increase students' comprehension, learner-centered prototypes were added to the original Bloom's Taxonomy in its revised version, which was published by Anderson et al. (2001) (Nkhoma et al., 2017).

The revised Bloom's Taxonomy matrix involves two dimensions: *cognitive and knowledge*. The cognitive dimension contains six categories: *remembering, understanding, applying, analyzing, evaluating, and creating*, while the knowledge dimension consists of *factual, conceptual, procedural, and metacognitive* (Aly Almer, 2006; Cannon & Feinstein, 2005, as cited in Prilanita & Susilowati, 2022). The knowledge dimension represents conceptual structures that progress in sophistication from factual to conceptual to procedural to meta-cognitive knowledge (Pintrich, 2002, as cited in Cannon et al., 2016). Metacognitive knowledge *involves knowledge about cognition in general and awareness of and knowledge about one's own cognition* (Pintrich, 2002, as cited in Krathwohl, D. R., 2002). Metacognitive knowledge is knowledge about knowledge. For example, strategies are a type of metacognition (Pintrich, 2002, as cited in Cannon et al., 2016). Understanding and applying are included in low-order thinking skills while analyzing, evaluating, and creating are included in high-order thinking skills (Yesil & Ozgen, 2010, as cited in Prilanita & Susilowati, 2022). Students must master seven survival skills: *imagination and curiosity, teamwork and leadership, critical thinking and problem-solving, effective oral and written communication, and access to and analysis of information* (Assaly & Smadi, 2015). The significance of helping students develop their higher-order skills has received more emphasis globally (Assaly & Smadi, 2015). Bloom (1956) discusses elements of higher-order thinking, which are essential to developing managerial skills. The taxonomy's higher-order cognitive levels would be the focus of an ideal assessment model (Athanassiou et al., 2003).

Higher-level questions help students strengthen their critical thinking abilities in practice, online, and classroom settings. Higher-level questions require students to synthesize knowledge and put concepts into practice. Higher-level questions give the student "a license to explore the possibilities" (Urbanoski, n.d., p. 2, as cited in Boswell, 2006). According to Elder and Paul (2002), asking questions is a mentally adaptive process that requires constant learning. Students' ideas and views are transformed due to well-crafted questions (Boswell, 2006). Elder and Paul (2002) stated that *"a mind with no questions is a mind that is not intellectually alive" (*Boswell, 2006). Generally, higher-level questions do not have one correct answer but encourage students to think critically (Nappi, 2017).

The taxonomy developed by Bloom et al. (1956) provides a scaffold for asking questions that become progressively more challenging and provides a structure for teachers to model complex thinking that can ultimately guide students to become independent thinkers who can develop their own viewpoints (Nappi, 2017).

One method by which students can build knowledge by doing so is through active learning. It is described as any teaching strategy involving students in learning or assigning tasks requiring them to actively engage with the subject matter being covered in class. To summarize, relevant learning activities and critical thinking are prerequisites for active learning (Ching & Da Silva, 2017). Engaging students and minimizing the need for instructor intervention are key components of active learning exercises (Weigel and Bonica, 2014, as cited in Ching and Da Silva, 2017).

According to the Association to Advance Collegiate Schools of Business (AACSB), business programs must educate their students on analyzing and thinking critically to gain insight into the business process (Flores, 2015). Using Bloom's taxonomy in an introductory principle-level accounting course in the U. S., Flores (2015) found that students progressed from memorizing basic accounting principles to applying their analytical and critical thinking skills.

Critical thinking abilities are essential for business students to prepare for strategic analysis and decision-making in organizational contexts. Analytical sophistication rises when students are compelled to think on higher thinking levels, as outlined in Bloom's Taxonomy. Business students are well on their way to becoming mindful thinkers and strategic decision-makers as they break through the learning barrier (Nentl & Zietlow, 2008).

Cornbleth (1975) stated that students' questions show information about their understanding, the process of gaining experience, and their feelings about something. Bosswell (2006) stated that lower cognitive questions reflect the level of knowledge and understanding. Yesil & Ozgen (2010) emphasized that understanding the material affected questioning skills. This is because the skill of asking is the result or outcome of the ability to think.

Assaly & Smadi (2015) aim to determine if the questions in the instructor's manual measured the achievement of stated course objectives. Their results revealed that though most authors placed few learning objectives on the first three levels of remember, understand, and apply, the questions on these three levels were given significantly more importance. On the other hand, the other three levels, which are related to the higher-order thinking levels in Bloom's Taxonomy (1956), were addressed as a learning level neither as objectives nor as questions by most of the texts' authors.

Athanassiou et al. (2003) discuss using Bloom's taxonomy (1956) in their management classes. They created and assessed a metacognitive framework, a taxonomy-based scaffolding tool that has helped them foster in their students a sense of personal accountability for their own learning, critical thinking, and synthesis capabilities. They add that the taxonomy has contributed to a more student-centered learning environment in their classrooms by giving their students more awareness and control over their cognitive growth.

Brazelton (2000) and Kidwell et al. (2013) in the accounting discipline concentrate on using Bloom's Taxonomy in accounting courses to transition from rote memorizing of accounting principles to the application of critical thinking skills to evaluate such concepts (Saadullah and Elsayed, 2020). Using Bloom's taxonomy, Brazelton (2000) offers a framework for more engaging and successful accounting instruction (Saadullah & Elsayed, 2020).

Metzgar, M. (2023) utilized qualitative research to determine whether the aspects of Bloom's revised taxonomy were utilized in end-of-chapter questions. The questions at the end of the "Principles of Economics" chapters were classified based on Bloom's revised taxonomy (2001). The study revealed that most of the questions utilized the application level of Bloom's cognitive domain. There were a few questions regarding evaluation or creation.

Nkhoma et al. (2017) hypothesize that the application of knowledge positively increases students' higher-order thinking. Their second hypothesis is that higher-order thinking positively increases practice evaluation knowledge. Thirdly, they propose that the act of checking and criticizing knowledge against standards can have an impact on students' improvement of knowledge. Their study verified this by the significant relationship between higher-order thinking skills and practice evaluation knowledge. They generalized employing case studies, based on Revised Taxonomy, to produce the desired effects of incremental learning in teaching.

The skill of asking questions can be defined as the ability to ask for information or explanations from other people or parties whose interlocutors are. Asking questions can also be used as an effective stimulus to encourage someone to think critically (Chan, 2013; Cojocariu & Butnaru, 2014; Prilanita & Susilowati, 2022; Setiana et al., 2021; Zhang and Toker, 2011, as cited in Prilanita and Susilowati, 2022).

Bloom et al.'s (1956) cognitive taxonomy and, more recently, Anderson and Krathwohl's (2001) revised taxonomy has drawn more attention than Krathwohl et al.'s (1964) affective taxonomy. Focusing specifically on business applications, the knowledge and conceptual skills from the cognitive taxonomy provide a basis for practical business problem-solving capabilities. Cannon, Geddes, and Feinstein (2014) provide a detailed discussion of how both the cognitive processes and knowledge components addressed by Anderson and Krathwohl fit into different levels of business problem-solving and the ability to develop new problem-solving capabilities quickly (Cannon et al., 2016).

Accounting courses focus on specific principles in various domains, such as general, managerial, and financial accounting. Rules, regulations, and methods of data recording and calculating are subject to mathematical background, analytical thinking, reasoning skills, and memory functions. Students will need to remember, list, and combine pieces of knowledge to make calculations and arrive at decisions that allow them to recognize the details of money management and its relation to other business functions. Accounting courses are thought to include various kinds of knowledge and require various ways of using cognitive skills. In this respect, researchers thought that gathering data to identify the frequency of cognitive actions taken mainly by students would be appropriate.

THE BACKGROUND AND METHOD OF THE STUDY

The study aims to understand business sophomores' questioning and decision-making skill levels. Business sophomores involved in the study are more likely to be in their fourth semester in the undergraduate business program in which they enrolled. Until this semester, they most likely took micro and macroeconomy courses and had to pass with a "C" or better grade for the Accounting Principles I (Financial Accounting) course. For the study, a very concise case (Exhibit 1) on cost control of a service department of a public university is provided first. The case is taken from the adopted textbook for the course Principles of Accounting II (Managerial Accounting, 17th. Ed., Garrison et al., 2020). The subject of the case provided will be discussed in the upcoming weeks of the semester through the chapter designated for master and flexible budgeting. Thus, students participating in the experiment have no background or knowledge about the subject in the case provided.

After providing the case as seen in Exhibit 1, the second step of the experience has two phases. The instructions for the first phase, called *"Welcoming Discussion 1,"* are as follows:

> *Please kindly find the attached. There is a monthly cost control report for the Boyne University Motor Pool. Using the data provided in the report, develop and ask four questions, and post them. Then, you may comment on your classmates' posts*.

For the first phase *(Welcoming Discussion 1)* of the second step of the experience, during the first week of the semester, the students provide and post their questions using the data in the case. They must post their questions first to see the others' posts.

TABLE 1
COST CONTROL REPORT

Boyne University Motor Pool Cost Control Report For the Month Ended March 31			
	March Actual	March Budget	(Over) Under Budget
Miles	63,000	50,000	
Autos	21	20	
Gasoline	$ 9,350	$ 7,500	$(1,850)
Oil, minor repairs, parts	2,360	2,000	(360)
Outside repairs	1,420	1,500	80
Insurance	2,120	2,000	(120)
Salaries and benefits	7,540	7,540	0
Vehicle depreciation	5,250	5,000	(250)
Total	$28,040	$25,540	$(2,500)

Garrison et al., 2020

The instructions for the second phase *(Welcoming Discussion 2)* of the second step of the experience are as follows:

> *Please kindly find the attached. This is the same document you have already worked on that. Using the data provided in the report, answer these questions, and post them. Good luck.*
>
> *Questions:*
>
> 1. *If you were the manager of the motor pool department of the university, what recommendations about the department would you develop and submit to your manager or director?*
> 2. *If you were CFO Chief Financial Officer of the university, what recommendations about the department would you make and submit to the university president?*
> 3. *If you were the university president, what decisions would you make about the department?*

In the first day lecture of the course, while walking through the syllabus, students were given some information regarding the course what to do, how to do it, when, etc. Then, the welcoming discussions are introduced, and the objectives of the experiential study and its phases are discussed in particular. The first week is designed to have a first welcoming discussion, and the second week is for the second one. The third week is for the survey to obtain feedback on the students' perceptions. The first two weeks of the course were considered an intervention; before the intervention, students formed questions, and after the intervention, students made decisions. Asking questions requires lower-order thinking skills, whereas making decisions targets a higher level. In this respect, researchers wanted to gain a central idea about the appropriateness of the intervention time because a different pattern might emerge among the question and decision groups because of the intervention. Asking questions and making decisions were the two tasks that student groups fulfilled.

65 students participated in the experiment during the spring of 2024. Twenty-one students were female (31%), and 45 were male (69%). The total sample size is 65 students. There are 21 students with a finance major (32.3%), 17 marketing majors (26.2%), 14 management majors (21.5%), 8 accounting majors (12.3%), 3 economics majors (4.6%), and 2 information management systems (3.1%).

The questions raised during the first welcoming discussion and students' decisions during the second welcoming were coded on a judgmental basis. Three researchers, including the course instructor, participated in the coding process, and inter-rater reliability of findings was aimed at establishing consensus among the coders. The categories used in the coding process are presented in Table 2.

TABLE 2
THE REVISED TAXONOMY:
KNOWLEDGE AND THE COGNITIVE PROCESS DIMENSIONS

Knowledge Dimension	**Cognitive Process Dimension**					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
A. Factual Knowledge	List	Summarize	Classify	Order	Rank	Combine
B. Conceptual Knowledge	Describe	Interpret	Experiment	Explain	Assess	Plan
C. Procedural Knowledge	Tabulate	Predict	Calculate	Differentiate	Conclude	Compose
D. Meta-Cognitive Knowledge	Appropriate use	Execute	Construct	Achieve	Action	Actualize

Anderson and Krathwohl (2001) Revision of Bloom Et Al. Taxonomy (1956)
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http://oregonstate.edu/instruct/coursedev/models/id/taxonomy/#table Designer/Developer - Dianna Fisher.
Adapted from A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. Lorin W. Anderson, David R. Krathwohl; et al. 2001 Addison Wesley Longman.

TABLE 3
RUBRICS AND METRICS TO SCORE STUDENTS' POSTS ON THE QUESTIONS THEY RAISED AND THE DECISIONS THEY RECOMMENDED

Knowledge Dimension	**Cognitive Process Dimension**					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
A. Factual Knowledge	1*X	2*X	3*X	4*X	5*X	6*X
B. Conceptual Knowledge	2*X	3*X	4*X	5*X	6*X	7*X
C. Procedural Knowledge	3*X	4*X	5*X	6*X	7*X	8*X
D. Meta-Cognitive Knowledge	4*X	5*X	6*X	7*X	8*X	9*X

X= Number of Students, Weighted Average Score will be a benchmark to understand the changes.

TABLE 4
LEVEL TAXONOMY

Levels	Demonstration of Achievement
Remember	Students can define and recall specific methods, processes, patterns, structure, and settings, or describe subject matter.
Understand	Students can correctly explain the history of an event, report on the status of an organization, and understand or apprehension such that the individual knows what is being communicated and can use the material or idea being communicated without necessarily relating it to other material or seeing its fullest implications.
Apply	Students can calculate econometric, mathematical, and statistical exercises to understand organizational problems and phenomena and apply theoretical models or frameworks to understand the challenges of starting a new business or creating/launching/changing products and/or services.
Analyse	Students can explain why a particular solution process works to resolve a problem. A student can see patterns underlying the content or deconstruct the critical components of a framework.
Evaluate	Students can devise a variety of ways to solve the problem and then, based on established criteria, select the solution method best suited for the problem. They can also judge an argument and/or evaluate another person's work.
Create	Students can create new products and/or services, new businesses, innovations, and new business concepts, e.g., from changes in the business area, market trends, and consumers' habits.

Source: Nentl and Zietlow (2008: pp. 161-164) and Flores (2015: pp. 2-5) as cited in Ching, H. Y., & Da Silva, E. C. (2017), p. 112.

TABLE 5
STRUCTURE OF THE KNOWLEDGE DIMENSION OF THE REVISED TAXONOMY

A. Factual Knowledge – The essential elements that students must know to be acquainted with a discipline or solve problems in it.
Aa. Knowledge of terminology
Ab. Knowledge of specific details and elements
B. Conceptual Knowledge – The interrelationships among the essential elements within a larger structure enable them to function together.
Ba. Knowledge of classifications and categories Bb. Knowledge of principles and generalizations Bc. Knowledge of theories, models, and structures
C. Procedural Knowledge – How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods.
Ca. Knowledge of subject-specific skills and algorithms
Cb. Knowledge of subject-specific techniques and methods
Cc. Knowledge of criteria for determining when to use appropriate procedures
D. Metacognitive Knowledge – Knowledge of cognition in general as well as awareness and knowledge of one's own cognition.
Da. Strategic knowledge
Db. Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge
Dc. Self-knowledge

Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. Theory into practice, 41(4), 212-218., p.214.

TABLE 6
STRUCTURE OF THE COGNITIVE PROCESS DIMENSION OF THE REVISED TAXONOMY

1.0 Remember – Retrieving relevant knowledge from long-term memory.
1.1 Recognizing
1.2 Recalling
2.0 Understand – Determining the meaning of instructional messages, including oral, written, and graphic communication.
2.1 Interpreting
2.2 Exemplifying
2.3 Classifying
2.4 Summarizing
2.5 Inferring
2.6 Comparing
2.7 Explaining
3.0 Apply – Carrying out or using a procedure in a given situation.
3.1 Executing
3.2 Implementing
4.0 Analyze – Breaking material into its constituent parts and detecting how the parts relate to one another and an overall structure or purpose.
4.1 Differentiating
4.2 Organizing
4.3 Attributing
5.0 Evaluate – Making judgments based on criteria and standards.
5.1 Checking
5.2 Critiquing
6.0 Create – Putting elements together to form a novel, coherent whole or make an original product.
6.1 Generating
6.2 Planning
6.3 Producing

Krathwohl, D. R. (2002). A revision of Bloom's taxonomy: An overview. Theory into practice, 41(4), 212-218., p.215

Krathwohl and Anderson (2009) outline cognitive process levels using action verbs—remember, understand, apply, analyze, evaluate, and create—to describe the cognitive processes by which learners acquire knowledge (Krathwohl and Anderson, 2009, as cited in Saadullah and Elsayed, 2020). The taxonomy starts with *remember*, in which the learner has to exhibit memory, recalling facts and basic conceptual underpinnings of the discipline. The second level is *understand*, in which the learner demonstrates an understanding of facts by explaining and discussing ideas. The third level is *apply*, where the learner utilizes acquired knowledge to solve problems in new situations and cases. The fourth level is *analyze*, in which the learner draws links between ideas, provides evidence, and examines information by identifying motives and causes. The fifth level is *evaluate*, in which the learner justifies a stand or provides a decision by defending opinions and making judgments about the given information. The sixth level is *create*, in which the learner produces original work by compiling information to provide a new pattern or propose an alternative solution (Saadullah & Elsayed, 2020). In summary, these cognitive actions of learning, starting from recalling information and ending with creating new knowledge, are dynamic, ongoing, and interrelated (Armstrong, 2013, as cited in Saadullah and Elsayed, 2020).

The Findings: Understanding Students' Questioning and Decision-Making Skills

The higher the cognitive ability level identified in Bloom's Taxonomy category, the higher the student's cognitive skills. There are three sets of data. Data 1 includes questioning skills, whereas data 2 includes decision-making skills. The third data set consisted of the distribution of students' answers regarding

question-asking skills and decision-making skills according to themes determined by the authors. To make a position statement, the coded results in the two data sets were analyzed to identify the frequency of the cognitive actions. In addition to frequency tables, word clouds were prepared to present a visual picture of each data set.

As seen in Table 7, the highest frequency is *interpret* (12, %18,5), which belongs to the third information category conceptual of the understanding process. Describe is the second highest (10, 15,4%), again to the conceptual information category of the remembering process. The third highest is appraise (9, 13,8%), in the first information category of factual, evaluating process. In questioning data, the highest information category, meta-cognitive is observed once with *identify*. The majority of the data is represented by the conceptual level-second knowledge category (49%), followed by the factual-first knowledge category (40%), and the procedural-third knowledge category (10%).

The Mann-Whitney U test, the non-parametric version of the independent samples t-test, was conducted to investigate whether there are meaningful differences between female and male students concerning their cognitive actions in the questioning data set. Female students' cognitive action ranking turned out to be slightly lower compared to male students. However, this difference is insignificant (mean rank 31.55 <33.64, p>0.05).

TABLE 7
QUESTIONING DATA COGNITIVE ACTION FREQUENCIES

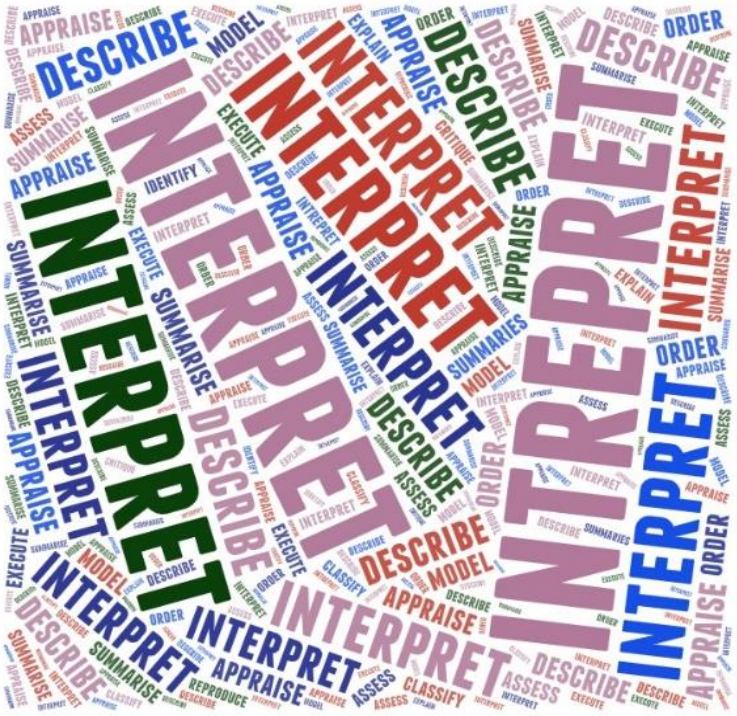
Mental Process / Knowledge Level	Cognitive Action / Rank	Frequency	Percent	Cumulative Percent
Remember / Factual	List /1	3	4,6	4,6
Understand/Factual	Summarise /2	8	12,3	16,9
Apply/Factual	Classify /3	2	3,1	20,0
Analyze/Factual	Order /4	4	6,2	26,2
Evaluate/Factual	Appraise /5	9	13,8	40,0
Remember/Conceptual	Describe /7	10	15,4	55,4
Understand/Conceptual	Interpret /8	12	18,5	73,8
Apply/Conceptual	Model /9	4	6,2	80,0
Analyze/Conceptual	Explain /10	2	3,1	83,1
Evaluate/Conceptual	Assess /11	4	6,2	89,2
Remember/Procedural	Reproduce /13	1	1,5	90,8
Apply/Procedural	Execute /15	4	6,2	96,9
Evaluate/Procedural	Critique/1	1	1,5	98,5
Remember/Meta-cognitive	Identify /19	1	1,5	100,0
	Total	65	100,0	

TABLE 8
QUANTITATIVE RESULTS FOR QUESTIONING SKILLS

Knowledge Dimension	**Cognitive Process Dimension**					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
A. Factual Knowledge	1*3	2*5	3*14	4*4	5*3	6*1
B. Conceptual Knowledge	2*0	3*4	4*7	5*4	6*1	7*2
C. Procedural Knowledge	3*0	4*1	5*12	6*3	7*2	8*0
D. Meta-Cognitive Knowledge	4*0	5*0	6*0	7*0	8*0	9*0

X= 65, Weighted Average Score =
[(1*3)+(2*5)+(3*4)+(4*1)+(3*14)+(4*7)+(5*12)+(4*4)+(5*4)+(6*3)+(5*3)+(6*1)+(7*2)+(6*1)+(7*2)]/65 = 4.123

FIGURE 1
QUESTIONING DATA WORD CLOUD

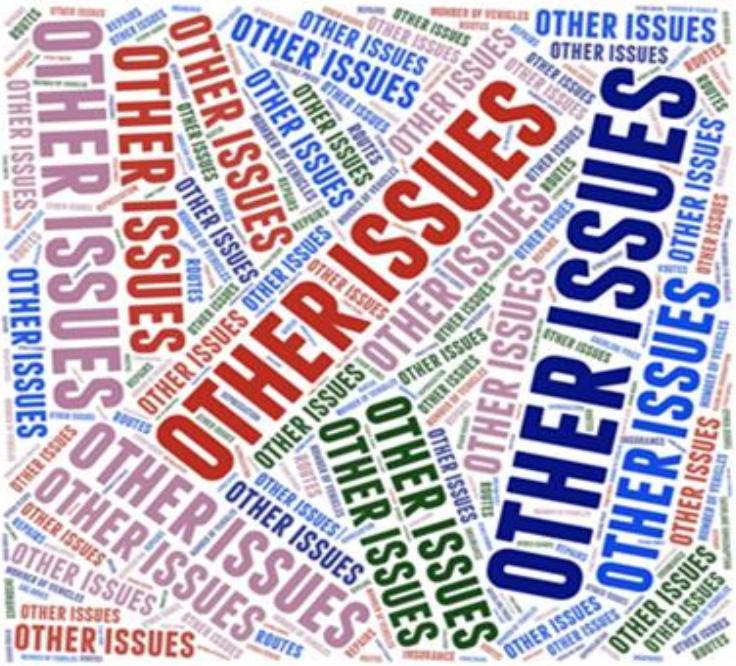


The themes from student answers were categorized, as seen in Table 9. The category of other issues has the highest frequency (133, 51,2%), the second highest repetition belongs to the number of vehicles (33, 12,7 %), and the third is routed (23, 8,8%). The same rank order appears in decision-making data.

TABLE 9
QUESTIONING DATA THEME CATEGORIES

Theme categories	Frequency	Percent	Cumulative Percent
Depreciation	15	5,8	5,8
Insurance	11	4,2	10,0
Salaries/Benefit	4	1,5	11,5
Renewable of vehicles	5	1,9	13,5
Number of vehicles	33	12,7	26,2
Gasoline price	11	4,2	30,4
Gasoline consumption	9	3,5	33,8
Routes	23	8,8	42,7
Repairs	16	6,2	48,8
Other issues	133	51,2	100,0
Total	260	100,0	

FIGURE 2
QUESTIONING DATA THEME WORD CLOUD



As seen in Table 10, the most repeated cognitive action is *classify* (14), which belongs to applying factual information. Factual information is the first of the six information categories and could be considered to be the lowest-ranking category. Lower than *classify*, there are *remember* and *understand*. The second most repeated cognitive action is *execute* (12), which belongs to the third information category of procedural. *Execute* is the application of procedural knowledge. The factual knowledge level-related cognitive skills *list, summarize, classify, order, appraise, and generate* make up the majority of answers (44.6%). Metacognitive knowledge (*identify, predict, use, deconstruct, reflect, create*), the highest of all

categories, is not observed in the decision-making cognitive action table. Evaluation of procedural knowledge, critique, is the highest cognitive ability action observed in Table 7, with a frequency of two. The first knowledge category represents the majority of the data, factual (46%), followed by the second knowledge category, conceptual (26%), and the third knowledge category, *procedural* (approximately 28%).

The Mann-Whitney U test, the non-parametric version of the independent samples t-test, was conducted to investigate whether there are meaningful differences across female and male students, concerning their cognitive actions in the decision-making data set. Female students' cognitive action ranking was higher than male students (mean rank 40.70 >29,58, $p<0.05$).

TABLE 10
DECISION-MAKING COGNITIVE ACTION FREQUENCIES

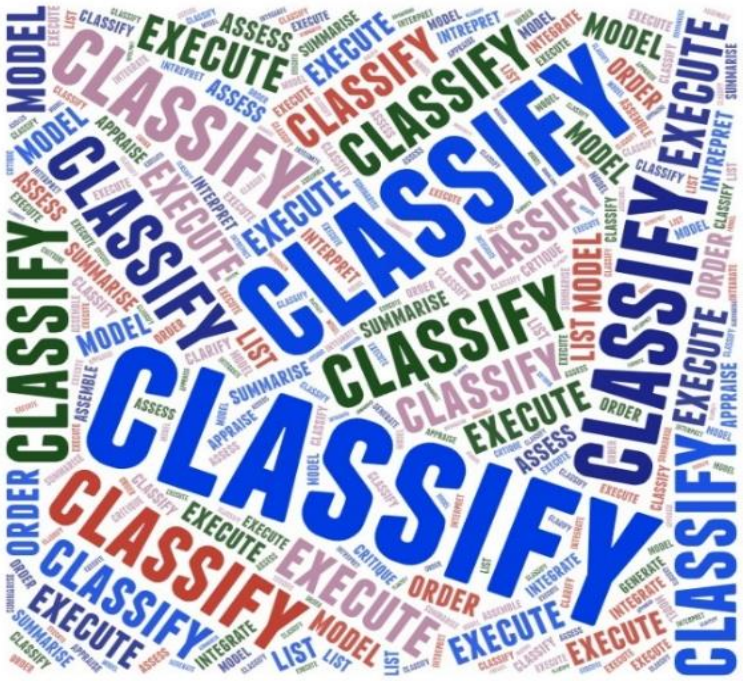
Mental Process / Knowledge Level	Cognitive Action / Rank	Frequency	Percent	Cumulative Percent
Remember / Factual	List /1	3	4,6	4,6
Understand/Factual	Summarise /2	5	7,7	12,3
Apply/Factual	Classify /3	14	21,5	33,8
Analyze/Factual	Order /4	4	6,2	40,0
Evaluate/Factual	Appraise /5	3	4,6	44,6
Create/Factual	Generate /6	1	1,5	46,2
Understand/Conceptual	Interpret /8	4	6,2	52,3
Apply/Conceptual	Model /9	7	10,8	63,1
Evaluate/Conceptual	Assess /11	4	6,2	69,2
Create/Conceptual	Assemble /12	2	3,1	72,3
Understand/Procedural	Clarify /14	1	1,5	73,8
Apply/Procedural	Execute /15	12	18,5	92,3
Analyze/Procedural	Integrate /16	3	4,6	96,9
Evaluate/Procedural	Critique /17	2	3,1	100,0
	Total	65	100,0	

TABLE 11
QUANTITATIVE RESULTS FOR DECISION-MAKING SKILLS

Knowledge Dimension	**Cognitive Process Dimension**					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
A. Factual Knowledge	1*3	2*8	3*2	4*4	5*9	6*0
B. Conceptual Knowledge	2*10	3*12	4*4	5*2	6*4	7*0
C. Procedural Knowledge	3*1	4*0	5*4	6*0	7*1	8*0
D. Meta-Cognitive Knowledge	4*1	5*0	6*0	7*0	8*0	9*0

X= 65, Weighted Average Score =
[(1*3)+(2*10)+(3*1)+(4*1)+(2*8)+(3*14)+(3*2)+(4*4)+(5*4)+(4*4)+(5*2)+(5*9)+(6*4)+(7*1)]/65 = 3.569

FIGURE 3
DECISION-MAKING COGNITIVE ACTIONS WORD CLOUD

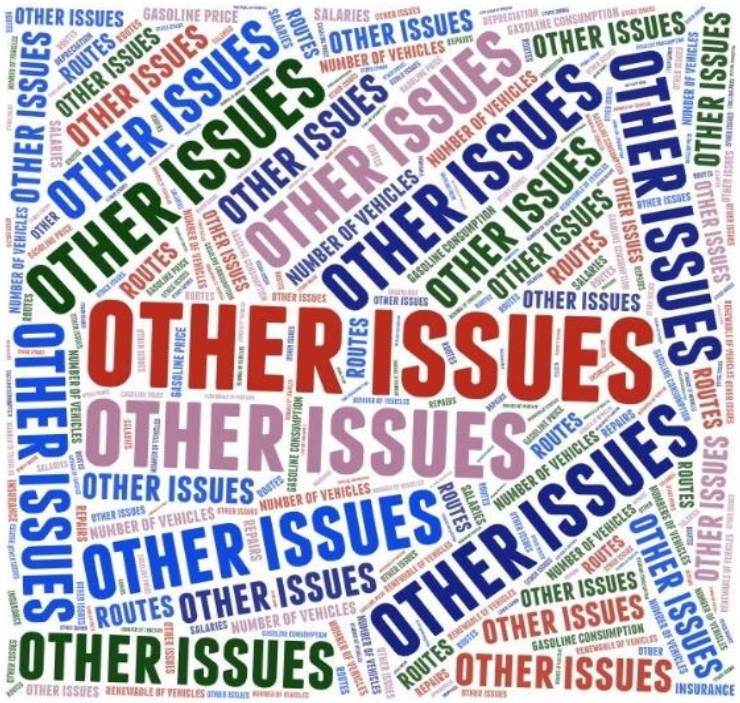


The themes from student answers were categorized, as seen in Table 12. The category of other issues has the highest frequency (66, 33.8%), the number of vehicles has the second highest repetition (35, 17.9%), and routes have the third highest repetition (25, 12.8%).

TABLE 12
DECISION-MAKING DATA THEMES

Theme categories	Frequency	Percent	Cumulative Percent
Depreciation	3	1,5	1,5
Insurance	4	2,1	3,6
Salaries/Benefit	10	5,1	8,7
Renewable of vehicles	14	7,2	15,9
Number of vehicles	35	17,9	33,8
Gasoline price	11	5,6	39,5
Gasoline consumption	17	8,7	48,2
Routes	25	12,8	61,0
Repairs	9	4,6	65,6
Other	1	,5	66,2
Other issues	66	33,8	100,0
Total	195	100,0	

FIGURE 4
DECISION-MAKING DATA THEMES WORD CLOUD



Learning Objectives-Based Assessment

For the study, three basic learning objectives were established to understand the sophomore-level students' questioning and decision-making skill levels.

After participating in the study, students will be able to

- *Raise and ask the right and relevant questions (LO1).*

- *Develop the right and relevant recommendations for managers to make effective decisions (LO2),*
- *Develop analytical skills to use the figures and facts of business organizations effectively and efficiently (LO3).*

Spring 2024	Mean Scores
LO1	4.123
LO2	3.569
LO3 - Average	3.846

Hypothetically, the mean score could be the min = 1 and the max = 9 from the matrix coded and scored above to understand the sophomore-level students' questioning and decision-making skill levels. From the mean scores, the business sophomore-level students' questioning skill level is 4.123 out of 9.0. The paper could argue that this level for the participant students might be acceptable. However, their decision-making skill level (3.569 out of 9) is lower than the questioning one. The paper could argue that this might also be acceptable since these students have not had much experience in their college education.

Data Collection for the Students' Feedback About the Study

The data set used in this study was collected via a self-administered and structured questionnaire completed by business sophomores who took the course Accounting Principles II (Managerial Accounting) during the Spring of 2024. The graded survey was purposefully conducted through the CANVAS LMS platform in the third week of the semester, just after completing the first two phases of the study. The data collection method was anonymous, and the respondents were not required to disclose their names or IDs. The same survey was conducted at the end of the semester again to understand any significant differences in students' perceptions of experiential study during the semester.

The questionnaire has two main sections: The first is to obtain students' perceptions of the study through seven statements provided for each welcoming discussion. Each statement has five Likert scale options: strongly disagree (1), Disagree (2), Neither disagree nor agree (3), Agree (4), and strongly agree (5). Exhibit 2 is for the first welcoming discussion, and Exhibit 3 is for the second welcoming discussion.

Exhibit 2: Statements for the First Welcoming Discussion (Questioning Skill)

- Relevancy1 - Studying "Welcoming Discussion - 1" was relevant to the discussion for this course.
- Worthiness1 - Studying "Welcoming Discussion - 1" was worth discussing.
- Time-consuming1 - For "Welcoming Discussion - 1", I did not spend more time than expected.
- Approach1 - For "Welcoming Discussion—1," the two-step approach of posting and then discussing was suitable.
- Materials1 - For "Welcoming Discussion - 1" I did not need to use materials for this discussion.
- Joyfulness1 - Discussing "Welcoming Discussion - 1" was fun and joyful.
- Apply1 - Discussing "Welcoming Discussion - 1" was a good opportunity to apply my knowledge.

Exhibit 3: Statements for the Second Welcoming Discussion (Decision-Making Skill)

- Relevancy2 - Studying "Welcoming Discussion - 2" was relevant to the discussion for this course.
- Worthiness2 - Studying "Welcoming Discussion - 2" was worthwhile for me to discuss.
- Time-consuming2 - For "Welcoming Discussion - 2", I did not spend more time than expected.
- Approach 2—The two-step approach, with posting first and then discussing, was suitable for "Welcoming Discussion—2. "
- Materials2 - For "Welcoming Discussion - 2" I did not need to use materials for this discussion.

- Joyfulness2 - Discussing "Welcoming Discussion - 2" was fun and joyful.
- Apply2 - Discussing "Welcoming Discussion - 2" was a good opportunity to apply my knowledge.

In the second section of the questionnaire, two open-ended questions are asked as follows:

- What do you think overall? Through these two discussions, have you added value to the knowledge and ideas you have already had?
- For the future, what would you recommend to the professor about these two discussions?

Analyses of the Students' Perceptions of the Experiential Study

Appendix 1 has raw data on students' perceptions of *questioning and decision-making skill developments.* The mean scores of the students' perceptions are summarized below in Table 13. It is observed that students' satisfaction with the course component of understanding and developing students' questioning and decision-making skills is very supportive. In addition, based on the mean scores (out of 5), the paper could argue that students' satisfaction with the course component is increased during the semester.

TABLE 13
SUMMARY OF MEAN SCORES OF THE STUDENTS' SATISFACTION

Mean Scores	**Group 1**		**Group 2**	
	N=35	**N=33**	**N=35**	**N=33**
Questioning Skill	**Beginning**	**Ending**	**Beginning**	**Ending**
Relevancy	4.143	4.212	3.545	4.067
Worthiness	3.886	4.212	3.788	3.933
Time-consuming	4.086	4.333	4.030	4.200
Approach	3.943	4.273	4.061	4.167
Materials	3.743	3.242	3.667	3.400
Joyfulness	3.914	3.818	3.545	3.600
Apply	4.200	4.273	3.970	4.033
Average	**3.988**	**4.052**	**3.801**	**3.914**

Mean Scores	**Group 1**		**Group 2**	
	N=35	**N=33**	**N=35**	**N=33**
Decision-making Skill	**Beginning**	**Ending**	**Beginning**	**Ending**
Relevancy	3.914	4.364	3.970	4.033
Worthiness	3.971	4.182	3.939	4.000
Time-consuming	3.971	4.242	3.970	3.800
Approach	3.971	4.242	4.000	4.033
Materials	3.571	3.455	3.576	3.300
Joyfulness	3.971	4.000	3.636	3.500
Apply	4.171	4.485	3.970	4.133
Average	**3.935**	**4.189**	**3.866**	**3.829**

Additionally, the paper seeks any differences in the students' perceptions of the course components with different dimensions of the groups. We have two discussions on questioning skills (1) and decision-making skills (2). We have two sections for students (09 and 10). Finally, we conducted the survey twice

(**Beg**, the *beginning of the semester*, and **End**, *the end of the semester*). To understand any differences among groups with different dimensions, we used the hypotheses below:

Null Hypothesis*: The mean ranks of the groups are the same.*

Alternate Hypothesis*: The mean ranks of the groups are not the same.*

First, we tested any differences in the students' perceptions of the first discussion: *questioning skills.* For this purpose, we checked whether our data was normally distributed and used the Shapiro-Wilk normality test. The results are as follows:

Beg_1_09, W = 0.73918, p-value = 1.603e-06 ---> **is not normally distributed**

Beg_1_10, W = 0.95828, p-value = 0.2309 ---> **is normally distributed**

End_1_09, W = 0.94985, p-value = 0.1317 ---> **is normally distributed**
End_1_10, W = 0.95074, p-value = 0.177 ---> **is normally distributed**

As a result of this analysis, we can't use the inappropriate parametric test (ANOVA), but we can use a nonparametric test (Kruskal-Wallis).

The Kruskal-Wallis Rank Sum test revealed that the mean ranks of the groups are the same, which means there is no significant difference in the students' perceptions of the questioning skills [Kruskal-Wallis chi-squared = 4.0766, df = 3, p-value = 0.2533>0.05]. In addition, we ran the Wilcoxon Rank-Sum Test (also known as the Mann-Whitney U Test) on the value variable across the two groups (Student Group 09, Questioning Skill, Beg and End). It yielded a test statistic W=566.5 and a p-value of 0.8964 that indicates no statistically significant difference between the groups' medians, leading to the conclusion that the central tendencies of the two groups are similar based on the data provided. When we ran the same test on the second student group, questioning skill, Beg and End, it yielded a test statistic W=470 and a p-value of 0.734, indicating the same conclusion.

Second, we tested any differences in the students' perceptions of the second discussion: *decision-making skills.* For this purpose, we checked whether our data was normally distributed and used the Shapiro-Wilk normality test. The results are as follows:

Beg_2_09, W = 0.63878, p-value = 4.728e-08 ---> **is not normally distributed**

Beg_2_10, W = 0.89479, p-value = 0.003912 ---> **is not normally distributed**

End_2_09, W = 0.88924, p-value = 0.002833 ---> **is not normally distributed**

End_2_10, W = 0.98925, p-value = 0.9868 ---> **is normally distributed**

As a result of this analysis, we can't apply for a parametric test (ANOVA) that is inappropriate for the study's decision-making skills, but we can apply for a nonparametric test (Kruskal-Wallis).

The Kruskal-Wallis Rank Sum test revealed that the mean ranks of the groups are not the same which means there is a significant difference in the students' perceptions of the questioning skills [Kruskal-Wallis chi-squared = 11.644, df = 3, p-value = 0.008708>0.05]. The Null Hypothesis is rejected since the p-value associated with a statistical test is less than our chosen level of significance (alpha, we set at 0.05); this means that we have found enough evidence to conclude that there is a statistically significant effect or difference in our data. However, From the output of the Kruskal-Wallis test, we know that there is a significant difference between groups, but we do not know which pairs of groups are different. Therefore, we used the function pairwise.wilcox.test() to calculate pairwise comparisons between group levels with

corrections for multiple testing. The pairwise comparisons show that End_2_10 and End_2_09 significantly differ ($p=0.042 < 0.05$).

FIGURE 5
PAIRWISE COMPARISON

```
        Pairwise comparisons using Wilcoxon rank sum test with continuity correction

data:  data_df$values and data_df$ind

          Beg_2_09 Beg_2_10 End_2_09
Beg_2_10 0.279    -        -
End_2_09 1.000    0.054    -
End_2_10 0.272    1.000    0.042

P value adjustment method: bonferroni
```

In addition, we ran the Wilcoxon Rank-Sum Test (also known as the Mann-Whitney U Test) on the value variable across the two groups (Student Group 09, Decision-making Skill, Beg and End). It yielded a test statistic W=497.0 and a p-value of 0.3189 that indicates no statistically significant difference between the groups' medians, leading to the conclusion that the central tendencies of the two groups are similar based on the data provided. When we ran the same test on the second student group, questioning skill, Beg and End, it yielded a test statistic W=516 and a p-value of 0.7763, indicating the same conclusion.

Open-Ended Questions: What Did Students Say About the Experiment?

As discussed above, students' responses to the seven-statement 5-Likert scale questions are consistent with the groups and from the beginning of the semester to the end, and almost all are positive. Concurrently, students' responses to two open-ended questions are positive and consistent with the groups and from the beginning of the semester to the end. The first open-ended question is "*What do you think overall? Through these two discussions, have you added value to the knowledge and ideas you have already had?"* In the first section, 36 students participated and responded to the first open-ended question at the beginning of the semester, 33 of whom expressed their perceptions as *positive, supportive, and encouraging*. In the second section, 33 participated, and 29 concurred with the first group. At the end of the semester, 33 students participated and responded in the first section, 32 of whom expressed their perceptions as *positive, supportive, and encouraging*. In the second section, 31 participated, and 30 concurred with the first group. At the beginning and end of the semester, only a few students expressed their recommendation to make the assignments more straightforward. None of those expressed negative responses.

The second open-ended question is "*For the future, what would you recommend to the professor about these two discussions?"* In the first section, 36 students participated and responded to the first open-ended question at the beginning of the semester, 19 of whom expressed their perceptions as positive, supportive, and encouraging to "*keep going without changing,"* and 7 recommended a study guide for the assignment, and rest of those provided individual recommendations which might be helpful for further satisfaction. In the second section, 33 participated, 15 recommended "*keep going without changing*," and 13 recommended a study guide might be useful. The rest of those concur with the first section's recommendations. At the end of the semester, 33 students participated and responded to the first open-ended question at the beginning of the semester, 27 of whom expressed their perceptions as positive, supportive, and encouraging to "*keep going without changing,"* and 4 recommended a study guide for the assignment, and rest of those provided individual recommendations which might be helpful for further satisfaction. In the second section, 31 participated, 15 recommended "*keep going without changing*," and 6 recommended a study guide might be useful. The rest of those concur with the first section's recommendations. From the beginning to the end, the number of students expressing "keep going without changing" increased since the students studied the assignment in the ninth week of the semester.

DISCUSSION

The paper documents an experiential study realized during the Spring semester of 2024. It was organized as a pilot study to understand business sophomores' questioning and decision-making skill levels. Undoubtedly, it has been important to add a skills development component to the accounting courses in college-level business education since the students need skills after graduation for their career in real business life. The experiential study documented in the paper is a self-employed component of the course; students discussed the subject virtually and provided feedback through the CANVAS learning management system.

As with any study, ours is not without limitations. The study uses a judgmental basis to classify students' submissions, which means that students' responses were coded on a judgmental basis. Future studies might consider more objective ways of building categories based on Bloom's taxonomy. More detailed data on each level of knowledge that targets each of the 24 cognitive actions would provide a broader picture of each subject's position in the taxonomy. On the other hand, the paper has only one semester of experience, which might not be sufficient to conclude whether the study is worth continuing.

The study's findings show that adding such components can make students engaged, connected, motivated, and successful.

SUMMARY AND CONCLUSION

The paper documents an experiential study to understand business sophomores' questioning and decision-making skill levels. A three-step approach is applied to the experience: First, a concise case is provided to students. Second, students participated in the study by responding to the instructions provided. Finally, they participated twice in a survey to provide their perceptions of the experience they were involved in. The results are empirically analyzed using qualitative and quantitative statistical techniques.

Based on the frequency data, the study's questioning and decision-making skill development parts show that students mostly displayed factual knowledge and lower-order cognitive thinking skills. As expected, the study verifies that there has not been any significant difference between raising and asking questions, taking a manager's role, and making decisions.

The study is motivated by how to use figures and facts in business organizations where business students will be employed. It has been conducted on an exploratory basis as an initial one and highlights the urge to apply long-term intervention with a more detailed task set.

The paper argues that the experiential study added value to sophomore-level business students and helped improve the skills needed in their careers since the findings are interesting and encouraging even in the principle-level accounting courses in business schools. The experience documented in the study would help students improve the questioning and decision-making skills they will need in the future.

ACKNOWLEDGEMENT

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APPENDIX

STUDENTS' FEEDBACK

Section: 1	**In the Beginning of Spring 2024 N=35**						**At the End of Spring 2024 N=33**					
Statements	**SD=1**	**D=2**	**Neither=3**	**A=4**	**SA=5**	**Mean**	**SD=1**	**D=2**	**Neither=3**	**A=4**	**SA=5**	**Mean**
Relevancy1 - Studying "Welcoming Discussion - 1" was relevant to the discussion for this course	1	0	2	22	10	4.143	0	0	2	22	9	4.212
Worthiness1 - Studying "Welcoming Discussion - 1" was worthwhile for me to discuss	1	1	5	22	6	3.886	0	1	1	21	10	4.212
Time-consuming1 - For "Welcoming Discussion - 1", I did not spend more time than expected	1	0	6	16	12	4.086	0	0	3	16	14	4.333
Approach1 - For "Welcoming Discussion - 1" the two-step approach was suitable as posting first and then discussing	1	1	4	22	7	3.943	0	0	4	16	13	4.273
Materials1 - For "Welcoming Discussion - 1" I did not need to use materials for this discussion	1	4	4	20	6	3.743	1	10	6	12	4	3.242
Joyfulness1 - Discussing "Welcoming Discussion - 1" was fun and joyful	1	0	8	18	8	3.914	0	0	10	19	4	3.818
Apply1 - Discussing "Welcoming Discussion - 1" was a good opportunity for me to apply my knowledge	1	0	3	18	13	4.2	0	1	2	17	13	4.273
					Average	**3.988**					**Average**	**4.052**

Section: 2	In the Beginning of Spring 2024 N=35						At the End of Spring 2024 N=33					
Statements	**SD=1**	**D=2**	**Neither=3**	**A=4**	**SA=5**	**Mean**	**SD=1**	**D=2**	**Neither=3**	**A=4**	**SA=5**	**Mean**
Relevancy1 - Studying "Welcoming Discussion - 1" was relevant to the discussion for this course	0	0	0	18	9	3.545	0	0	4	20	6	4.067
Worthiness1 - Studying "Welcoming Discussion - 1" was worthwhile for me to discuss	1	1	7	19	5	3.788	0	1	7	15	7	3.933
Time-consuming1 - For "Welcoming Discussion - 1", I did not spend more time than expected	0	1	4	21	7	4.03	0	1	2	17	10	4.2
Approach1 - For "Welcoming Discussion - 1" the two-step approach was suitable as posting first and then discussing	0	0	5	21	7	4.061	0	0	3	19	8	4.167
Materials1 - For "Welcoming Discussion - 1" I did not need to use materials for this discussion	0	2	9	20	2	3.667	0	7	6	15	2	3.4
Joyfulness1 - Discussing "Welcoming Discussion - 1" was fun and joyful	0	3	12	15	3	3.545	0	3	12	9	6	3.6
Apply1 - Discussing "Welcoming Discussion - 1" was a good opportunity for me to apply my knowledge	0	1	6	19	7	3.97	1	0	4	17	8	4.033
					Average	**3.801**					**Average**	**3.914**

Section: 1	In the Beginning of Spring 2024 N=35						At the End of Spring 2024 N=33					
Statements	**SD=1**	**D=2**	**Neither=3**	**A=4**	**SA=5**	**Mean**	**SD=1**	**D=2**	**Neither=3**	**A=4**	**SA=5**	**Mean**
Relevancy2 - Studying “Welcoming Discussion - 2” was relevant to the discussion for this course	2	0	3	24	6	3.914	0	0	0	21	12	4.364
Worthiness2 - Studying “Welcoming Discussion - 2” was worthwhile for me to discuss	1	0	3	26	5	3.971	0	1	2	20	10	4.182
Time-consuming2 - For “Welcoming Discussion - 2”, I did not spend more time than expected	1	1	2	25	6	3.971	0	0	2	21	10	4.242
Approach2 - For “Welcoming Discussion - 2” the two-step approach was suitable as posting first and then discussing	1	1	2	25	6	3.971	0	1	3	16	13	4.242
Materials2 - For “Welcoming Discussion - 2” I did not need to use materials for this discussion	2	4	7	16	6	3.571	0	8	9	9	7	3.455
Joyfulness2 - Discussing “Welcoming Discussion - 2” was fun and joyful	1	0	5	22	7	3.971	0	0	7	19	7	4
Apply2 - Discussing “Welcoming Discussion - 2” was a good opportunity for me to apply my knowledge	1	0	2	21	11	4.171	0	0	1	15	17	4.485
					Average	**3.935**					**Average**	**4.139**

Section: 2	In the Beginning of Spring 2024 N=35						At the End of Spring 2024 N=33					
Statements	**SD=1**	**D=2**	**Neither=3**	**A=4**	**SA=5**	**Mean**	**SD=1**	**D=2**	**Neither=3**	**A=4**	**SA=5**	**Mean**
Relevancy2 - Studying "Welcoming Discussion - 2" was relevant to the discussion for this course	1	0	5	20	7	3.97	0	0	3	23	4	4.033
Worthiness2 - Studying "Welcoming Discussion - 2" was worthwhile for me to discuss	0	0	6	23	4	3.939	0	0	5	20	5	4
Time-consuming2 - For "Welcoming Discussion - 2", I did not spend more time than expected	0	1	6	19	7	3.97	0	3	5	17	5	3.8
Approach1 - For "Welcoming Discussion - 2" the two-step approach was suitable as posting first and then discussing	0	0	5	23	5	4	0	1	2	22	5	4.033
Materials2 - For "Welcoming Discussion - 2" I did not need to use materials for this discussion	0	3	9	20	1	3.576	0	8	7	13	2	3.3
Joyfulness2 - Discussing "Welcoming Discussion - 2" was fun and joyful	0	3	10	16	4	3.636	0	3	12	12	3	3.5
Apply2 - Discussing "Welcoming Discussion - 2" was a good opportunity for me to apply my knowledge	0	0	6	22	5	3.97	0	1	3	17	9	4.133
					Average	**3.866**					**Average**	**3.829**