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FINDINGS FROM AN EXAMINATION OF A CLASS PURPOSED TO TEACH THE SCIENTIFIC METHOD APPLIED TO THE BUSINESS DISCIPLINE

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ABSTRACT

Aim/Purpose: This brief paper will provide preliminary insight into an institutions effort to help students understand the application of the scientific method as it applies to the business discipline through the creation of a dedicated, required course added to the curriculum of a mid-Atlantic minority-serving institution. In order to determine whether the under-consideration course satisfies designated student learning outcomes, an assessment regime was initiated that included examination of rubric data as well as the administration of a student perception survey. This paper summarizes the results of the early examination of the efficacy of the course under consideration.

Background: A small, minority-serving, university located in the United States conducted an assessment and determined that students entering a department of business following completion of their general education science requirements had difficulties transferring their understanding of the scientific method to the business discipline. Accordingly, the department decided to create a unique course offered to sophomore standing students titled Principles of Scientific Methods in Business. The course was created by a group of faculty with input from a twenty person department.

Methodology: Rubrics used to assess a course term project were collected and analyzed in Microsoft Excel to measure student satisfaction of learning goals and a student satisfaction survey was developed and administered to students enrolled in the course under consideration to measure perceived course value.

Contribution: While the scientific method applies across the business and information disciplines, students often struggle to envision this application. This paper explores the implications of a course specifically purposed to engender the development and usage of logical and scientific reasoning skills in the business discipline by

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	students in the lower level of an bachelors degree program.
	The information conveyed in this paper hopefully makes a contribution in an area where there is still an insufficient body of research and where additional exploration is needed.
Findings	For two semesters rubrics were collected and analyzed representing the inclusion of 53 students. The target mean for the rubric was a 2.8 and the overall achieved mean was a 2.97, indicating that student performance met minimal expectations. Nevertheless, student deficiencies in three crucial areas were identified.
	According to the survey findings, as a result of the class students had a better understanding of the scientific method as it applies to the business discipline, are now better able to critically assess a problem, feel they can formulate a procedure to solve a problem, can test a problem-solving process, have a better understanding of how to formulate potential business solutions, understand how potential solutions are evaluated, and understand how business decisions are evaluated.
Conclusion	Following careful consideration and discussion of the preliminary findings, the course under consideration was significantly enhanced. The changes were implemented in the fall of 2020 and initial data collected in the spring of 2021 is indicating measured improvement in student success as exhibited by higher rubric scores.
Recommendations for Practitioners	These initial findings are promising and while considering student success, especially as we increasingly face a greater and greater portion of under-prepared students entering higher education, initiatives to build the higher order thinking skills of students via transdisciplinary courses may play an important role in the future of higher education.
Recommendations for Researchers	Additional studies of transdisciplinary efforts to improve student outcomes need to be explored through collection and evaluation of rubrics used to assess student learning as well as by measuring student perception of the efficacy of these efforts.
Impact on Society	Society needs more graduates who leave universities ready to solve problems critically, strategically, and with scientific reasoning.
Future Research	This study was disrupted by the COVID-19 pandemic; however, it is resuming in late 2021 and it is the hope that a robust and detailed paper, with more expansive findings will eventually be generated.

Keywords	first generation college students, transdisciplinary education, scientific method in the business discipline, scientific reasoning in management education, scientific literacy, management education, business education, rubric, student learning outcomes, assessment of student learning, HBCU

INTRODUCTION

Traditionally, students learn the scientific method in required general education courses with the assumption that the knowledge and skills gained will transfer to their primary discipline. In recent years, however, a small number of schools of business have started to recognize that this assumed skill transfer may be suboptimal. For business schools with a history of accommodating traditionally under-served learners and building critical skills necessary for success professionally and personally, cognizance of changing employer expectations and possible skill deficiencies is imperative.

Historically Black Colleges and Universities are American institutions founded before the Civil Rights Act of 1964 to provide educational opportunities that might otherwise be denied (Buzzetto-Hollywood & Mitchell, 2019; Schexnider, 2017). HBCUs have as their missions to engage and uplift students who are often marginalized (Lomax, 2006; Seymour & Ray, 2015). Gregory Clay of The Undefeated points out that this is because "HBCUs operate with a special mission in mind and a higher cause" as they seek to elevate and improve traditionally underserved communities (Clay, 2016). While the original challenges that existed during reconstruction and Jim Crow no longer exist, new educational inequities present themselves at today's HBCUs, which impact students coming from historically marginalized communities (Buzzetto-Hollywood et al., 2018; Lomax, 2006)

Established in 1886, the University of Maryland Eastern Shore (UMES) is a Historically Black, 1890 land grant institution. It is a member of the University System of the State of Maryland and primarily serves first-generation, low-income, and minority learners. The student population is approximately 2900, as of the fall of 2019, with a student body that is 71.1% African American, 14.9% white, 5% Hispanic, 3.6% multi-ethnic, and 3% international. UMES was ranked in the top 20 among Historically Black Colleges and Universities (HBCU) in 2020. The acceptance rate for applying students was 61%, with most students coming from the Mid-Atlantic region, more specifically the Baltimore and Washington D.C. urban centers. UMES has a long history of providing academic programs and services for ethnically and culturally diverse students and, toward that end, offers programs and assistance that attract, serve, retain, and graduate many first-generation college students (Buzzetto-Hollywood & Mitchell, 2019; Buzzetto-Hollywood, Mitchell, & Hill, 2019; Buzzetto-Hollywood, Quinn, et al., 2019).

The UMES Department of Business, Management, and Accounting (DBMA) is accredited by the Association to Advance Collegiate Schools of Business (AACSB) International. The Department offers a range of programs, including business administration, accounting, marketing, and finance. Additionally, certificate programs in business, marketing, entrepreneurship, and financial analytics were recently approved. The Department has an Assurance of Learning Committee that is purposed to continuously explore student learning outcomes through meaningful assessment, explore factors impacting the student experience, identify mechanisms through which teaching and learning can be approved, and promote innovative teaching strategies.

LITERATURE REVIEW

Duncan Watts (2014) explains that business practitioners need an understanding of the scientific method even more than technical skills. He notes that understanding the scientific method and its application in business leads to a scientific mindset that involves looking at the world in a systematic and replicable way with the formulation of hypotheses that require the gathering of data and testing.

An examination published in Harvard Business Review (Spina et al., 2020) looked at 116 early-stage start-up companies. Their research found that entrepreneurs who were taught the scientific method and were able to formulate and rigorously test hypotheses using sound data collection and analysis techniques were more successful. This success was measured in the form of revenue generation. They concluded that continuous experimentation, discovery, and genuinely rigorous investigation techniques lead to favorable results.

The Workforce Institute (Lauby, 2014) notes that contemporary challenges faced by corporations require advanced problem-solving skills. They explain that it is the application of the scientific method that provides the most "logical way of tackling business problems," advocating that the scientific method can, and should, be used by non-scientists to find optimal solutions.

Shute et al. (2016) define problem-solving skills as "a person's ability to engage in cognitive processing to understand and resolve problem situations where a method to solve the problem is not immediately available." They explain that the poor problem-solving skills of graduates of U.S. business skills are a significant concern to American business leaders. A similar assessment was made by

Hart Research Associates (2015), who conducted a study on behalf of the Association of American Colleges and Universities, finding that while nearly all employers (96%) feel that students should have experiences in college that build complex problem-problem solving and that graduates should leave college with analytical reasoning capabilities (81%), only 24% of employers report that recently hired American college graduates able to analyze and solve complex business problems.

The scientific method as it applies to business and industry involves identifying problems, developing hypotheses, formulating a procedure to solve the problem, testing the problem-solving process, carrying out an experiment/test, analyzing findings, and formulating an informed plan of action/improvement based on what has been learned. Traditionally, students learn the scientific method in required general education courses with the assumption that the knowledge and skills gained will transfer to their primary discipline. In recent years, however, a growing number of schools of business have started to recognize that this assumed skill transfer may be suboptimal. Smith (2013) identifies shortcomings in how business students are taught to think analytically and solve problems and suggests that "if business schools aspire to improve their students' thinking skills, they must teach, or develop, those skills and undertake assessment activities to determine if related learning goals are being achieved."

Student learning outcomes assessment is an integral part of quality assurance in higher education that has been recognized as an ongoing process, the goal of which is to maintain a culture committed to continuous improvement and student success. Successful assessment is an ongoing cycle predicated on identifying objectives, gathering and analyzing data, discussions, recommendations, implementing changes, and reflection to improve student outcomes (Buzzetto-Hollywood, 2017). Haken (2006) explained that assessment is an integral piece to assuring that an educational institution achieves its learning goals and a crucial means of providing the crucial evidence necessary for seeking and maintaining accreditation. Hersh (2004) advocated that assessment of student learning should be considered an integral part of the teaching and learning processes and part of the feedback loop that serves to enhance institutional effectiveness.

Among the crucial learning goals that are frequently the subject of institutional assessment, but which commonly include only a cursory examination, is student thinking skills as exhibited as the ability to engage in scientific reasoning. Unfortunately, too often, scientific reasoning is a skill that is solely relegated to the study of science. Nevertheless, some in business are recognizing the importance of critical reasoning skills among business practitioners. Regrettably, critical thinking and scientific reasoning skills in business education are an area that is shockingly under-researched and where attention is desperately needed (Calma & Devies, 2020). This paper is purposed to contribute to the virtually nonexistent literature on the topic of scientific reasoning in the business discipline. This paper explores the implications of a course specifically purposed to engender the development and usage of logical and scientific reasoning skills in the business discipline by students in the lower level of an undergraduate degree program.

THE COURSE

Following an assessment that found that students entering a department of business following completion of their general education science requirements had difficulties transferring their understanding of the scientific method to the business discipline, the Department of Business, Management, and Accounting at the University of Maryland Eastern Shore decided to create a unique course offered to sophomore standing students titled Principles of Scientific Methods in Business. Following rigorous discussion among the faculty, it was decided that the course under development be targeted to sophomore standing students. The rationale is that sophomore standing students are likely to have already completed the University's required general education science courses but would not yet fully emerge in their business discipline courses. The development of the course was a collaborative effort by a group of faculty with input from the larger sixteen-person department.

The course was purposed to partially address a departmental learning goal stated as "Graduates should be able to reason quantitatively and acquire scientific knowledge and skills." The first half of the learning outcome is accessed in business calculus, business statistics, and quantitative methods. As such, it is the second portion of the learning goal, "acquire scientific knowledge and skills," that is now assessed in the course scientific methods in the business discipline otherwise known as BUAD 222.

The student learning outcomes for the course BUAD 222 are as follows:

1. Upon completion of this course, students will be able to express a basic knowledge of the scientific method process as it applies to business.

2. Upon completing this course, students will be able to critically assess a problem, formulate a procedure to solve the problem and develop a mechanism to test the problem-solving process.

3. Upon completion of this course, students will be able to demonstrate the ability to formulate, analyze, and make informed business decisions through the implementation of a comprehensive project

In conjunction with the course, a comprehensive term project was developed assessed by a custom-created rubric built around the course's student learning outcomes. The rubric evaluated student work based on ten criteria: 1) format, organization, and representation of information; 2) communication of ideas; 3) introduction of the hypothetical firm; 4) identification of goals; 5) identification of variables; 6) projected correlations between core dependent and independent business variables; 7) market analysis; 8) equilibrium conditions-mathematical examination of all conditions under which the hypothetical businesses can achieve success as well as to incur losses; 9) presentation of pricing strategy; and 10) use of logical reasoning. A five-point scale was employed where 1 equaled unacceptable, 2 equaled attempt in progress, 3 indicated that a basic level of understanding was present, 4 represented proficiency with all performance expectations being satisfied, and 5 exceeded all expectations with an advanced understanding and performance demonstrated. A copy of the rubric is represented in Table 1: BUAD 222 Rubric.

Table 1: BUAD 222 Rubric

Criteria	Exceeds Performance Expectations/ Advanced (5)	Meets Expectations / Proficient (4)	Basic Understanding (3)	Attempted / In Progress (2)	Not Acceptable (1)
Format, Organization, and Representation of Information	Perfectly follows all formatting. Organization is meaningful. All labels and headings are present, fonts are consistent, and all margins and justifications are appropriate. Everything is properly labeled. Tables and charts are expertly presented. No errors, of any kind, in either format or organization can be found. Information clearly and professionally presented in various forms (graphs, tables, and words) to illustrate ideas in a meaningful manner.	Follows formatting and organizational requirements. Qualitative information presented in various formats to enhance understanding.	Satisfactory with only minor improvements needed. All minimal expectations are met. Information represented in appropriate formats.	Attempted; however, flaws that require correction are evident. Attempt made to represent information.	Does not follow the required format and/or is unorganized. Limited representation of information.

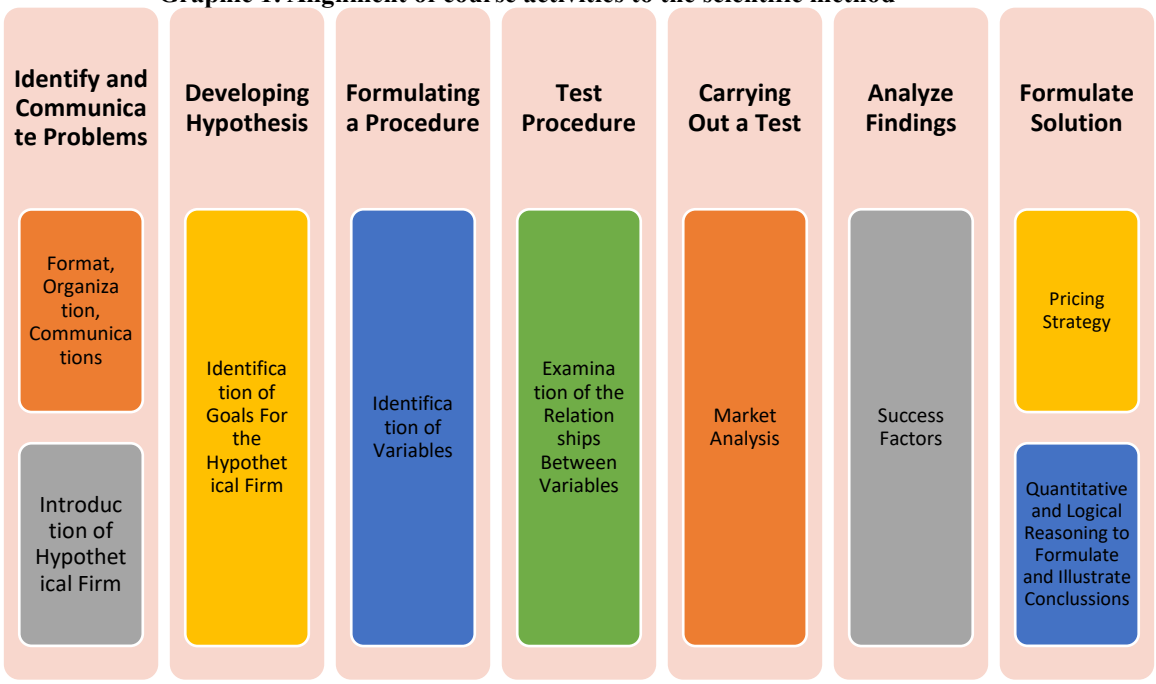
Criteria	Exceeds Performance Expectations/ Advanced (5)	Meets Expectations / Proficient (4)	Basic Understanding (3)	Attempted / In Progress (2)	Not Acceptable (1)
Communications	Cohesive and succinct. A correct and complete explanation is clearly presented. Superior writing with descriptive language is demonstrated. Perfect use of grammar, word choice, punctuation, sentence structure, transitions, and spelling. The work presented is flawless and exceeds expectations. Entire effort is clearly of the student's own authorship with no plagiarism or lack of originality indicated.	Correct use of grammar, word use, punctuation, sentence structure, transitions, and spelling. No more than two minor errors can be found.	Most of the document is correct. The project demonstrates control of writing mechanics. Some minor flaws discernible that are easily corrected.	Attempted; however, flaws that require correction are evident.	Weak, disjointed, illogical, or inconsistent. Serious corrections required. Indication of plagiarism may exist.
Introduction of Hypothetical Firm	A well-designed and thoughtful hypothetical firm is introduced with great detail and elaboration. The name, type of business, industry of focus, logo, and other distinguishing factors are discussed. A well-developed context in which the firm will operate is offered. All details are reasonable for the type of business presented. A distinguished effort is indicated. Explanation and justification is expertly and convincingly presented so that the reader is left with no questions but is compelled and convinced by the quality of the information presented.	All required information is included. The information is clear and logical. No major omissions, or oversights, are present.	All required information is included. Some greater elaboration for clarity is recommended. A reader reviewing the proposal might be left asking questions. Some additional flaws in reasoning or articulation may exist.	Issues with clarity, purpose, context, or explanation. Most of the required information is included with one, or more major omissions evident. A reader reviewing the proposal will be left with questions.	Hypothetical firm presented in a way that it is either vague or missing significant components. A lack of, effort is indicated.
Identification of Goals	More than the required minimum number of goals are presented. Each goal is discussed with elaboration and justification. All goals are SMART (specific, measurable, attainable, relevant, and timely).	At least three goals are presented that are clear, sensible, and explained.	Three goals are presented some suggestions for improvement exist.	An attempt to present goals is made; however, flaws that require correction are evident.	Goals are either missing, incomplete, or illogical.
Identification of Variables	Observations, evaluations, and analyses made in the identification of the variables. Evidence of significant reasoning skills are indicated. All relevant threats and opportunities are thoroughly assessed. Comparisons are made as necessary. Explanations and justifications are presented as well as a thorough analysis of potential ramifications.	Five, or more, key variables influencing the business are analyzed and discussed. Student identifies potential extraneous variables that may impact the business. All variables introduced are clear, sensible, thoughtful, and well explained.	Five key variables influencing the business are identified and introduced. Some potential extraneous variables that might impact the business are presented.	Variables are discussed with some issues with clarity, purpose, logic, context, or explanation.	Variables are either insufficient, incomplete, or weakly presented.
Relationships between Variables	Student examines projected correlations between core dependent and independent business variables. Various outcomes are evaluated and thoughtful judgments are made. Student uses correct and complete analyses as needed to interpret information and make relevant and correct conclusions. All decisions are well-reasoned, logical, and properly justified.	Student identifies and explores projected correlations between dependent and independent variables in order to draw logical conclusions.	Projected relationships are made. A basic understanding of correlation analyses is demonstrated with some minor logical errors or unsubstantiated claims.	Attempt made to correlate dependent and independent variables; however, omissions and/or flaws indicate more effort is needed.	Correlation between independent and dependent variables are incomplete, illogical, missing, or weakly presented.

Criteria	Exceeds Performance Expectations/ Advanced (5)	Meets Expectations / Proficient (4)	Basic Understanding (3)	Attempted / In Progress (2)	Not Acceptable (1)
Market Analysis	Student demonstrates a clear, and logical, use of deductive reasoning in the creation and presentation of the firm that are likely to be effective and convincing to potential funders of the business being proposed, and likely to lead to a competitive advantage. A mastery of consumer behavior is clearly indicated as the student explains the rational for the statements presented as well as how they are reflective of the target consumers. An identification of the target consumer (who makes the purchase, who influences decisions, consumer motivation, utility, equilibrium) is presented. Statements are without errors.	At least five elements of the proposed market for the firm are described and justified. Full descriptions of the potential customer based is included. Competition is described and quantification is attempted.	Basic market conditions are described.	Some market conditions are presented but are not connected to the proposed firm. No indications given of competition.	Market descriptions are either flawed, incomplete, missing, or illogical.
Success Factors	All conditions that should prevail for the firm to reach success in the marketplace are presented as well as under which conditions the firm would be likely to incur losses. Profit maximization concepts are applied to address various perspectives in how to actualize and achieve profit making goals of a business and the factors that affects such process. Concepts of cost minimization and the efficient usage of resources are addressed. Student uses both a chart and mathematical approach. Synthesis of ideas to engender understanding and make predictive statements is shown.	All conditions under which the hypothetical businesses they have created can achieve success as well as under which conditions the firm would be likely to incur losses. Relevant analyses are presented to support the conclusions drawn.	Conditions that should prevail for the firm to reach success in the marketplace are identified and presented.	Student attempts to discuss success conditions. Some errors, omissions, or flaws that require corrections are evident.	A weak or partial attempt to discuss success conditions is presented.
Price Strategy	A clear and extensive understanding of price elasticity of demand (PED) is illustrated which shows the relationship between price and quantity demanded and provides a precise calculation of the effect of a change in price on the quantity demanded. As a result of the advanced understanding illustrated, a well-developed, logical, and effective pricing strategy is proposed. Detailed information, explanations, and justifications are presented.	A clear and coherent pricing structure is introduced.	A pricing structure is presented some minor issues with the rationale, calculations, and or explanations.	A pricing structure is attempted; however, the plan does not give a complete pricing structure. No rationale for, or explanation of, the pricing strategy is given.	A weak, partial, or missing attempt. A lack of effort is indicated.
Quantitative and Logical Reasoning Used to Formulate Conclusions	Quantitative information is presented in various forms (equations, graphs, tables, and words). Any, and all, calculations used are clearly demonstrated, are without flaws, and lead to a correct conclusion. All quantitative reasoning is logical, systematic, and justified. Quantitative reasoning is used to analyze information, evaluate findings, and synthesize conclusions.	Calculations used are included. Explanations are presented and justifications are made. Graphs, charts, and formulas used to analyze data are present as needed.	Evidence of the use of calculations to draw conclusions is present.	Calculations are made but either contain errors or are not complete enough to solve the problem.	Major errors are evident that indicate a lack of effort or basic understanding.

How the ten elements assessed on the rubric relate to applying the scientific method in the business discipline is indicated in Graphic 1: Alignment of Course Activities to the Scientific Method. As indicated in the graphic, identification and communications of problems are considered in introducing the hypothetical firm and in the communications and organization employed in

the project. Developing a hypothesis is done as the student introduces the goals for the hypothetical firm around which their investigation will be anchored. Formulating a procedure is done when the student identifies the necessary variables to be explored to test the hypothesis/ability to meet identified goals. The procedure is tested when the student the projected correlations between core dependent and independent business variables. The test is carried out when the student engages conducts research while engaging in a thorough market analysis. Findings are analyzed from the market research and as well as additional data in order to generate success factors. Students formulate a solution by creating a pricing strategy as well as in the use of quantitative and logical reasoning to formulate conclusions.

Graphic 1: Alignment of course activities to the scientific method



METHODOLOGY

For two semesters, completed assessment rubrics were collected and analyzed in Microsoft Excel with mean, standard deviation, and confidence interval at 95% calculated. In addition to the analysis of rubric data, a student satisfaction survey was developed and administered to students enrolled in the course under consideration. The survey contained seven Likert-scaled five-point agreement questions that explored student perceptions of the course's efficacy in building the designated student learning outcomes. The survey was administered via the Survey Monkey system, and the data exported to SPSS for basic summary statistical analyses, including mean and standard deviation.

Two hypotheses were considered as part of this small preliminary study.

Hypothesis1: The BUAD 222 course was successful at helping students apply the scientific method to the business discipline.

> This hypothesis is tested by considering the mean score on the assessment rubric, whereas if a mean of >3.0 was achieved, then the threshold for affirming the hypothesis is viewed as having been met.

Hypothesis 2: Business students are satisfied with the efficacy of the course under consideration purposed to teach the scientific method in the business discipline.

This hypothesis is tested by examining the student responses to the Likert-scaled survey statements, whereas if a mean of >3.0 was achieved, then the threshold for affirming the hypothesis is viewed as having been met.

FINDINGS

For two semesters, completed student evaluation rubrics used by the instructors teaching the course were saved. They were later collected and analyzed by the Department's Assurance of Learning Committee. In sum, there were 53 students included in the sample who were assessed based on the consideration of ten criteria evaluated on a five-point scale. The analysis of the rubric data in the form of mean, standard deviation, and confidence interval are shown in Table 2, whereas the mean for format and organization was 3.31, the mean for communication of ideas was 3.18, the mean score for the students' introduction and explanation of the hypothetical firm under consideration was a 3.00, the mean for the identification of goals was a 3.39, the mean for the identification of variable was a 3.04, the mean for the projected correlations was a 2.55, the mean for market analysis and strategy was a 3.04, the mean for the identification of equilibrium conditions was a 2.73, the mean for the development of a sound pricing strategy was a 2.41, and the mean for the application of logical reasoning was a 3.02.

Table 2: Rubric Results

Criteria	Mean	Standard Deviation	Confidence at 95%
Format/Organization/representation of information	3.31	0.753818933	0.202944458
Communication of Ideas	3.18	0.549719442	0.147996435
Hypothetical Firm	3.00	1.102581641	0.296838968
Identification of Goals	3.39	0.887349686	0.238893843
Variables	3.04	0.88474621	0.23819293
Projected Correlations	2.55	1.193343063	0.321273918
Market Analysis and Strategy	3.04	0.765961764	0.206213573
Equilibrium Conditions	2.73	0.971726407	0.261609892
Pricing Strategy	2.41	0.771463356	0.207694721
Logical Reasoning	3.02	0.77939635	0.209830456

A survey was administered following completion of the course using the online survey tool Survey Monkey. These results of the survey are illustrated in Table 3 and depict student perceptions of the efficacy of a lower- level undergraduate course designed to teach the applications of the scientific method in the business discipline.

Table 3: Survey Results

Statement	Mean	Standard Deviation
As a result of this class, I now have a better understanding of the scientific method as it applies to business.	3.75	1.42
As a result of this class, I now have a better understanding of how to critically assess a business problem	3.83	1.40
As a result of this class, I now have a better understanding of how to formulate potential business solutions.	3.58	1.47
As a result of this class, I now have a better understanding of how to evaluate potential business solutions.	3.63	1.31

Statement	Mean	Standard Deviation
As a result of this class, I now have a better understanding of how to formulate a procedure that can be used to help solve a problem.	3.73	1.41
As a result of this class, I now have a better understanding of how to test a problem-solving process	3.75	1.45
As a result of this class, I now have a better understanding of how to effectively analyze business decisions.	3.96	1.27

DISCUSSION

The preliminary findings of the analysis of the rubric used to assess the project in a course purposed to build the scientific method in the business discipline were promising. The target mean set by the Department for the rubric was 2.8, and the overall achieved mean was 2.97, indicating that student performance met minimal expectations. Nevertheless, student deficiencies in three crucial areas were identified, namely the ability to make projected correlations, calculate equilibrium conditions, and formulate an effective pricing strategy. For testing Hypothesis 1, a >3.00 was set as the requisite threshold. With a 2.97 mean achieved, hypothesis one was close to meeting the threshold but just shy of being affirmed.

According to the survey findings, as a result of the class, students had a better understanding of the scientific method as it applies to the business discipline, are now better able to assess a problem critically, feel they can formulate a procedure to solve a problem, can test a problem-solving process, have a better understanding of how to formulate potential business solutions, understand how potential solutions are evaluated, and understand how business decisions are evaluated. For testing Hypothesis 2, a >3.00 was set as the requisite threshold. With a 3.75 mean achieved, hypothesis two met the threshold to be affirmed.

As a result of the preliminary findings and identification of areas where there were student deficiencies, significant improvements have been made to the course and the course project. It was determined that the guidance provided to students was insufficient given the complexity of the project and with consideration that students enrolled in the course are sophomore standing students. As such, robust additional resources and aids were developed.

In terms of course delivery of content, greater coverage of the topics in which students performed below expectations was included along with additional assessments that will provide students with increased formative feedback. For the project, checkpoints were developed in order to provide students with enhanced formative feedback. Additionally, a professor with extensive experience in building students' scientific reasoning and complex problem solving was designated as the sole instructor of record for the course.

The instructor now assigned to the course reflected on the changes by saying:

> I have taken on board the lack of understanding about the relationships between variables and have now included a discussion of variables in every topic presented to the class. I identified dependent and independent variables very early in the semester and have reinforced the concepts everywhere possible. I have introduced the individual project much earlier in the semester and have already defined the sections with due dates which will be enforced with point penalties. Once students submit the sections, I can provide feedback that should improve the scores for format and communication in particular.

LIMITATIONS

This exploration was interrupted by the Covid-19 pandemic and as such data collection was halted. This resulted in a smaller than ideal sample size. Additionally, it is the norm in studies to compare the findings to the larger body of literature; however, that was not possible with this paper as no comparable exploration in the business discipline could be found.

CONCLUSION

This paper presented a course created by a business department for offering to sophomore standing students majoring in business purposed to help students apply the scientific method to the business discipline. A rubric presented in this paper, which was utilized to evaluate student performance on a course term project, was collected, analyzed, and presented. Additionally, a short student satisfaction survey was administered to gauge student perceptions of the course's efficacy under consideration. According to the findings, the course was marginally successful at helping students apply the scientific method in the business discipline, but serious student deficiencies in three crucial areas were identified. In terms of student satisfaction and perception, the participating students were satisfied with the efficacy of the BUAD 222 course, responding that it did help them better understand the scientific method as it applies to the business discipline, better critically assess a problem, formulate a procedure to solve a problem, test a problem-solving process, have a better understanding of how to formulate potential business solutions, understand how potential solutions are evaluated, and understand how business decisions are evaluated.

Following careful consideration and discussion of the initial findings, the course under consideration was significantly enhanced. The changes were implemented in the fall of 2020, and initial data collected in the spring of 2021 indicates measured improvement in student success as exhibited by higher rubric scores.

These initial findings are promising, and while considering student success, especially as we increasingly face a greater and more significant portion of underprepared students entering higher education, initiatives to build the higher-order thinking skills of students via transdisciplinary courses may play an essential role in the future of higher education.

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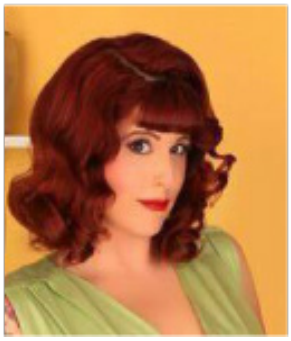

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