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An Experiential Learning Approach to the Introduction to Business Course

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Abstract

This paper presents the results of a multi-year effort to redesign the introduction to business course at Western Michigan University. ScrimmageSIM, a business simulation that emulates commercial ERP systems, provides the core experience in the course and is a mechanism for students to develop their understanding of business with a focus on quantitative analysis. The design and implementation of the simulation experience follows the experiential learning spiral, as students run the simulation five times with increasingly complex scenarios. The overall design of the course is competency-based, as students have the opportunity to redo many of the course assignments to earn a better grade. The simulation experience, combined with the competency-based design of the course, has resulted in a more rigorous course with students earning grades that are better than they were with the previous curriculum.

Keywords: Business Simulation, Experiential Learning, Introduction to Business, Competency-Based Education

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An Experiential Learning Approach to the Introduction to Business Course

Bret Wagner and Melissa Intindola

1. INTRODUCTION

Borden (2016) compared introduction to business courses at 17 top-ranked business schools (see Appendix A). This comparison suggests that there is not a consensus on what should be taught in an introduction to business course—or even if there should be one. In the fall of 2020, the Haworth College of Business at Western Michigan University (WMU) made the decision to redesign their introduction to business course. This change was prompted by a restructuring of the university's general education requirements. Appendix B compares the previous general education curriculum with the new Essential Studies curriculum. Among the improvements made to this curriculum was a "laddering" of the requirements so that there was not a tendency for students to complete all of these requirements in their freshman/sophomore years. The new curriculum had learning objectives defined for each category, and a curriculum proposal was required for courses to be included in the new Essential Studies curriculum. These proposals required a detailed assessment plan to show how the course would meet the learning objectives for the category, and an organizational structure was established to review Essential Studies courses on a regular basis.

The existing introduction to business course, BUS 1750 - Business Enterprise, qualified for the previous General Education requirements under Area V, Social and Behavioral Sciences. The new WMU Essential Studies curriculum did not have this, or a similar, category. To avoid adding additional credits to the degree requirements for all business students, it was necessary to find a "home" for the introduction to business course in the new WMU Essential Studies curriculum. After review, the category Oral and Digital Communication was identified as the best opportunity for this course to be included in the WMU Essential Studies program.

Courses in the essential studies curriculum must be accessible to students from a variety of majors. WMU is a comprehensive university with over 150 majors, and many of the students in this course, especially in the spring semester, are not business students. The revised course was

designed to provide a good foundation for business majors to build on as they progress through the curriculum, and for non-business majors many will work in for-profit organizations, and the concepts covered in the course are valuable those who will work for-profit and in not-for profit organizations.

Three goals were set for this redesign of this course:

1. Meet the new WMU Essential Studies Requirement for Oral and Digital Communication
2. Make the course more experiential in nature.
3. Improve the quantitative literacy of students.

The vehicle for achieving these goals in the course redesign was the ScrimmageSIM business simulation that was developed by the lead author. At this time the ScrimmageSIM simulation was not only used in several courses at WMU but also at a handful of other universities in a variety of courses.

ScrimmageSIM was designed to replicate Enterprise Resource Planning systems like SAP and Oracle, which provides two advantages:

1. A student experience that mimics the type of enterprise systems students will see in industry.
2. A configuration capability to facilitate the simulation of different businesses and business scenarios.

Using the ScrimmageSIM simulation would not only provide the experiential learning component of the course but would also evolve to address several challenges in deploying this course to over 1,100 students annually.

In addition to providing the experiential learning component of the course, ScrimmageSIM also supported the goal of quantitative literacy. The concept of quantitative literacy used to revise BUS 1750 consisted of two components: the application of mathematical models to business problems, and the analysis of financial statements to understand a business.

This goal would be difficult to achieve with the current generation of introduction to business textbooks. Appendix C shows the chapters for three current introduction to business textbooks from Pearson Publishing, and Appendix D shows the chapters for two current introduction to business textbooks from McGraw-Hill. While the design of introduction to business courses is varied, the content of all five textbooks is quite similar. All five books cover Ethics and Global Business within the first four chapters, even though students will not have a very deep understanding of business when reading these chapters if the instructor assigns chapters in the order in which they appear in the table of contents. All five also postpone the discussion of accounting and finance topics until the end of the book, and then cover the topic in a cursory fashion. Because of this, the current set of introduction to business textbooks proved unsatisfactory to achieve the goal of quantitative literacy.

Thus, the lead author began work on Fundamentals of Business, a textbook that is sold as an Amazon Kindle textbook for \$9.99. Not only is the textbook be affordable, but because the Kindle Application is available for computers, tablets, and cell phones, it is easier for students to read as it is be readily available when the student has a few spare minutes. The simulation cost was \$99 per student, which included grading of two papers and a presentation, which is discussed later. The total cost of course materials was approximately two-thirds of the previous course materials.

Table 1 shows the chapters of Fundamentals of Business used in the revised course. Chapter 2 – Generating profits covers the income statement. The chapter does not cover the construction of the income statement using debits and credits, but rather, presents the completed income statement and shows how the information provided can be used by managers to understand the business.

Chapter 3 – Assets of the Firm, covers the balance sheet and Chapter 4 – Managing Cash, covers the statement of cash flows. A major focus of these chapters is how to use financial ratios to understand the performance of a business.

Chapter 14 – Business Financing, provides significant coverage of discounted cash flows, which is emphasized in the course. Chapter 25 – Personal Financial Planning, builds on the discounted cash flows covered in Chapter 14 to provide concrete examples on long-term financial

planning. Simple quantitative models were included as much as possible in other chapters, for example, the lifetime customer value formula is presented in Chapter 7 – Marketing: Providing Customer Value.

Chapter 1 – Introduction
Chapter 2 – Generating Profits
Chapter 3 – Assets of the Firm
Chapter 4 – Managing Cash
Chapter 8 – Leadership in Business Organizations
Chapter 5 – Economics
Chapter 6 – Introduction to Business Strategy
Chapter 14 – Business Financing
Chapter 7 – Marketing: Providing Customer Value
Chapter 15 – New Product Development
Chapter 10 – Supply Chain Management
Chapter 25 – Personal Financial Planning

Table 1 – Chapters from the textbook Fundamentals of Business

To further the quantitative literacy of students, spreadsheets are integral to the course. There are two problems that must be addressed to ensure that students learn from spreadsheet assignments. The first one is well known: cheating. This issue was addressed by creating a security macro in Excel that does two things.

First, the student must enable the macro and type their name in a pop-up window before working on the spreadsheet. This macro saves their name to a password protected sheet so that each student must create their own spreadsheet. To close the loop, the macro also disables the paste function in Excel, so that the results from one spreadsheet cannot be pasted into the macro-enabled spreadsheet. Thus, the only way for a student to submit someone else's work is to have the other person create a complete spreadsheet for the student.

The other issue with spreadsheet assignments is that students may perceive the spreadsheet as an additional, non-value-added step if the spreadsheet is not actively used in the class. If a student is presented with a concept in class and given an assignment to build a spreadsheet that incorporates that concept but never applies the spreadsheet to solve a realistic problem, they are much less likely to see spreadsheets as a tool. To address this problem, students are provided with pre-built planning spreadsheets which they must use to develop plans that they will execute in the simulation. This use of spreadsheets helps the

students see the value of spreadsheets as a tool. An expanded security macro is used for these spreadsheets that logs every student input so that it can be determined whether the students used the spreadsheets in a trial-and-error fashion to develop their simulation plan.

2. INTEGRATION OF SCRIMMAGESIM

Using a simulation in a course does not, in and of itself, create engagement or, more importantly, learning. As David Crookall noted, "simulation/games can generate strong feelings (both positive and negative) during play. They may include frustration, anger, satisfaction, accomplishment, desire to win, group belonging, new identity, pleasure, overwhelmed by complexity, cognitive dissonance, and so on." (Crookall, 2014). He pointed out that these emotions, especially the negative ones, can get in the way of learning and "can only be addressed (and defused) in the debriefing, not in the thick of the action of the simulation/game." This is partially true, in that the debriefing may not be able to fully address negative emotions if a student performs poorly and has no option to improve. Furthermore, if the simulation is just a one-time experience, there may be limited motivation to engage fully in the debrief.

These problems can surface even when a simulation is a continuous component of the course, for example, a strategy simulation in a capstone course. If a team performs poorly in the first period of a semester-long simulation, it may put them in a situation where they will need to work very hard for the rest of the semester just to end up with a mediocre grade.

ScrimmageSIM was designed to address these issues. The ERP design of the simulation allows for the creation of a set of increasingly difficult simulation scenarios using the same company. Poor performance on one scenario has no impact on the performance in the next scenario. In addition, the simulation was structured so that students could rerun the simulation on their own to earn a better score while simultaneously increasing their understanding of the scenario and preparing them for the next simulation scenario. Example screens from ScrimmageSIM are shown in Appendix E.

The simulation experience and debrief can be viewed as two parts of Kolb's experiential learning model (Kolb, 1984). Figure 1 illustrates Kolb's experiential learning model. The simulation is the concrete experience and the debrief is the reflective observation. Learning from these two

steps is enhanced if this is followed by abstract conceptualization and active experimentation. Furthermore, the learning can be enhanced by repeating the four steps of the experiential learning model, which Kolb and Kolb (2012) describe as the experiential learning spiral. In BUS 1750, students run the simulation five times, which provides for an experiential learning spiral experience. Details of these simulation runs are shown in Appendix F.

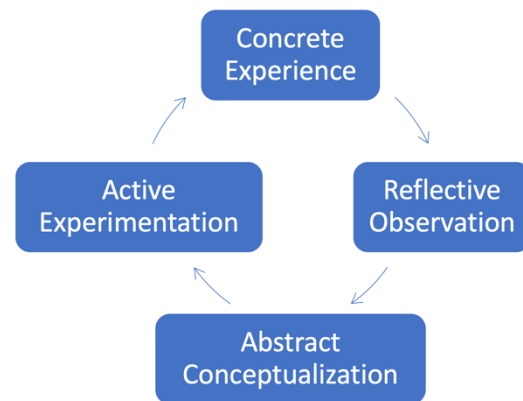


Figure 1 – Experiential Learning Cycle

Prior to running the simulation for the first time, students review two videos: one describing the simulation environment for Scenario 100 and one describing the operation of the simulation.

The simulation environment is a small brewery that produces three beers using four fermenters, which are the bottleneck operation of the production process. Students operate the simulation for one simulated year, and in the first scenario they only need to decide what product to make on each of the four fermenters. In the scenario, there is a summer beer with high demand from April through August. The demand in these months exceeds the facility's capacity, which provides the challenge in the simulation. Students must produce a written paper that summarizes the information provided in these two videos in a format that should be useful during the first simulation run.

The simulation is run using teams of three students during class time to leverage competition in increasing engagement. Despite writing a paper describing the simulated environment and simulation operation, students may not perform well on the first simulation. Even with an effective debrief, students may be frustrated by their performance and miss the benefits of reflective observation. BUS 1750

employs two mechanisms to counteract this: the ability to rerun the simulation outside of the classroom and earn a better score, and they fact that they will run Scenario 100 again in class (after developing plans) as well as three others that build on the fundamentals introduced in Scenario 100. To support this course, a well-staffed tutoring center is provided where students can receive individualized help when rerunning the simulation.

In addition to being able to rerun the simulation, students also are guided in reflective observation on a variety of topics.

For example, after the first run of Scenario 100 there is a discussion on cost absorption. Many students assume that they should run the inventory to zero by the end of the simulated year. During the first run of Scenario 100 they are advised not to do this. In the class after the simulation, the basics of cost absorption and its

impact on earnings before tax is explained so they will understand why they should not run the inventory down to zero in the simulation as well as the the reason cost absorption may cause companies to engage in "channel stuffing" to improve the income statement in the short run in spite of the long-run negative impact.

To provide an opportunity for students to engage in Abstract Experimentation and Active Engagement, students are provided with a planning spreadsheet to use in developing a plan for their second run of Scenario 100. An example of this spreadsheet is shown in Figure 2. This spreadsheet helps them understand the use of spreadsheets as a tool, and exposes them to more advanced spreadsheet capabilities like conditional formatting. In the simulation, each batch of beer requires 14 days to produce. The planning spreadsheet is designed with monthly production quantities to simplify the problem.

AN34										
	A	B	C	D	E	F	G	H	I	J
1										
2										
3										
4										
5										
6										
7										
8										
9									Price =	\$17.50
10									Cost =	\$10.43
11										
		Forecast (CS)	Beginning Inventory (CS)	Production (CS)	Available for Sale (CS)	Sales (CS)	Lost Sales	Ending Inventory (CS)	Gross Profit	
13										
14	Jan	3,489	5,873	4,000	9,873	3,489		6,384	\$24,667	
15	Feb	3,525	6,384	4,000	10,384	3,525		6,859	\$24,922	
16	Mar	3,561	6,859	4,000	10,859	3,561		7,298	\$25,176	
17	Apr	3,596	7,298	4,000	11,298	3,596		7,702	\$25,424	
18	May	3,632	7,702	4,000	11,702	3,632		8,070	\$25,678	
19	Jun	3,668	8,070	4,000	12,070	3,668		8,402	\$25,933	
20	Jul	3,704	8,402	4,000	12,402	3,704		8,698	\$26,187	
21	Aug	3,739	8,698	4,000	12,698	3,739		8,959	\$26,435	
22	Sep	3,775	8,959	4,000	12,959	3,775		9,184	\$26,689	
23	Oct	3,811	9,184	4,000	13,184	3,811		9,373	\$26,944	
24	Nov	3,847	9,373	4,000	13,373	3,847		9,526	\$27,198	
25	Dec	3,882	9,526	4,000	13,526	3,882		9,644	\$27,446	
26								TOTAL =	\$312,699	
27										
28										
29									Price =	\$15.50
30									Cost =	\$10.08
31										
		Forecast	Beginning Inventory (CS)	Production (CS)	Available for Sale (CS)	Sales (CS)	Lost Sales	Ending Inventory (CS)	Gross Profit	
33										
34	Jan	553	2,564	5,000	7,564	553		7,011	\$2,997	
35	Feb	1,280	7,011	5,000	12,011	1,280		10,731	\$6,938	
36	Mar	2,527	10,731	5,000	15,731	2,527		13,204	\$13,696	
37	Apr	4,000	14,204	5,000	19,204	4,000		16,204	\$24,696	

Figure 2 – Scenario 100 Planning Spreadsheet

Part of the abstract conceptualization is to understand how complex business problems are frequently simplified to make them manageable, but that this creates a challenge in implementing the results of the simplified model. Many times in the course students are reminded of George Box's saying that "all models are wrong—some are useful."

Finally, active engagement is achieved by having students submit their planning spreadsheet for a grade. The planning spreadsheet incorporates a security macro that makes sure that their name is saved to a password-protected sheet, the paste function is disabled, and a log is kept of every change to a decision cell. In the Scenario 100 version, students make production decisions for two of the three products, and any remaining capacity is allocated to the third. Conditional formatting alerts students if their schedule is infeasible because they scheduled more production than the available capacity. The spreadsheet grade is comprised of three components: is the proposed schedule of production feasible, does the plan generate an earnings before tax (EBT) value that exceeds a minimum target, and does the log sheet indicate that students have met a minimum number of trial-and-error entries?

Planning spreadsheets are modified to incorporate additional features in each scenario, reinforcing their abstract conceptualization of the simulation environment. Active experimentation occurs both when they build their spreadsheet plan and when they present their spreadsheet to their team and develop a team spreadsheet and execution plan in a required team planning meeting. Students record the team planning meetings using Microsoft Teams. Instructors review these team meeting videos and provide feedback to students on their participation in the meeting. If a student continues to be unprepared for team meetings and does not participate effectively, teams are shuffled, and a non-performing team member may become an "individual performer." This does not happen often, and it usually happens when a student has completely disengaged from the course and does not respond to emails. In this case the instructor files a student concern form so that Student Academic Affairs can follow up on the student.

Teamwork is also emphasized in the lecture on Leadership in Business Organizations, which includes an in-class group exercise on personality types and the impact this has on their participation in their team.

3. COMPETENCY-BASED DESIGN

Much of the focus in competency-based education is on the entire educational institution, and includes topics such as curriculum processes, institutional resources, financial aid, role of the faculty, etc. There is not a single agreed-upon definition of competency-based education, but the one offered by the Competency-Based Education Network aligns with the philosophy used in the development of this course:

Competency-based education combines an intentional and transparent approach to curricular design with an academic model in which the time it takes to demonstrate competencies varies, and the expectations about learning are held constant. Students acquire and demonstrate their knowledge and skills by engaging in learning exercises, activities, and experiences that align with clearly defined programmatic outcomes. Students receive proactive guidance and support from faculty and staff. Learners earn credentials by demonstrating mastery through multiple forms of assessment, often at a personalized pace. (Stewart 2021)

With the restrictions of a college course in a traditional educational environment, BUS 1750 was designed to give students as much time as possible to develop mastery. The ability to rerun simulations is one aspect of the competency-based design approach used in the development of the course. The mid-term and final exams are both formative and summative. These exams are online and taken by the student outside of the classroom. There are two versions of each quantitative problem with randomly generated problem values. True/false and multiple-choice questions are randomly selected from a larger bank of questions. The midterm exam is available at the beginning of the semester and allows for multiple attempts with the best score counting. There are no practice problems for quantitative topics. Students are encouraged to attempt the questions related to each topic in the exam after it is covered in class, providing a formative assessment of their learning. The student's grade for the midterm is determined by their best performance on the exam, providing a summative assessment of the material covered. For the midterm exam, there are four weeks between the time all of the material in the exam is covered in class and when the exam is due. A similar structure is used for the comprehensive final exam.

The course has two written assignments: A report that summarizes the information provided to run the first simulation scenario and a detailed company report that includes an analysis of the company's financial statements.

To moderate the additional teaching workload, grading of the two papers is outsourced to a team of writing professionals via ScrimmageSIM. Student papers are submitted as PDF files via the simulation. The graders are provided with iPads and iPencils, so they can write comments on the student's PDF file. Graders assign the score based on the detailed rubric and can also provide summary comments. Continuing the competency-based design, students are encouraged to take the feedback, revise their assignment, and resubmit their paper for a better grade. In addition to reducing the instructor workload and providing students with an opportunity to learn by revising their work, this system provides quicker, more detailed, and more consistent student feedback.

In addition to being able to resubmit the two paper assignments, students can also resubmit two spreadsheet assignments—the first involves building a spreadsheet to calculate their grade in the course and the second one to calculate gross margins. Late assignments are accepted in most cases with a 10% late penalty to encourage students to work in a timely fashion yet allow them to be successful if they make mistakes in time management. The exception to this late submission policy is the simulation planning spreadsheets and planning meetings, which must be completed prior to the simulation sessions for students to take full advantage of the experiential learning component of the course.

4. PRELIMINARY FINDINGS

During the development of the course there was much concern on the part of many faculty members that it would be too hard for students. This turned out not to be true. Figure 3 shows that students performed better with the new curriculum than with the old curriculum, even considering the impact of Covid on freshman student's high school education in the Spring 2023 classes. Spring 2019 was used as the comparison group because the composition of students in the spring semester is approximately 2/3 non-business students and 2019 was the latest semester of the old curriculum that was not impacted by Covid. There were 551 students in the course in Spring 2019, and 416 in Spring 2023. Two major reasons that students were able to do well with a more challenging curriculum was

the ability to resubmit many of the assignments and the staffing of a tutoring center for the course.

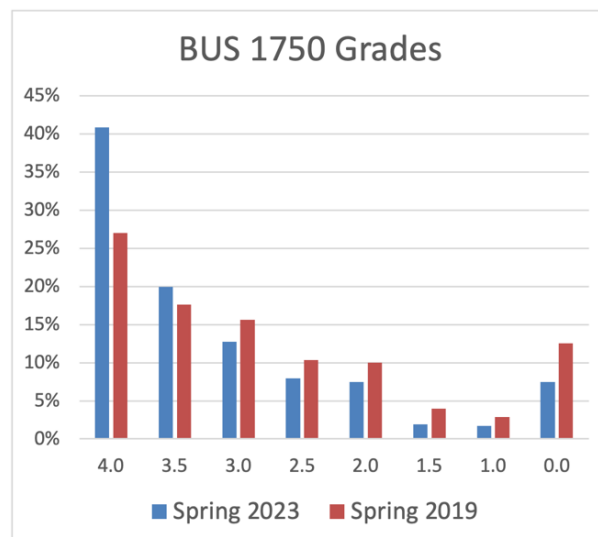


Figure 3 – Comparison of Final Grades

To better understand how well the course was performing, students were given a detailed end-of-semester course evaluation. Extra credit was given for completing the survey, which resulted in 330 of 416 students completing the survey, which is a 79% response rate.

Again, the simulation was designed to provide a spiral of learning experience, and teamwork was designed to be a critical component of this spiral. Two questions in the survey were geared to finding out if these simulation components of the course were successful. Figure 4 shows the response to the question "The simulation exercises helped me to be more engaged in the course," and Figure 5 shows the response to the question "Working with fellow students in my team contributed to my learning in this course."



Figure 4 – Simulation and Engagement

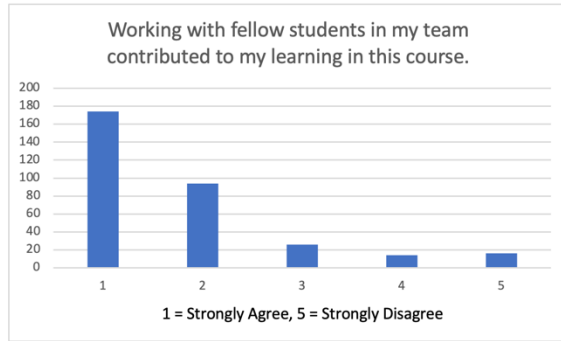


Figure 5 – Teamwork and Learning

These results show that 83% of students agreed or strongly agreed that the simulation helped them be engaged in the course. The use of teams for planning and execution of the simulation resulted in 87% of the students agreeing or strongly agreeing that working with fellow students contributed to their learning.

Because students participated with their teams in class and submitted recorded meetings, students were unable to be “free riders” without it being noticed. The authors feel this contributed to the strong survey response on the value of teamwork. Hopefully these students will be more likely to actively participate with teams in their future classes.

Four class sessions at the beginning of the course are devoted to understanding financial statements. Students also produce a company analysis paper which includes analyzing the company’s financial statements. In addition, accurate financial statements are a key feature of ScrimmageSIM, and there are a number of points where the simulation financial statements are used in reflective observation to inform key course concepts. Figure 6 shows the results for the question of how satisfied students were with their ability to analyze financial statements. While not as strong as the results for the value of the simulation and teamwork, 75% of the students were extremely satisfied or satisfied with their ability to analyze financial statements. Hopefully this experience will result in better performance in accounting classes for these students.

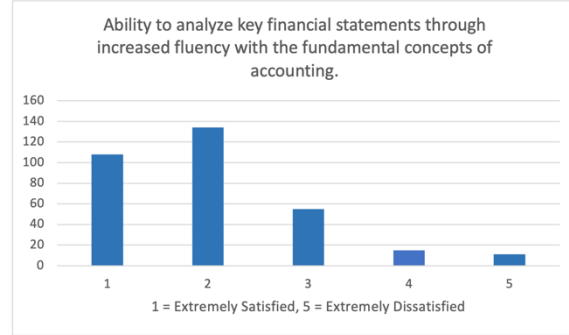


Figure 6 – Analyzing Financial Statements

A single-factor ANOVA was performed to determine the impact of the instructor on the question of student satisfaction with their ability to analyze key financial statements. The result of this analysis showed that the impact of the instructor was statistically significant with $p = 1.77e-7$.

The course survey was designed as an exploratory survey, however, three different regression analyses were conducted to look for other factors that influenced student learning.

In the first, we regressed the degree with which students reported that “The simulation exercises, including the pre-simulation work, helped me learn to use Excel as a problem-solving tool” onto the students’ “... fundamental understanding of economics and how economic concepts can be used to better understand the business environment.” In this model, adjusted R^2 was .28, indicating that approximately 28% of the variation in student’s understanding of economics and the application of economic concepts to business could be explained by the simulation exercise. The model was significant at the .05 level, but this R^2 value is widely considered ‘weak’ (Srinivasan, 2020).

In the second model, we regressed student’s assessment of whether “The instructor was knowledgeable about the operation of the simulation and could answer student questions about how the simulation worked” onto the students’ “... fundamental understanding of economics and how economic concepts can be used to better understand the business environment.” In this model, adjusted R^2 was .30, indicating that approximately 30% of the variation in student’s understanding of economics and the application of economic concepts to business could be explained by perception of the instructor’s knowledge of the simulation and ability to answer questions about the simulation. The model was significant at the .05 level, and

adjusted R^2 is at the bottom of the 'moderate' range for explanatory value (Srinivasan, 2020).

In the third model, we utilized a multiple regression approach, regressing the instructor's knowledge and ability to answer questions ("The instructor was knowledgeable about the operation of the simulation and could answer student questions about how the simulation worked") and students' assessment of the simulation tool ("The simulation exercises, including the pre-simulation work, helped me learn to use Excel as a problem-solving tool") onto students' "... fundamental understanding of economics and how economic concepts can be used to better understand the business environment." In this model, adjusted R^2 was .39, indicating that approximately 39% of the variation in student's understanding of economics and the application of economic concepts to business could be explained by perception of the instructor's knowledge of the simulation **as well as** the simulation exercise. This model was significant at the .05 level, and is reporting at a level well into the 'moderate' range (.3-.5) of explanatory power (Srinivasan, 2020).

In Scenario 200 and beyond, students were able to adjust prices so that they could align demand with capacity and increase their gross margins. The course spends three classes covering economics: one class on supply and demand, one class on price elasticity, and one class on economic systems (free market economies, socialism, and communism). In addition to discussing elasticity in class, elasticity is implemented in the planning spreadsheet for Scenarios 200, 220 and 230. Because elasticity is not only discussed as an abstract classroom topic but implemented in a planning spreadsheet prior to being a crucial part of three simulations, it makes sense that students feel the simulation helps them understand the relationship between economic concepts and business.

These three regression models were the only models that showed instructor experience had an impact on learning key topics. That instructor experience was not shown to impact the student experience more is not surprising as all instructors share common teaching materials including classroom PowerPoint slide decks. Instructors are encouraged to include personal examples when presenting the material but to stay consistent with the core of the material. In addition, during the two-year implementation of this course, of five adjunct faculty who taught the course with the old curriculum, only 2 were teaching when the survey was conducted. Thus, the variability in instructor ability was reduced

through attrition and careful hiring of new instructors.

Interestingly, neither class status (i.e., freshman, etc.) nor class time (i.e., morning, afternoon, etc.) had any significant bearing on the students' assessment of the simulation exercise.

Instructor quality did surface in a rudimentary review of the students' open-ended responses to the following questions: "What was the best thing about this course?" "How would you improve this course?" "What did you like about the style/manner in which I taught? i.e. what did I do well?" "What did you dislike about the style/manner in which I taught? i.e. what could I improve?" "Please feel free to provide additional comments about the course or instructor." In a review of the first 100 open ended responses, 40% of students reported that ScrimmageSIM was the best part of the course. Students reported varying degrees of satisfaction with the quality of instructor, specifically as it pertained to instructor's knowledge of the simulation and ability to answer questions. It became clear in reviewing the qualitative data that the instructor's role in student success in this particular class is important. For example, students either reported comments akin to "*Instructor was great and made the course more interesting*" or more negative comments like "*If I had to take it [this course] again, I would take it with another professor.*"

5. DISCUSSION AND CONCLUSION

There is currently little consistency in college-level introduction to business courses. The change in WMU's required general education courses provided an opportunity to review the purpose of the introduction to business course at WMU. The new course is designed to prepare business students for their future studies by providing an experiential learning environment where they can appreciate the importance of financial information and quantitative models. For non-business students, the class provides a strong foundation in how business operate and the need to integrate different business functions.

This course redesign has shown that, with the proper design and student support resources, students can succeed in a quantitatively challenging course.

The new course has also been challenging for some instructors. One adjunct instructor opted out of teaching the course before it's initial offering, two opted out after the first year and one

was not renewed after the second year. With some effort, new instructors have been found that are up to the challenges of the new curriculum, which requires instructors to learn to operate the simulation, refresh their knowledge of accounting fundamentals, and learn how to integrate the simulation experience into the regular classroom sessions.

Faculty who are interested in implementing this curriculum in their introduction to business course can contact the lead author to get access to all of the teaching and support materials, including lecture PowerPoint files, exam test banks, assignments, etc.

Future research is being planned to determine if the revised introduction to business course is contributing to better performance of business students in later business courses like accounting.

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Editor's Note:

This paper was selected for inclusion in the journal as the 2023 ISCAP Conference Best Data Analytics Paper. The acceptance rate is typically 2% for this category of paper based on blind reviews from six or more peers including three or more former best papers authors who did not submit a paper in 2023.

APPENDIX A
Comparison of Introduction to Business Courses at 17 Top-Ranked Schools

School	Year Offered / Credit Hours / Required	Professional Communications	Professional Development	Survey of Business Disciplines	Course Projects (Team vs. Individual)
Bentley	Fr / 1 / yes	NA	Yes	No	Individual
Boston College	Fr / 3 / yes	Yes	Yes	Yes	Both
Cornell	Fr / 4 / yes	Yes	Yes	Yes	Both
Georgetown	Fr / 3/ no	NA	NA	Yes	Team Case Competition
Indiana	Fr / 1.5 / yes	NA	Yes	Yes	Individual
Michigan	Fr / 1 / yes* Fr / 0 / yes	NA NA	Yes Yes	Yes Yes	NA NA
NYU	Fr / 0 / yes	Yes	Yes	Yes	Team
Northeastern	Fr / 4/ yes* Fr / 0 / yes	Yes NA	No Yes	Yes NA	Team
Ohio State	So / 3 / yes	Yes	Yes	Yes	Team
Penn State	Fr / 1 / yes	Yes	Yes	Yes	Both
Syracuse	Fr / 3/ yes	YES	NA	Yes	Team
Penn	Fr / 0.5 / yes pass/fail	NA	Yes	Yes	Individual
Texas	Fr / 1/ yes	Yes	Yes	No	Individual
Villanova	Fr / 3 / yes	Yes	Yes	Yes	Both
Wake Forest	Fr / 3 / yes	NA	NA	Yes	NA
Washington U.	Fr / 3 / yes Fr / 2 / yes	NA Yes	NA Yes	Yes NA	NA Team
William & Mary	Jr / 1 / yes pass/fail	Yes	Yes	Yes	Both

Fr - Fresman Year, So - Sophomore Year, Jr - Junior Year, Sr - Senior Year

* Two-course sequence required for most students.

APPENDIX B
Comparison of WMU General Education Curriculum with the new
Essential Studies Curriculum

General Education Curriculum

Proficiency Courses

- College-level writing course
- Baccalaureate-level writing or writing-intensive course
- College-level mathematics or quantitative reasoning course

Distribution Areas

- Area I – Fine Arts
- Area II – Humanities
- Area III – The United States: Cultures and Issues
- Area IV – Other Cultures and Civilizations
- Area V – Social and Behavioral Sciences
- Area VI – Natural Sciences with Laboratory
- Area VII – Natural Science and Technology: Applications and Implications
- Area VIII – Health and Well-Being

Essential Studies Curriculum

Level 1 – Foundations

- Writing
- Oral and Digital Communications
- Quantitative Literacy
- Inquiry and Engagement

Level 2 – Exploration and Discover

- Personal Wellness
- World Language and Culture
- Artistic Theory and Practice
- Scientific Literacy with a Lab
- Science and Technology
- Societies and Cultures

Level 3 – Connections

- Local and National Perspectives
- Global Perspectives

APPENDIX C

Table of Contents for Pearson Publishing Introduction to Business Textbooks

Title Authors Publisher Chapters	Better Business Solomon, Poatsy & Marin Pearson	Business Essentials Ebert & Griffin Pearson	Business in Action Bovee & Thill Pearson
1	Business Basics	The US Business Environment	Developing a Business Mindset
2	Economics	Understanding Business Ethics and Social Responsibility	Economics, Money and Banking
3	Ethics in Business	Entrepreneurship, New Ventures, and Business Ownership	The Global Marketplace
4	Business in a Global Economy	Understanding the Global Context of Business	Business Ethics and Corporate Social Responsibility
5	Business Law (mini chapter)	Managing the Business	Forms of Ownership
6	Small Business and Entrepreneurship	Organizing the Business	Entrepreneurship and Small-Business Ownership
7	Forms of Business Ownership	Operations Management and Quality	Management Roles, Functions, and Skills
8	Constructing an Effective Business Plan (mini chapter)	Employee Behavior and Motivation	Organization and Teamwork
9	Business Management and Organization	Leadership and Decision Making	Production Systems
10	Motivation, Leadership, and Teamwork	Human Resource Management and Labor Relations	Employee Motivation
11	Human Resources	Marketing Processes and Consumer Behavior	Human Resource Management
12	Online Business and Technology	Developing and Pricing Products	The Art and Science of Marketing
13	Production, Operations, and Supply Chain Management	Distributing and Promoting Products	Product Management and Pricing Strategies
14	Business Communications (mini chapter)	Information Technology (IT) for Business	Customer Communication and Product Distribution
15	Marketing and Consumer Behavior	The Role of Accountants and Accounting Information	Financial Information and Accounting Concepts
16	Product Development, Branding, and Pricing Strategies	Understanding Money and the Role of Banking	Financial Management and Financial Markets
17	Promotion and Distribution	Managing Business Finances	
18	Finding a Job (mini chapter)	Risk Management	
19	Finance and Accounting for Business Operations	The Legal Context of Business	
20	Investment Opportunities in the Securities Market	Managing your Personal Finances	
21	Personal Finance (mini chapter)	Unions and Labor Management	
22			
23			
24			

APPENDIX D
Table of Contents for McGraw-Hill Introduction to Business Textbooks

Title	Business Foundations	Understanding Business
Authors	Ferrell, Hirt & Ferrell	Nickels, McHugh & McHugh
Publisher	McGraw-Hill	McGraw-Hill
Chapters		
1	The Dynamics of Business and Economics	Taking Risks and Making Profits within the Dynamic Business Environment
2	Business Ethics and Social Responsibility	Understanding Economics and How It Affects Business
3	Business in a Borderless World	Doing Business in Global Markets
4	Options for Organizing Business	Demanding Ethical and Socially Responsible Behavior
5	Small Business, Entrepreneurship, and Franchising	How to Form a Business
6	The Nature of Management	Entrepreneurship and Starting a Small Business
7	Organization, Teamwork, and Communication	Management and Leadership
8	Managing Operations and Supply Chain	Structuring Organizations for Today's Challenges
9	Motivating the Work Force	Production and Operations Management
10	Managing Human Resources	Motivating Employees
11	Customer-Driven Marketing	Human Resource Management: Finding and Keeping the Best Employees
12	Dimensions of Marketing Strategy	Dealing with Employee-Management Issues
13	Digital Marketing and Social Media	Marketing: Helping Buyers Buy
14	Accounting and Financial Statements	Developing and Pricing Goods and Services
15	Money and the Financial System	Distributing Products
16	Financial Management and Securities	Using Effective Promotions
17		Understanding Accounting and Financial Information
18		Financial Management
19		Using Securities Markets for Financing and Investing Opportunities
20		Money, Financial Institutions, and the Federal Reserve
21		Working within the Legal Environment
22		Using Technology to Manage Information
23		Managing Risk
24		Managing Personal Finance & Investing

APPENDIX E

Key Screens in the ScrimmageSIM Simulation

Production Order Screen

Production Order: CreateProduction Order 300042 created

Tenant: 100 - BUS 1750
Scenario: 100 - Arborcrest Basic
Team 1
Run: 11 - Test Run 1
User: Student-01
Bret Wagner
Simulation Time: 04/27/2024 12:00:00 AM

[Back](#) [Refresh](#) [Open Window](#)

Material: TajMCS12 - Taj Mahal 12oz bottle case

Quantity: 1240 Unit of Measure: CS Plant: 100 - Brewery BOM: 100 - Basic BOM Routing: 100 - TajMahal Basic Routing

01/21/2024

☒ **Start** ☐ **End** [Create Production Order](#)

Production Orders

Order Number	Material_Number	Mat'l Description	Plant	Routing	Start Date	Quantity	Q Complete	UoM	Actions
<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>
300042	TajMCS12	Taj Mahal 12oz bottle case	100	100	04/27/2024	1,240	0	CS	
300041	TajMCS12	Taj Mahal 12oz bottle case	100	100	04/27/2024	1,240	0	CS	
300040	AliCatCS12	AliCat Ale 12oz bottle case	100	100	04/27/2024	1,240	0	CS	
300039	AliCatCS12	AliCat Ale 12oz bottle case	100	100	04/27/2024	1,240	0	CS	
300038	TajMCS12	Taj Mahal 12oz bottle case	100	100	04/12/2024	1,240	0	CS	
300037	AliCatCS12	AliCat Ale 12oz bottle case	100	100	04/12/2024	1,240	0	CS	
300036	AliCatCS12	AliCat Ale 12oz bottle case	100	100	04/12/2024	1,240	0	CS	

[Export](#)

View 1 - 40 of 40

Workcenter Queue Screen

WCTR Queue: Status

Tenant: 100 - BUS 1750
Scenario: 100 - Arborcrest Basic
Team 1
Run: 11 - Test Run 1
User: Student-01
Bret Wagner
Simulation Time: 04/28/2024 12:00:00 AM

[Back](#) [Refresh](#) [Open Window](#)

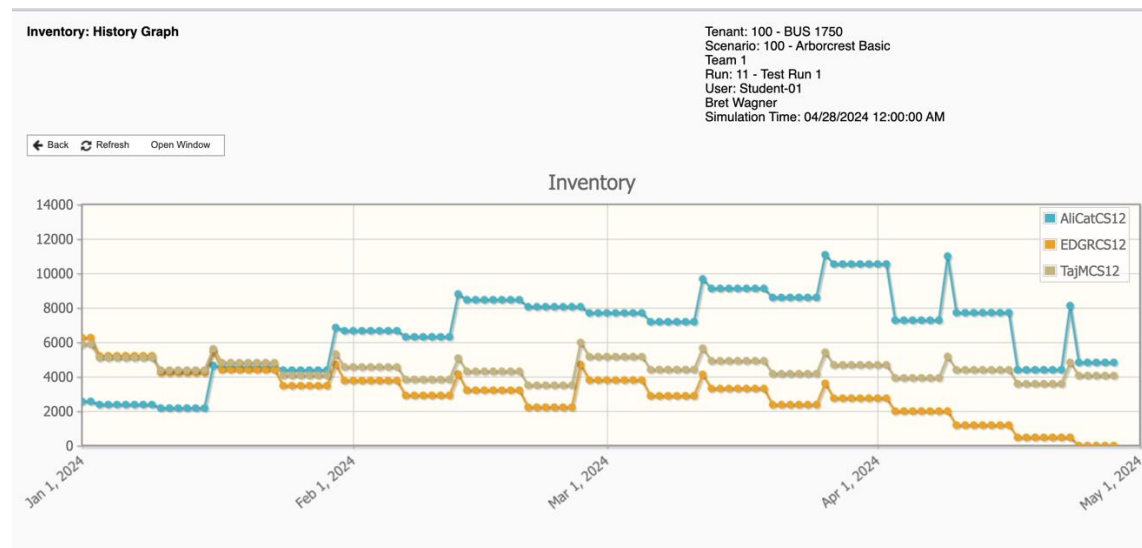
Production Orders

WCTR	Workcenter	Seq	Op	Stage	Order Type	Prod Ord	Lot	Material	Description	Quantity	Time Remain
<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>	<input type="text" value="Search..."/>
601	Fermenter #1	0	20	20	Run	300035	500032	AliCatCS12	AliCat Ale 12oz bottl...	1,240	8 days 00 hrs 00 min 00 sec
602	Fermenter #2	0	20	20	Run	300036	500033	AliCatCS12	AliCat Ale 12oz bottl...	1,240	8 days 00 hrs 00 min 00 sec
603	Fermenter #3	0	20	20	Run	300037	500034	AliCatCS12	AliCat Ale 12oz bottl...	1,240	8 days 00 hrs 00 min 00 sec
604	Fermenter #4	0	20	20	Run	300038	500035	TajMCS12	Taj Mahal 12oz bottl...	1,240	8 days 00 hrs 00 min 00 sec
601	Fermenter #1	1	20	20	Run	300039	500036	AliCatCS12	AliCat Ale 12oz bottl...	1,240	14 days 00 hrs 00 min 00 sec
602	Fermenter #2	1	20	20	Run	300040	500037	AliCatCS12	AliCat Ale 12oz bottl...	1,240	14 days 00 hrs 00 min 00 sec
603	Fermenter #3	1	20	20	Run	300041	500038	TajMCS12	Taj Mahal 12oz bottl...	1,240	14 days 00 hrs 00 min 00 sec
604	Fermenter #4	1	20	20	Run	300042	500039	TajMCS12	Taj Mahal 12oz bottl...	1,240	14 days 00 hrs 00 min 00 sec

[Export](#)

View 1 - 8 of 8

Inventory History Graph Screen



Financial Statement Screen

Financial Statements

Tenant: 100 - BUS 1750
Scenario: 100 - Arborcrest Basic
Team 1
Run: 11 - Test Run 1
User: Student-01
Bret Wagner
Simulation Time: 04/28/2024 12:00:00 AM

← Back Refresh Open Window

Name	Acct/Cat	Current	Dr./Cr.
Financial Statements	-	-	-
Income Statement	-	54,434	-
Gross Profit	1010	264,078	-
Sales Revenue	400000	716,118	Cr.
Cost of Goods Sold	500000	452,040	Dr.
Expenses	1020	209,644	-
Conversion Cost	600000	952	Dr.
Advertising Promotion and Selling	600100	35,377	Dr.
General & Administrative	600200	76,738	Dr.
Depreciation Machinery Plant & Equipment	600300	6,333	Dr.
Depreciation Buildings and Improvements	600400	10,833	Dr.
Salary & Wage Expense	600500	57,639	Dr.
Interest Expense	600600	22,048	Dr.
Conversion Variance	900100	-276	Dr.
Material Variance	900200	0	Dr.
Balance Sheet	-	0	-
Assets	2010	3,755,954	-
Liabilities	2020	1,582,751	-
Owner's Equity	2030	2,173,203	-

APPENDIX F
ScrimmageSIM Experiential Learning Spiral

Concrete Experience	Reflective Observation	Abstract Conceptualization	Active Experimentation
Scenario 100, Run 1 1. Schedule Production	1. Revise paper 2. Review data 3. Rerun scenario 4. Absorption Costing	1. Planning Spreadsheet 2. Planning vs. Execution	1. Planning Spreadsheet 2. Team Planning Meeting
Scenario 100, Run 2 1. Schedule Production	1. Review data 2. Rerun scenario 3. Gross Margin, Operating Margin 4. Elasticity, Price Changes & Capacity Constrains	1. Planning Spreadsheet with Pricing	1. Planning Spreadsheet 2. Team Planning Meeting
Scenario 200 1. Schedule Production 2. Change Prices	1. Review data 2. Rerun scenario 3. Capacity Expansion 4. Loans & Compound Interest	1. Planning Spreadsheet with Pricing & Capacity Expansion	1. Planning Spreadsheet 2. Team Planning Meeting
Scenario 220 1. Schedule Production 2. Change Prices 3. Expand Capacity 4. Pay off loans	1. Review data 2. Rerun scenario 3. New Product Introduction 4. Standard Costs 5. Scenario 220 Presentation	1. Planning Spreadsheet with Pricing, Capacity Expansion & New Product	1. Planning Spreadsheet 2. Team Planning Meeting
Scenario 230 1. Schedule Production 2. Change Prices 3. Expand Capacity 4. Pay off loans 5. Produce 4 th product	1. Review data 2. Rerun scenario		