A COLLABORATIVE FACULTY-DRIVEN APPROACH FOR BUSINESS SKILL DEVELOPMENT IN EXECUTIVE MBA PROGRAMS

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ABSTRACT

30 years ago, Kennesaw State University's College of Business experienced an increased demand from working adults who did not necessarily have a business education background but desired to obtain their MBA. With this limitation in mind, it developed an Executive MBA (EMBA) where today roughly 50% of its students lack a business undergraduate degree upon entering the program. As such, the program is challenged with developing a foundational curriculum to overcome business acumen skill deficits while also providing a non-traditional adult business student with pedagogy and tools that enable them to absorb and integrate the material quickly and across functional areas. The Income/Outcome® game-based simulation helps in accomplishing this by immersing learners in an all-encompassing business acumen teaming exercise that demonstrates the outcomes of decision-making on functional areas of business via nontraditional classroom pedagogy while incorporating a collaborative faculty teaching model to enhance the learning exercise. Building upon the Constructivism Learning Theory framework, we present a fifteen-year study of the Income/Outcome® simulation employed in our Executive MBA Program. Using a pre- and post-survey, we examine perceived foundational business acumen knowledge and skill attainment across multiple functional areas of business. With a significant difference in skill perceptions between the two surveys for most functional areas, the results indicate that this simulation has had a causal improvement on skill development of approximately 18% and thus a broader more effective learning experience for EMBA students.

Keywords: *game-based learning, Constructivism Learning theory, action learning, collaborative teaching, Income/Outcome® Simulation, student perceptions.*

INTRODUCTION

THE EXECUTIVE MBA (EMBA) STUDENT LEARNING APPROACH

Higher-ed business schools traditionally organize their courses around functional areas. This traditional approach no doubt provides students with in-depth knowledge of specific business concepts, however, it can lead to a siloed understanding of how the functional areas

interact and impact one another. This approach is less effective for EMBA students (adult learners with an average age of 38, 16 years of work experience, 8 years of management experience, and 6 or more years since their undergraduate degree completion) who choose an Executive MBA program format for relevancy, applicability, and speed of degree. At Kennesaw State University's Coles College of Business, our innovative pedagogical approach delivers on this demand by providing our students an integrative business action learning experience using a collaborative faculty model where all faculty team teach to enhance that integration. An established body of literature emphasizes an integrated curriculum to meet the demands of corporations and learning attributes of EMBA students (Jhan et al. 2023; Laessig & Myers 2010; Smith & Fletcher 2004; Conger & Xin 2000; Moodie & Roebuck 2002; Stumpf & Tymon 2002; Crotty & Soule 1997; Verlander 1989). Updated studies in the literature have been difficult to find with the exception of Jhan et. al 2023. However, the dated studies are still used today as models in EMBA curriculum development and continue to exemplify the foundation that EMBA Programs need to deliver an integrative, cross-functional curriculum specific to the learning attributes of the EMBA student.

Since the 90s, the Kennesaw State University College of Business's Executive MBA Program has observed the value of an integrated curriculum faculty team-teaching design. This 19-month lock-step cohort-based program is designed to address the knowledge gap between business acumen and people skills using a program long teaming format. The 5-semester format allows adult students to complete courses using a multi-functional integrated unit-based framework (instead of a traditional one subject course) with a variety of activities that focus on teaching EMBA students how to deal with work-related issues. The Program involves a team-based approach for students and as such, faculty are asked to incorporate a team-teaching approach to model the integrative process. The main functional business areas are team-taught to show the impact on organizational decision-making and only those faculty who are willing to collaborate and team-teach participate in the Program.

According to Stumpf and Tymon (2002), programs that "emphasize practical "hands-on" action learning" will create an environment that allows greater student engagement and high self-reported levels of learning. More recent studies confirm the achievement of learning outcomes such as skill development through high rates of student engagement (Huang et al. 2022; Rogmans & Abaza 2019; and Buil et al. 2019); and overall, EMBA students learn better when there are high levels of experiential engagement. These characteristics make the EMBA student well-suited to operate in an action learning environment. Conger and Xin (2000), Kamath et al. (2008), and Perusso et al. (2021) have argued for a greater use of action based or experiential learning experiences for students in business education. However, studies outlining the learning challenges of Executive MBA (EMBA) programs along with curriculum innovations that accommodate the learning differences are limited (Jhan et al. 2023; Han & Liang 2015; and Laessig & Myers 2010). Only about 50% of incoming Coles College of Business EMBA students have an undergraduate business degree thus, it is imperative that the Program provides a solid foundation to help students understand how the functional areas are integrated in an organizational environment. Since the studies above also show that EMBA students demonstrate a greater ability to learn through action learning, lecture time is limited and the concept of

"learning by doing" is a pervasive theme throughout the 19-months. A need for an experiential learning atmosphere is imperative for the development and success of the EMBA student.

SIMULATIONS AS GAMED-BASED ACTION LEARNING TOOLS

Business education has been trending toward greater learner-centered environments, especially through action type learning projects since the mid-90s (Conger & Xin 2000; Stopper 1998). This trend involves team-based experiential exercises in which the aim is to solve workplace relevant type issues. The value in this type of learning format or pedagogy is that individuals are more motivated to learn because of their active involvement in the learning process and when they can understand the importance or relevance of the problem to their own lives and careers. The pervasive theme throughout the business simulation literature is that there is continued and growing evidence of the effectiveness of action learning through game-based simulations as a means for students to learn and obtain skills. (Huang et al. 2022; Beranic and Hericko 2022; Hallinger & Wang 2020; Buil et al. 2019; Bell & Loon 2015; Blackford & Shi 2015; Lean et al. 2015, Loon et al. 2015; Khan & Pearce 2015; Tiwari, Nafees, & Krishnan 2014; Lu, Hallinger, & Showanasai 2014; Anderson & Lawton 2009; Gabrielsson, Tell, & Politis 2010; Adobor & Daneshfar 2006). This very extensive body of literature shows that there is well-documented validation that the use of business simulations is an effective learning tool, and that action learning is a proven means of delivering relevant and applicable material to students. The process of integrating action learning into the classroom allows students to make decisions and experience how the concepts and knowledge provided in a traditional lecture can be used in applicable situations (Fox et al., 2018; Matute & Melero, 2016; Piercy & Caldwell 2011; Pasin & Giroux 2011; Gredler 2004; Larreche 1987).

Furthermore, business simulations can provide decision-making capabilities and cross-functional connections because during the simulation, complex problems are presented that require immediate applicability of learned concepts. Capelo and Silva (2020), Goi (2019), and Pasin and Giroux (2011) all supply evidence that simulations are a more effective way for students "to develop decision-making abilities for managing complex and dynamic situations" versus the traditional lecture. Buil et al. (2019), and Borrajo et al. (2010) have both demonstrated that business simulations can increase a student's learning and skills across functional business areas and Gabrielsson, Tell, and Politis (2010) fully outline the initiative of using business simulations as a means of supporting experiential learning in business schools. Both Capelo and Silva (2020) and Hall and Ko (2006) provide evidence that "students engaged in simulations retain about 75% of the instructional content compared to 5% for lectures and 20% for audio-visual presentations." Critics of business simulations state that they are an "inefficient pedagogy for teaching terminology, factual knowledge, basic concepts, or principles" and that basics can be covered more quickly with a lecture (Anderson & Lawton 2009). However, the research overwhelming supports action learning and the use of simulations in the achievement of retained learning thus, these studies prove the effectiveness of business simulations.

We investigate whether an experiential game-based simulation such as Income/Outcome® using a collaborative faculty teaching model can be more effective for

development of foundational business knowledge and skills across all functional areas in an Executive MBA (EMBA) Program. Whereas previous studies have detailed the advantages of using simulations for student engagement, motivation, knowledge, and skill development (Buil et al. 2019; Wei et al. 2022; Huang et al. 2023), not many use two instruments (pre- and post-surveys) for measurement, none used a collaborative faculty teaching model, none were focused on adult learners who have been in the workforce for over a decade, none have been long-term over many groups of students, and none were focused on specific skill attainment across all functional areas of business. Kiss and Schmuck (2021) outline that long-term research into skill attainment using business simulations are not common and many use one survey instrument versus pre- and post-surveys. Based on prior research that knowledge and skill development can be attained by means of simulations, this paper engages the Constructivism Learning theory to measure development of cross-functional foundational business acumen knowledge and skills, using a pre- and post- perception skill survey, by employing a game-based experiential learning simulation involving faculty who team-teach throughout the simulation. Thus, this paper advances the established business pedagogy research by intentionally targeting specific foundational business knowledge and skills that Coles College EMBA students need to acquire quickly given the deficiency of business acumen upon entering the program and provides evidence over a long span of time of the benefits of a collaborative faculty team-taught game-based experiential learning on EMBA students.

THEORECTICAL FRAMEWORK AND RESEARCH HYPOTHESIS

Constructivism Learning theory follows the teachings of Dewey and has created an underlying framework and teaching methodology for this project. According to Chuang (2021), "The effectiveness of adult education and training may be influenced by how well instructors understand and apply fundamental learning theories and principles into practice. Adult learning theories explain phenomena of how adults learn and offer essential knowledge and insights in respect to adult learners' development." As this research is centered around working adult education in an EMBA program, this learning theory became prevalent in our approach to conducting the simulation and the overall instruction in the program. In and of its core, Constructivism Learning theory is a student's ability to construct their own knowledge and skills from the experiences they have. They are active participants in their own learning through action learning type of activities such as simulations. Bada and Olusegun (2015) explain the theory as "Constructivism is an approach to teaching and learning where students learn by fitting new information together with what they already know" and by constructing knowledge and skills through action rather than passive activities. "Natural cumulative learning occurs by creating personal meaning through experiential learning which focuses on hands-on and active learning events to enhance learners' engagement and learning retention" (Chuang 2021). The Income/Outcome® simulation does have team-taught foundational business lectures associated within it. However, in this case and in a Constructivism Learning environment, the EMBA students maintain most of the control over running the simulation and the team-teaching faculty

members who serve as instructors are primarily there to facilitate and assist in the development of understanding as well as knowledge and skills.

This study occurred over a 15-year period and utilizes pre- and post-survey perception data of the Income/Outcome® simulation to determine its effects on Kennesaw State University College of Business EMBA student knowledge and skill development. The study involved 876 participants (22 cohorts of EMBA students over 15 years). Appendix A provides the survey instrument foundational knowledge and skill perception questions used in both surveys. Knowledge and skills are differentiated in this study as knowledge being the information obtained in the lectures and books and skills referring to the application of knowledge in practice. The pre- and post-simulation surveys were constructed of 16 closed questions using a 5-point symmetrical Likert-survey instrument. The survey answers ranged from mostly unconfident (1) for the knowledge or skill to mostly confident (5). During the lectures embedded in the simulation, all foundational functional area skills were covered, however, marketing and operations lectures were limited as much of that material is presented in the next semester. Thus, marketing and operations knowledge was not tested. Management knowledge was tested as students enter the program with 8 years of management experience so that knowledge base should be present. The survey does list all foundational skills as those are present in the simulation itself but there was more focus on finance and accounting knowledge since that is the weakest area for most incoming students therefore, those areas were tested.

As stated, an average of 50% of Coles College EMBA students don't have an undergraduate business degree or had completed their undergraduate degree over 6 years prior so we expect their foundational business knowledge and skill abilities to be limited and we also expect that pre-survey indicators will average in the unconfident range. The collected data was measured to indicate whether foundational knowledge and skills have been perceived to be attained or increased over the length of the simulation to provide a clearer picture of student learning using the simulation. A data analysis was run on the indicators from the surveys. We propose that once students have completed the simulation, they will be able to realize the importance of an integrated business curriculum because their perceptions of their business knowledge and skill development will increase. We also propose that experiential learning provides a faster way to develop cross-functional foundational business acumen for EMBA students. Since the prior research presented shows support for the effectiveness of business simulations in knowledge and skill attainment, we combine knowledge and skills in our initial hypothesis that EMBA students' perceptions of their foundational business knowledge and skill development will increase as a direct result of participating in the simulation.

H1: The Income/Outcome® simulation will positively influence perceived business knowledge and skills development.

We then separate the different functional areas of business based on the survey questions and hypothesize whether the simulation develops specific business area knowledge and skills.

H2: The Income/Outcome® simulation will positively influence perceived finance knowledge development.

H3: The Income/Outcome® simulation will positively influence perceived accounting knowledge development.
H4: The Income/Outcome® simulation will positively influence perceived marketing skills development.
H5: The Income/Outcome® simulation will positively influence perceived sales skills development.
H6: The Income/Outcome® simulation will positively influence perceived management knowledge development.
H7: The Income/Outcome® simulation will positively influence perceived operations skills development.
H8: The Income/Outcome® simulation will positively influence perceived negotiation skills development.
H9: The Income/Outcome® simulation will positively influence perceived strategic-thinking skills development.
H10: The Income/Outcome® simulation will positively influence perceived strategic decision-making skills development.
H11: The Income/Outcome® simulation will positively influence perceived income statement generation skills development.
H12: The Income/Outcome® simulation will positively influence perceived balance sheet generation skills development.
H13: The Income/Outcome® simulation will positively influence perceived budget creation skills development.
H14: The Income/Outcome® simulation will positively influence perceived cash flow forecast skills development.
H15: The Income/Outcome® simulation will positively influence perceived cash flow management skills development.
H16: The Income/Outcome® simulation will positively influence perceived break-even analysis skills development.
H17: The Income/Outcome® simulation will positively influence perceived ratio analysis skills development.

METHODOLOGY/RESEARCH DESIGN

INCOME/OUTCOME® SIMULATION PROCEDURAL SET-UP

Executive MBA students (N=876, M_{age}=38, Female=42%, $M_{years\ of\ work\ experience}$=16, $M_{years\ of\ management\ experience}$=8, 100% with an undergraduate degree, and 100% response rate) from Kennesaw State University experience the simulation during a 2-day opening residency. The residency is specifically designed to provide the business acumen foundation needed for future courses. The simulation itself is foundational in nature and is not intended to replace more advanced knowledge and skill development. Future lectures and experiential activities in the program build upon the foundational knowledge and skills developed here. The simulation itself is not part of the students' overall grade by design so students can concentrate on the learning aspect of the residency versus worrying about what grade they may receive. The EMBA faculty team constructs 5-6 teams of 6-7 students per team (ideal class size of 35-45) in which the team make-up is based on the students' DiSC profile (required before the opening residency begins), the students' work experience, managerial experience, functional business area, and current operating industry. Each student is then asked to fill out a pre-simulation survey (found in Appendix A) and turn it in to the facilitators (EMBA faculty members) before the simulation can begin. The faculty then introduce the simulation, provide the learning objectives and rules, and outline the structure of the simulation. Each team is instructed to assign roles to each member

(finance, marketing, sales, accounting, operations, and management) and informed that the members can switch roles during the simulation as needed.

Designed by Andromeda Training, Inc., Income/Outcome® is a high-touch enterprise management game intended to jumpstart business acumen skill development by creating a cross-functional visual learning approach. The visual learning approach is a type of learning style where students can utilize the simulations' game board to see and recall the information in order to learn it. The objects on the board can be easily visualized. In Figure 1, the visual learning approach is seen in the Income/Outcome® game board where the company is represented as a whole by the different functional areas. This visualization allows them to more accurately complete skill tasks such as an income statement and balance sheet since the information visually in front of them. The simulation also allows for students to understand the connections between each area of an operating company by immersing them in a teaming exercise designed to demonstrate decision-making outcomes on financial performance while providing cross-functional development via experiential pedagogy over a 12-year time cycle (or over the course of a day and a half). The simulation length is designed to fit in to the 2-day residency and is adequate time to keep the students focused while providing the right time frame for foundational knowledge and skill development. The simulation can be extended to 3 full 8-hour days, but faculty felt that the needed foundational information could be acquired in the day and a half format and student feedback has indicated that this time frame is just enough to hold their attention and that more residency time would take time away from their work schedule.

Figure 1: Income/Outcome® game board

This strategic decision-making simulation takes students from the start of a business to full growth where they are making research and development (R&D), production, sales, marketing, management, accounting, and finance decisions while experiencing a competitive

environment and employing optimal game theory choices for the team to achieve success and the business to thrive. We take the learning process one step further by employing a collaborative team-teaching model where not only do instructors from each of the functional areas teach specific topics within the simulation timeframe but also work together to demonstrate how each functional area impacts the others. There are 6 "shadow" rounds of the simulation where the faculty walk the teams through the procedure of running a company and provide small lectures on the different functional areas such as finance, accounting, and marketing before the 7th round where the teams are given a specific checklist and must go through it on their own through round 12. Figure 1 provides a typical "run" of the simulation from start to end. Team members work together to address supply and inventory issues along with working capital and cash flow situations. The team starts with the R&D process moving through marketing, sales, and production onto completing financial statements to track their position and performance in the marketplace all while dealing with the ability to operate as a strategic decision-making team and overcoming dysfunctional team dynamics. Teams are wholly accountable for their own results and make their shareholder reports to the class at the end of each business cycle and a debrief of all the results is provided by the teaching team as well as a discussion on what went right, what went wrong, and how decisions can be made differently going forward to improve results. Information such as amount sold, sales strategy, cash flow and budget analyses, and financial indicators are presented and then discussed amongst the groups before the next round begins.

Figure 2: Simulation Program Run

Format	Face-to-Face
When conducted	Start of Program
Simulation Length	1 day and ½
Simulation Rounds and Run Time	Shadow Round 1: 15 min Shadow Round 2: 20 min Shadow Round 3: 25 min Shadow Round 4: 30 min Shadow Round 5: 55 min Shadow Round 6: 35 min Round 7: Briefing=20 min; Planning and Decision-Making = 75 min; Round Results and Debrief = 30 min Round 8: Briefing=20 min; Planning and Decision-Making = 65 min; Round Results and Debrief = 20 min Round 9: Briefing=20 min; Planning and Decision-Making = 50 min; Round Results and Debrief = 20 min Round 10: Briefing=10 min; Planning and Decision-Making = 40 min; Round Results and Debrief = 20 min Round 11: Briefing=10 min; Planning and Decision-Making = 30 min; Debrief = 10 min Simulation Debrief and Tiebacks: 30 min

This activity has been designed so that students gain an "understanding of how and why their everyday decisions and actions impact other areas of the company" (Andromeda Training, Inc., 2023). The lectures and discussions clarify the function of each department and how the actions of one area affect the others while demonstrating the need for functional areas in a business to collaborate on decisions. This big picture approach allows students to fully understand the inner workings of a business and the cross-functional learning is immediately applied as all students are required to prepare an income statement and balance sheet, create a budget and cash flow analysis, apply for financing based on a cash flow analysis, create a business strategy, and forecast sales and loans. No new round is allowed to begin until all students on every team have successfully completed an income statement and balance sheet for that round as well as a complete financial analysis of where their company currently stands. This provides a true action learning encounter for the students and greater thoughtfulness in the decision-making process; thus, the learning and retention process is increased. Once the game has concluded, the faculty team asks each student to complete and hand in the post-survey before they leave.

RESULTS

A casual view of the data shows, overall, that perceived knowledge and skill indicators increased over the life of the simulation. Table 1 displays frequency percentage of each knowledge and skill indicator as well as mean score for the pre-survey and table 2 shows the post-survey data. On average, Coles College of Business students' confidence perceptions of their foundational business knowledge and skill base was greater after the completion of the simulation. The frequency percentage for slightly confident to mostly confident in all knowledge and skill indicators grew from the pre-survey to the post-survey indicating that there may be greater perceived skills in the functional areas of business after completing the Income/Outcome® simulation. The main knowledge indicators that students felt unconfident with were finance and accounting and the skills associated with those functional areas such as income statement generation, cash-flow forecasting, break-even analysis, and ratio analysis with mean scores of less than 2 showing that on average, most students felt that they were mostly unconfident or slightly unconfident in their knowledge or skill abilities. Management knowledge and the strategic-thinking skill had the highest pre-survey mean scores (3.11 and 3.03) indicating that most students felt at least slightly to mostly confident in their knowledge and skills.

Table 1: Pre-survey data						
Knowledge/Skill (K/S)	**Mostly Unconfident Freq %**	**Slightly Unconfident Freq %**	**Neither Freq %**	**Slightly Confident Freq %**	**Mostly Confident Freq %**	**M Score**
Finance (K)	40.53	32.76	23.17	2.17	1.37	1.91
Accounting (K)	37.90	34.47	23.86	2.51	1.26	1.90
Marketing (S)	25.57	23.63	22.03	24.89	3.89	2.52
Sales (S)	24.66	26.37	22.26	23.97	2.74	2.42
Management (K)	18.38	22.72	26.83	26.94	5.14	3.11
Operations (S)	20.89	23.74	25.23	25.91	4.22	2.51
Negotiations (S)	24.66	24.09	22.60	23.97	4.68	2.44
Strategic Thinking (S)	30.37	25.00	19.29	21.58	3.77	3.03
Strategic Decision-Making (S)	28.88	24.09	23.40	18.15	5.48	2.94
Income Statement Generation (S)	38.13	33.45	25.11	2.05	1.26	1.90
Balance Sheet Generation (S)	37.67	33.11	25.46	2.17	1.60	1.90
Budget Creation (S)	38.36	33.68	25.00	2.05	0.91	1.90
Cash Flow Forecast (S)	40.75	33.90	21.80	2.40	1.14	1.91
Cash Flow Management (S)	41.67	32.42	22.15	2.51	1.26	1.90
Break-Even Analysis (S)	37.90	34.36	24.60	2.17	1.37	1.90
Ratio Analysis (S)	40.64	32.88	22.95	2.40	1.14	1.91

Table 2: Post-survey data						
Knowledge/Skill (K/S)	**Mostly Unconfident Freq %**	**Slightly Unconfident Freq %**	**Neither Freq %**	**Slightly Confident Freq %**	**Mostly Confident Freq %**	**M Score**
Finance (K)	33.76	29.00	32.42	3.88	1.94	2.42
Accounting (K)	31.28	30.71	32.31	3.54	2.17	2.43
Marketing (S)	23.97	20.89	22.95	25.57	6.62	2.72
Sales (S)	20.89	26.83	22.95	24.54	4.79	2.65
Management (K)	13.81	21.35	28.54	28.20	8.11	3.16
Operations (S)	14.16	20.43	29.34	28.77	7.31	2.72
Negotiations (S)	17.81	21.46	27.51	25.57	7.65	2.66
Strategic Thinking (S)	25.46	21.12	23.06	24.09	6.28	3.07
Strategic Decision-Making (S)	24.54	20.43	26.14	21.12	7.76	3.01
Income Statement Generation (S)	29.34	30.25	34.36	3.65	2.40	2.43
Balance Sheet Generation (S)	30.71	29.11	33.22	3.88	3.08	2.43
Budget Creation (S)	28.77	30.94	35.84	3.20	1.26	2.43
Cash Flow Forecast (S)	27.63	31.28	35.16	3.88	2.05	2.42
Cash Flow Management (S)	27.74	31.62	34.13	4.68	1.83	2.42
Break-Even Analysis (S)	29.00	31.96	32.88	4.00	2.17	2.43
Ratio Analysis (S)	29.91	31.28	32.53	4.23	2.05	2.42

Table 3: Pre- to Post-Survey Data analysis						
Knowledge/Skill (K/S)	**Mostly Unconfident % Change**	**Slightly Unconfident % Change**	**Neither % Change**	**Slightly Confident % Change**	**Mostly Confident % Change**	**M % Change**
Finance (K)	-19.15	-11.50	39.90	78.95	41.67	26.70*
Accounting (K)	-17.47	-10.93	35.41	40.91	72.73	27.89*
Marketing (S)	-9.82	-15.94	1.04	2.75	70.59	7.93*
Sales (S)	-15.28	1.73	3.08	2.38	75.00	9.50*
Management (K)	-24.84	-6.03	6.38	4.66	57.78	1.60
Operations (S)	-32.24	-13.94	16.29	11.01	72.97	8.36*
Negotiations (S)	-27.78	-10.90	21.72	6.67	60.98	9.01*
Strategic Thinking (S)	-16.17	-15.53	19.53	11.64	66.67	1.32
Strategic Decision-Making (S)	-15.02	-15.17	11.71	16.35	41.67	2.38
Income Statement Generation (S)	-23.05	-9.56	36.82	77.78	90.91	27.89*
Balance Sheet Generation (S)	-18.48	-12.07	30.49	78.95	92.86	27.89*
Budget Creation (S)	-25.00	-8.14	43.38	55.56	37.50	27.89*
Cash Flow Forecast (S)	-32.21	-7.74	61.26	61.90	80.00	26.70*
Cash Flow Management (S)	-33.42	-2.46	54.12	86.36	45.45	27.36*
Break-Even Analysis (S)	-23.49	-6.98	35.85	84.21	58.33	27.38*
Ratio Analysis (S)	-26.40	-4.86	41.79	76.19	80.00	26.70*

*$p < .05$
Average % Change: 17.90%

The post-survey results show that the mean score for management knowledge and the strategic-thinking skill did grow (3.16 and 3.07) but it was the accounting and finance knowledge and skill areas that saw the greatest increase with mean scores growing from on average 1.90 to an average of 2.42. Even though both these functional areas remain in the slightly unconfident area, the perceived growth in knowledge and skills seems to be achieved. Table 3 shows the average percentage change in the knowledge or skills area from the pre-survey to the post-survey. When the pre- and post-survey results are analyzed, on average, there is a 17.90% increase in all perceived knowledge and skills as a result of the simulation. While each variable did see increases over time from the pre- to post-survey, the income statement and balance sheet generation scores were the highest percentage change (34.58% and 34.34%) of all indicators. If each variable is compared over the 5 indicator answers, the greatest increases can be found in the cash-flow management and break-even analysis skills. This makes sense given that each round of the simulation requires that each student complete an income statement, balance sheet, cash-flow forecast, and break-even budget analysis and the next round is not allowed to start until every student on each team is finished with each of these tasks. The results indicate that overall, the greatest increases come in the accounting and finance areas. The analysis of the surveys indicates that there is a favorable increase in perceived foundational knowledge and skill development

with completing the simulation and that learning productivity increased for these adult EMBA learners just over the life of the simulation.

We then test the various hypotheses using a t-test to determine if our casual interpretation of the results are indeed indications that EMBA students' business knowledge and skills have been effectively attained due to the simulation. The t-test is appropriate when the two variables are from the same population and to determine if there is a significant difference between the means of the pre- and post-survey responses. The results show the with a t-value of 3.383 and a corresponding two-tailed p-value of 0.0044, there is a significant difference in the overall means between the pre- and post-surveys indicating that students perceived that their business knowledge and skills had increased because of the simulation. Table 4 presents the complete set of results for all hypotheses tested.

Table 4. Summary of Model Hypotheses

Hypothesis	Two-tailed P-value	Supported
H1: sim → knowledge & skill development	0.00445	Yes
H2: sim → finance knowledge development	0.00181	Yes
H3: sim → accounting knowledge development	0.00199	Yes
H4: sim → marketing skill development	0.00791	Yes
H5: sim → sales skill development	0.00174	Yes
H6: sim → management knowledge development	0.23847	No
H7: sim → operations skill development	0.00371	Yes
H8: sim → negotiations skill development	0.00396	Yes
H9: sim → strategic-thinking skill development	0.52325	No
H10: sim → strategic decision-making skill development	0.30308	No
H11: sim → income statement generation skill development	0.00129	Yes
H12: sim → balance sheet generation skill development	0.00142	Yes
H13: sim → budget creation skill development	0.00145	Yes
H14: sim → cash flow forecast skill development	0.00126	Yes
H15: sim → cash flow management skill development	0.00119	Yes
H16: sim → break-even analysis skill development	0.00149	Yes
H17: sim → ratio analysis skill development	0.00191	Yes

*$p<0.05$

When the t-test was run against the corresponding means from the pre- and post-surveys, all the hypotheses were supported except for H6, H9, and H10 showing the simulation had no significant effect on the perceived management knowledge development or skill development of strategic thinking or strategic decision making. This result is not surprising. EMBA students entering the program, on average, have 8 years of management experience. They enter with more management knowledge, strategic-decision making abilities and strategic-thinking skills. They already possess the foundation in this functional area, but they lack the knowledge and skills in the other functional areas. Of the support for the remaining hypotheses, there was a greater

significant difference for the finance and accounting variables. Variables such as cash flow forecast, and management (H14 and H15) had p-values (0.00126 and 0.00119, respectively) below all other variables. This trend continued with the other finance and accounting variables which again may make sense given many of the incoming EMBA students' work and education experience include no background in those functional areas. The greatest increase in perceived knowledge and skills was in the accounting and finance functional areas.

Many of the favorable results presented above are accomplished by taking the Constructivism Learning approach within the Income/Outcome® simulation where the faculty team are more of facilitators and the students are the active participants creating their own business acumen knowledge and skills. The significant results show that students perceive that the learning by doing of the income statement, balance sheet, budget creations, cash-flow forecasting, and break-even analysis allows them to quickly acquire working skills in the accounting and finance areas. The Income/Outcome® simulation allows our EMBA students to apply real world concepts in real world practice as well as help build their professional business skills.

Several studies have investigated student perceptions of skill attainment using simulations such as Miles et. Al 1986, Lacruz and Américo 2018, Brazhkin and Zimmerman 2019, Kiss and Schmuck 2021, and Huang et al. 2022. Each one supports the conception that business skills can be acquired using a simulation and that perceived learning does indeed occur. These studies are similar to this one based on the overall goal of determining whether student perception led to skill attainment and thus learning but they differ in approach and theory as well as student attributes. The main difference is the age range and education level. A study by Jhan et al. (2023) explains the highly interactive nature of EMBA students in their decision-making abilities and the need for instructors to design action learning environments to meet those needs. The previous mentioned studies focus solely on undergraduate learners who have different learning attributes. Thus, this study contributes to the knowledge base by focusing in on adult graduate level students whose learning attributes differ from undergraduate students. The results provided paint a convincing indication that a Coles College of Business EMBA student's ability to apply the material and acquire foundational business skills was influenced through the Constructivism Learning/action learning process and the effectiveness of the simulation. These findings are encouraging when viewed in a multi-dimensional analysis. One notable observation came from Chai et al. (2017) who proposed educational programs' improvement can come about with a better understanding of students' perceptions of learning; thus this study aides in that assertion that our EMBA students' perceive that they have attained foundational business knowledge and skills using the simulation and the ability to integrate learning and application of materials, which is the core competency of this EMBA program, is achieved using an action learning environment and a collaborative faculty teaching approach.

CONCLUSIONS

This study aims to provide evidence of the effectiveness of the Income/Outcome® simulation in an action learning environment where non-traditional classroom curriculum using a

collaborative faculty team teaching model attempts to integrate functional business areas and provide a deeper skill base for adult learners such as EMBA students. Published studies presented above provide evidence that Executive MBA Programs benefit greatly from the transition from traditional teaching methods to action-based experiential learning as it bridges the gap between theory and practice and allows adult EMBA learners to absorb and apply business acumen knowledge much quicker thus meeting their demands in the classroom (Jhan et al. 2023). After completion of the simulation, EMBA students' perception of their foundational business knowledge and skills increased on average 18%. The largest increases came in the accounting and finance areas which corresponds to the average EMBA student not having a background in those areas and struggle with increasing their knowledge and skills quickly in a fast-paced program.

One of the many Coles College EMBA students who completed the simulation said "I was very impressed with the Income/Outcome® game. It was a fun and innovative way to learn how all the functional areas of business are tied to and work together. The interactive approach to planning and decision-making in a simulated manufacturing environment really made the understanding come alive for me." Another provided this insight: "The simulation during the opening residency provided a great experience for me to start connecting the dots for the financial statements, especially the components on financial analysis, where I learned how to understand, interpret, and make decisions from a company's financial statements (income statement, balance sheet, and cash flows)." While the student feedback has been mostly positive, several students throughout the years provided constructive feedback that the simulation was difficult to relate to because it was not similar to their industry or was not service related. This made it difficult for the students to fully engage in the process and more examples of how this works in their industry or line of work would be helpful. Finally, a new faculty member who had just concluded his first team-teaching of the Income/Outcome® game said it best: "I was hesitant on collaborating with other faculty as I thought it would take away from my lecture time but I found it only enhanced the material I delivered and to see the student results from that collaboration and the simulation as well as the enjoyment I received from team-teaching, I am sold of this type of interaction with students." This study concludes with a recommendation for all EMBA programs to integrate game-based action learning into their programs to effectively increase student learning as well as perceived foundational knowledge and skill levels.

LIMITATIONS AND FUTURE RESEARCH

The results do provide an assurance that the Coles College of Business EMBA students perceive that foundational skills and knowledge have been acquired as a result of the Income/Outcome® simulation, however, limitations of this study are time and faculty. The literature shows that faculty have reported that using a management simulation up front takes away valuable teaching time and collaboration amongst faculty members can be difficult to achieve without deliberate intent and a willingness to move beyond conventional teaching methods. This study shows that both are possible to overcome. Faculty must be open to collaboration for this simulation to be successful. This has been achieved in the Kennesaw State

University EMBA Program by making team-teaching a requirement if one wants to teach in the program. By introducing these concepts through game-based action learning up front and using a team-teaching approach, students can absorb and apply concepts much quicker because they can see the integration of areas through team-teaching and achieve those foundational skills easier through learning by doing. The implications of this study suggest that an introductory management simulation is beneficial and effective in providing a foundational advantage for EMBA students that lack a business undergraduate degree.

Another limitation offered by another study (Lacruz & Américo 2018) is the lack of a control group. In that study, two groups went through the simulation but only the experimental group was exposed to a debriefing. This study had a debriefing session after each round and no control group was used. This potentially could provide stronger evidence for the effectiveness of the simulation in skill attainment if two groups could be compared. Furthermore, this study may benefit from investigating the effectiveness of the simulation to different sub-groups within the large sample that was not previously investigated. The sample could be spilt into separate classes and examine the perceived skill development and learning to exhibit potential increases or decreases over each cohort. Finally, the surveys done were completely anonymous thus we could not separate the sample into demographic or attribute sub-groups such as holding a business undergraduate degree versus not.

One area of this study not presented is the effect that team dynamics may have on the learning or on the perceived knowledge or skill attainment. In this case, learning may also increase when it is collective learning and team dynamics are such that it aids in the learning environment. Future research opportunities include incorporating teaming dynamics into the perception analysis to see if the overall learning environment is enhanced.

DECLARATION OF CONFLICTING INTERESTS

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

Adobor, H. & Daneshfar, A. (2006). Management simulations: determining their Effectiveness. *Journal of Management Development*, Vol. 25 No. 2, pp. 151-168. https://doi.org/10.1108/02621710610645135

Anderson, P. H., & Lawton, L. (2009). Business simulations and cognitive learning: Developments, desires, and future directions. *Simulation & Gaming*, 40(2), 193-216 https://doi.org/10.1177/1046878108321624

Andromeda Training, Inc. (2023) Homepage, accessed March 9, 2023, available at http://www.income-outcome.com/.

Bada, S. O., & Olusegun, S. (2015). Constructivism learning theory: A paradigm for teaching and learning. *Journal of Research & Method in Education*, *5*(6), 66-70.

Bell, R. & Loon, M. (2015). The impact of critical thinking disposition on learning using business simulations. *The International Journal of Management Education*, 13(3), 362-370. https://doi.org/10.1016/j.ijme.2015.10.003

Beranic, T. & Hericko, M. (2022). Impact of Serious Games in Economic and Business Education: A Case of ERP Business Simulation. *Sustainability*, 14, 683. https://doi.org/10.3390/su14020683

Blackford, B. & Shi, T. (2015). The relationship between business simulations in capstone management courses and standardized test scores. *The International Journal of Management Education*, 13(1), 84-94.

Borrajo, F., Bueno, Y., de Pablo, I., Santos, B., Fernández, F., García, J., & Sagredo, I. (2010). SIMBA: A simulator for business education and research. *Decision Support Systems*, 48, 498– 506.

Brazhkin, V., & Zimmerman, H. (2019). Students' perceptions of learning in an online multi-round business simulation game: what can we learn from them? *Decision Sciences Journal of Innovative Education*, *17*(4), 363-386.

Buil, I., Catalán, S., & Martínez, E. (2019). Encouraging intrinsic motivation in management training: The use of business simulation games. *International Journal of Management Education*, 17 (2), pp. 162-171.
https://doi.org/10.1016/j.ijme.2019.02.002

Capelo, C., & Silva, A. L. (2020). Optimising the Learning Potential of Simulations Through Structural Transparency and Exploratory Guidance. *Simulation & Gaming*, 51(4), 498–523. https://doi.org/10.1177/1046878120916209

Cai, H., Gu, X., & Wong, L. H. (2017). An investigation of twenty-first century learners' competencies in China. *Asia Pacific Education Review*, *18*, 475-487.

Chuang, S. (2021). The Applications of Constructivist Learning Theory and Social Learning Theory on Adult Continuous Development. *Perf. Improv*., 60: 6-14. https://doi.org/10.1002/pfi.21963

Conger, J.A. & Xin, K. (2000). Executive education in the 21st Century. *Journal of Management Education*, 24(1), 73-99.

Crotty, P.T. & Soule, A.J. (1997). Executive Education: yesterday and today, with a look at tomorrow. *Journal of Management Development*, 16(1), 4-21. https://doi.org/10.1108/02621719710155445

Fox, J., Pittaway, L., & Uzuegbunam, I. (2018). Simulations in Entrepreneurship Education: Serious Games and Learning Through Play. *Entrepreneurship Education and Pedagogy*, 1(1), 61-89. https://doi.org/10.1177/2515127417737285

Gabrielsson, J., Tell, J., & Politis, D. (2010). Business simulation exercises in small business management education: using principles and ideas from action learning. *Action Learning: Research and Practice*, 7(1), 3-16, https://doi.org/10.1080/14767330903576812

Goi, C-L. (2019). The use of business simulation games in teaching and learning. *Journal of Education for Business*, 94(5), 342-349, https://doi.org/10.1080/08832323.2018.1536028

Gredler, M.E (2004). Games and simulations and their relationships to learning. In D.H. Jonassen (Ed.) *Handbook of research on educational communications and technology*.

Mahwah, NJ, Hall, O.P., & Ko, K. (2006). Learning Assurance Using Business Simulations: Applications to Executive Management Education. *Developments in Business Simulation and Experiential Learning*, 33, 1-6.

Hallinger P., & Wang R. (2020). The evolution of simulation-based learning across the disciplines, 1965–2018: A science map of the literature. *Simulation & Gaming*, 51(1), 9-32. https://doi.org/10.1177/1046878119888246

Han, J., & Liang, N. (2015). In Their Own Eyes and Voices: The Value of an Executive MBA Program According to Participants. *Journal of Management Education*, 39(6), 741–773. https://doi.org/10.1177/1052562915582268

Huang, Y.-M., Silitonga, L. M., Murti, A. T., & Wu, T.-T. (2023). Learner Engagement in a Business Simulation Game: Impact on Higher-Order Thinking Skills. *Journal of Educational Computing Research*, 61(1), 96–126. https://doi.org/10.1177/07356331221106918

Huang, Y., Silitonga, L.M., & Wu, -T. (2022). Applying a business simulation game in a flipped classroom to enhance engagement, learning achievement, and higher-order thinking skills. *Computers & Education*, 183, Article 104494. https://doi.org/10.1016/j.compedu.2022.104494

Jhan, Y.-C., Luarn, P., & Lin, H.-W. (2023). A study on EMBA students' cognitive and decision-making models in learning through play. *International Journal of Management Education*, 21 (1), Article 100765,
https://doi.org/ 10.1016/j.ijme.2023.100765

Kamath, S., Agrawal, J., & Krickx, G. (2008). Implementing Experiential Action Learning in International Management Education: The Global Business Strategic (GLOBUSTRAT) Consulting Program. *Journal of Teaching in International Business*, 19(4), 403-449. https://doi.org/10.1080/08975930802427692

Khan, A. & Pearce, G. (2015). A study into the effects of a board game on flow in undergraduate business students. *The International Journal of Management Education*, 13(3), 193-201. https://doi.org/10.1016/j.ijme.2015.05.002

Kiss, T., & Schmuck, R. (2021). A Longitudinal Study of the Skills and Attitudes Conveyed by Two Business Simulation Games in Pécs, Hungary. *Simulation & Gaming*, 52(4), 435–464. https://doi.org/10.1177/1046878120972458

Lacruz, A. J., & Américo, B. L. (2018). Debriefing's influence on learning in business game: An experimental design. *BBR. Brazilian Business Review*, *15*, 192-208.

Laessig, R. & Myers, B. (2010). Issues and Considerations Regarding the Use of Enterprise Simulations Early in an EMBA Program. *ABD Journal*, 2, 1-17.

Larréché, J. (1987). On simulations in business education and research. *Journal of Business Research*, 15(6), 559-571. https://doi.org/10.1016/0148-2963(87)90039-7

Lean, J., Moizer, J., & Warren, M. (2015). The use and impact of simulations in management education, *The International Journal of Management Education*, 13(3), 349. https://doi.org/10.1016/j.ijme.2015.11.001

Loon, M., Evans, J., & Kerridge, C. (2015). Learning with a strategic management simulation game: A case study. *The International Journal of Management Education*, 13(3), 227-236. https://doi.org/10.1016/j.ijme.2015.06.002

Lu, J., Hallinger, P. & Showanasai, P. (2014). Simulation-based learning in management education: A longitudinal quasi-experimental evaluation of instructional effectiveness. *Journal of Management Development*, 33(3), 218-244. https://doi.org/10.1108/JMD-11-2011-0115

Matute, J. & Melero, (2016). Games-based learning: using business simulators in the university classroom. *Universia Business Review*, 3, 72-91. https://doi.org/10.3232/UBR.2016.V13.N3.03

Miles Jr, W. G., Biggs, W. D., & Schubert, J. N. (1986). Student perceptions of skill acquisition through cases and a general management simulation: A comparison. *Simulation & Games*, *17*(1), 7-24.

Moodie, D.R. & Roebuck, D.M. (2002). An Integrated EMBA for an Integrated World. *Journal of Executive Education*, 1(1), 32-44.

Pasin, F. & Giroux, H. (2011). The impact of a simulation game on operations management education. *Computers & Education*, 57(1), 1240-1254.

Perusso, A., Van der Sijde, P., Leal, R., & Blankesteijn, M. (2021). The Effectiveness and Impact of Action Learning on Business Graduate' Professional Practice. *Journal of Management Education*, 45(2), 177-205. https://doi.org/ 10.1177/1052562920940374

Piercy, N. & Caldwell, N. (2011). Experiential Learning in the International Classroom: Supporting Integration and Learning Effectiveness. *International Journal of Management Education*, 9(2), 25-35. https://doi.org/10.3794/ijme.92.313

Rogmans, T., & Abaza, W. (2019). The Impact of International Business Strategy Simulation Games on Student Engagement. *Simulation & Gaming*, 50(3), 393–407. https://doi.org/10.1177/1046878119848138

Smith, D.B. & Fletcher, H.D. (2004). The Balanced Scorecard and Curriculum Integration in an Executive MBA Program. *Journal of Executive Education*, 3(1), 41-55.

Stopper, W.G. (1998). Agility in action: Picturing the lessons learned from Kodak and 23 other companies. *Human Resource Planning*, 21(1), 11-13.

Stumpf, S.A. & Tymon, W.G. (2002). Interdisciplinary Learning in an EMBA: Making it Happen. *Journal of Executive Education*, 1(1), 12-23.

Tiwari, S., Nafees, L., & Krishnan, O. (2014). Simulation as a pedagogical tool: Measurement of impact on perceived effective learning. *The International Journal of Education*, 12, 260-270.

Verlander, E. G. (1989). Improving University Executive Programmes. *The Journal of Management Development*, MCB University Press Limited, Bradford, U.K., 8(1), 5-19.

Wei, C. L., Wang, Y. M., Lin, H. H., Wang, Y. S., & Huang, J. L. (2022). Developing and validating a business simulation systems success model in the context of management education. *The International Journal of Management Education*, *20*(2), 100634.

APPENDIX A: LIKERT SCALE PRE- AND POST- INCOME/OUTCOME® SURVEY QUESTIONS

Rate your Knowledge/Skill (K or S) Level for the following 16 business concepts.

	Survey Question	Mostly unconfident	Slightly unconfident	Slightly confident	Mostly confident	Completely confident
1	Finance (K)					
2	Accounting (K)					
3	Marketing (S)					
4	Sales (S)					
5	Management (K)					
6	Operations (S)					
7	Negotiation (S)					
8	Strategic Thinking (S)					
9	Strategic Decision-Making (S)					
10	Income Statement Generation (S)					
11	Balance Sheet Generation (S)					
12	Budget Creation (S)					
13	Bash Flow Forecast (S)					
14	Cash Flow Management (S)					
15	Break-even Analysis (S)					
16	Ratio Analysis (S)					