ACCELERATING ENGAGEMENT & LEARNING VIA EARLY DECISION SUPPORT MEDIATION

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Full Paper
Simulations Track

ABSTRACT

Based on learning and engagement theory, this longitudinal study of simulation participant engagement during Spring 2021 and Spring 2022 illustrates that early introduction of decision support and freedom of choice results in substantial increase in engagement during each simulation phase. Further, the results support the hypothesis that decision support system (dss)-induced user autonomy, relatedness and competence foster engagement, and that complex heavy workload demands under time pressure can be offset by range of decision-making freedom and the amount of support provided. Based on prior participant suggestions, early dss introduction and support during the Spring 2022 semester resulted in substantial increase in online activity on both the simulation portal and course website. Participants downloaded and used substantially more dss packages, dss-related articles and dss demo videos during each simulation phase. Enhanced understanding and application of strategic marketing concepts is evidenced in improved team presentations and individual strategic market plan reports.

INTRODUCTION

The AACSB International mission, stated in *2020 Guiding Principles and Standards for Business Accreditation* adopted by the AACSB Accreditation Council (updated July 1, 2022), is "to foster engagement, accelerate innovation, and amplify impact in business education." Accordingly, AACSB accreditation requires evidence of continuous quality improvement in engagement, innovation and impact. Further AACSB specifies that "curricula and extracurricular programs should be innovative and foster engagement among learners, between learners and faculty, and with business practice. (AACSB International, 2020).

This paper reports on current efforts to (a) foster and track evidence on engagement, (b) accelerate innovation based on participant suggestions via co-creation of user-perceived value, and (c) amplify impact on learning via the early introduction and use of Excel-based dss packages. The 18 dss packages used in this study extract pertinent information from the simulation results via external linking, and facilitate analysis and informed decision making in a problem-based learning (PBL) environment.

Student engagement is considered an important predictor of student achievement (Handelsman, Briggs, Sullivan, & Towler, 2005). Engaged students are good learners and effective teaching stimulates and sustains student engagement (Pintrich & DeGroot, 1990; Skinner & Belmont, 1993). In addition, Skinner and Belmont (1993) found a reciprocal relationship between student engagement and teacher involvement. Yet, the definitions and measurement of student engagement are limited.

AACSB International asserts that student academic and professional engagement occurs when students are actively involved in their educational experience, in both academic and professional settings, and when they are able to connect these experiences in meaningful ways. AACSB International bases for evaluating student engagement, include giving appropriate attention and dedication to learning materials, and maintaining engagement with these materials even when challenged by difficult learning activities. In addition, the curricula include approaches that actively engage and include all students in learning. Pedagogical approaches suitable for challenging students in this way include problem-based learning projects and simulations (AACSB International, 2013). Faced with challenging learning activities, students are willing to invest personal, internal energies regardless of task difficulty. Kahn (1990) asserts that this investment of resources results in physical, cognitive, and emotional dimensions of engagement that produce active, full performance as demonstrated by attendance, performance and student products.

The primary purpose of this paper is to provide evidence of substantial increases in (a) observed in-class and out-of-class cognitive, affective, and behavioral engagement by simulation participants that resulted from early dss introduction and support. Early dss introduction and support during Spring 2022 prompted by sustained and consistent prior participant suggestions resulted in substantial increases in course engagement, as well as understanding and application of strategic marketing concepts in the one-hour team presentation and individual strategic market planning (SMP) report at the end of the semester. In-class engagement measures include attendance, classroom focus and energy, questions raised, and discussion quality. Other in-class measures include decision support package usage, team discussion, responses to thinklets (problems posed in class) using a problem-based learning approach, group discussion with the professor during scaffolding sessions at

the end of class, and co-creation of value using the operand resources (dss packages) and student knowledge, skills and notebook computers (operant resources).

Out-of-class engagement measures include timely bi-weekly online decision entry prior to preset decision deadlines and subsequent results retrieval and analysis, online graphics package usage, and timely submission of weekly writing assignments. Other out-of-class engagement measures include server log records of online graphics generation and website tracking of visitor activity, page views, time spent, marketing dss package, ABSEL dss article, and dss demo video downloads.

DSS packages tied to the simulation results were developed and deployed in the course simulation based on the comments by scholars on the value of including dss software in computer simulations (Keys and Biggs, 1990; Teach, 1990; Gold and Pray, 1990; Wolfe and Gregg, 1989). In addition, the literature is replete with references to the use and impact of decision support systems with computer simulations (Affisco and Chanin, 1989, 1990; Burns and Bush, 1991; Cannon et al., 1993; Fritzsche et al., 1987; Grove et al., 1986; Halpin, 2006; Honaiser and Sauaia, 2006; Markulis and Strang, 1985; Mitri et al., 1998; Muhs and Callen, 1984; Nulsen et al., 1993, 1994; Palia, 1989, 1991, 2006, 2009; Peach, 1996; Schellenberger, 1983; Shane and Bailes, 1986; Sherrell et al., 1986; Wingender and Wurster, 1987; Woodruff, 1992).

DSS used with business simulations yield several benefits. These benefits include (a) greater depth of understanding of simulation activity with resulting increase in planning (Keys et al., 1986), (b) in-depth understanding of quantitative techniques as students visualize the results of their applications, (c) sensitivity to weaknesses in techniques used, and (d) experience in capitalizing on their strengths (Fritzsche et al., 1987). Other benefits include (a) minimization of paperwork and errors, (b) error-free graphical representation of output, (c) a competitive tool with increasing value as simulation progresses, and (d) potential for participants to create their own dss (Burns and Bush, 1991). In addition, dss enhance understanding of complex business relationships and provide additional value over time (Halpin, 2006). Further, they provide realism, relevance, literacy, flexibility and opportunity for refinement (Sherrell et al., 1986).
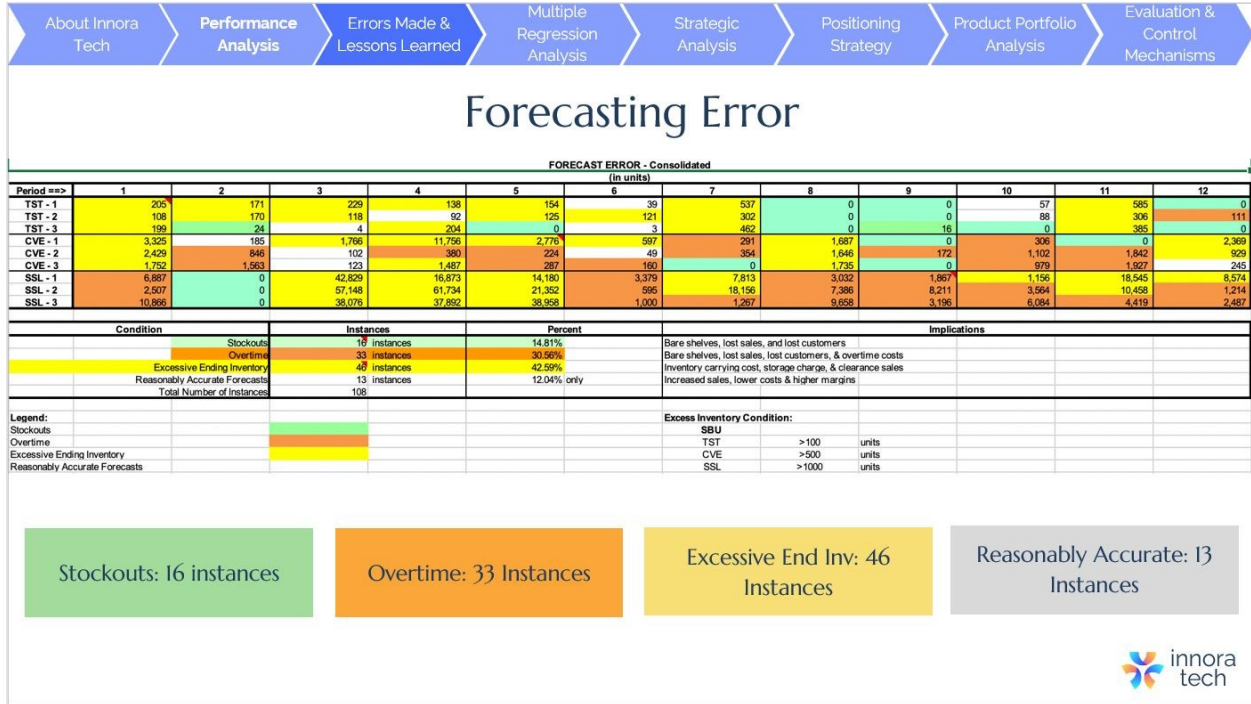
Some authors contend that combining an active student generated database in the form of a simulation game with a dss will result in improved decision making, lead to improved pro-active rather than re-active strategic planning, and result in improved simulation game performance and enhanced learning (Muhs and Callen, 1984). Others have reported no support for the premise that dss usage improves small group decision making effectiveness (Affisco and Chanin, 1989), and that dss usage to support manufacturing function decisions resulted in decreased manufacturing costs and increased "earnings/cost of goods sold" ratio in the second year of play (Affisco and Chanin, 1990). This paper provides evidence of accelerated engagement and consequent learning that results from the early introduction of dss based on student suggestions.

First, a review of the literature on student engagement includes (a) Keller (1983) model on the ARCS management theory of learner motivation, (b) Karasek (1979, 1982, 1990) Job Demand Control Support (JDCS) model, (c) Demerouti et al. (2001) and Baaker and Demerouti (2007) Job Demand Resources (JD=R) model, and (d) Argyris (1970) Organizational Development Intervention model.

Then, this longitudinal study provides behavioral engagement metrics for identical remote course offerings (via Zoom) of comparable size, with the same course schedule, and instructor during the Spring 2021 and Spring 2022 semesters. Engagement metrics monitored on a daily basis include (a) page-views, (b) visitors, (c) sessions, (d) online product positioning map (PPM) and product portfolio analysis (PPA) graphics generated on the simulation portal, and (e) downloads of dss packages, ABSEL dss-related articles, and dss demo videos. The in-class and outside-class engagement metrics of 34 Spring 2021 participants and 37 Spring 2022 participants in identical Marketing Strategies courses, were monitored on a daily basis throughout both semesters.

Based on prior student suggestions, in Spring 2022, the dss packages are progressively introduced and demonstrated earlier in the semester. Students are encouraged to access, download, and use the dss packages in their decision-making during the simulation competition. They provide evidence of dss package usage in their weekly writing assignments. Later, they provide evidence of dss package usage during the 1-hour team presentation and individual strategic market plan report. For instance, an Innora Tech (team C1) presentation slide on Forecasting Error reveals the extent of 16 stockout instances, 33 overtime instances, 46 ending inventory instances, and only 13 (out of 108) instances of reasonably accurate forecasts experienced during the 12 decision periods (see exhibit 1).

Forecast Error dss Package (Team Presentation Slide)
Exhibit 1

Forecasting Error

FORECAST ERROR - Consolidated
(in units)

Period ==>	1	2	3	4	5	6	7	8	9	10	11	12
TST - 1	205	171	229	138	154	39	537	0	0	57	585	0
TST - 2	108	170	118	92	125	121	302	0	0	88	306	111
TST - 3	199	24	4	204	0	3	462	0	16	0	385	0
CVE - 1	3,325	185	1,766	11,756	2,776	597	291	1,687	0	306	0	2,369
CVE - 2	2,429	846	102	380	224	49	354	1,646	172	1,102	1,842	929
CVE - 3	1,752	1,563	123	1,487	287	160	0	1,735	0	979	1,927	245
SSL - 1	6,887	0	42,829	16,873	14,180	3,379	7,813	3,032	1,867	1,156	18,545	8,574
SSL - 2	2,507	0	57,148	61,734	21,352	595	18,156	7,386	8,211	3,564	10,458	1,214
SSL - 3	10,866	0	38,076	37,892	38,958	1,000	1,267	9,658	3,196	6,084	4,419	2,487

Condition	Instances	Percent	Implications
Stockouts	16 instances	14.81%	Bare shelves, lost sales, and lost customers
Overtime	33 instances	30.56%	Bare shelves, lost sales, lost customers, & overtime costs
Excessive Ending Inventory	46 instances	42.59%	Inventory carrying cost, storage charge, & clearance sales
Reasonably Accurate Forecasts	13 instances	12.04% only	Increased sales, lower costs & higher margins
Total Number of Instances	108		

Legend:
Stockouts
Overtime
Excessive Ending Inventory
Reasonably Accurate Forecasts

Excess Inventory Condition:		
SBU		
TST	>100	units
CVE	>500	units
SSL	>1000	units

Stockouts: 16 instances	Overtime: 33 Instances	Excessive End Inv: 46 Instances	Reasonably Accurate: 13 Instances

innora tech

This Forecast Error Impact dss package highlights the importance of accurate forecasting to company profits. For instance, the total forecast error impact of $66.14 million experienced by Innora Tech during the 12 decision periods consists of $18.24 million (27.58%) in lost sales revenue, $1.08 million (1.63%) in premium overtime production costs, $44.59 million (67.42%) in excess ending inventory cost, and $2.23 million (3.37%) in storage charges (see exhibit 2).

Forecast Error Impact dss Package (Team Presentation Slide)
Exhibit 2

Total Forecasting Error Impact

Condition	Impact		Percent of Total $ Impact
Stockouts	Lost Sales Revenue	$ 18,241,015.00	27.58%
Overtime	Overtime Production Premium	$ 1,078,563.26	1.63%
Excessive Ending Inventory	Inventory Carrying Cost	$ 44,590,958.50	67.42%
Storage Charge	Storage Charge	$ 2,229,547.93	3.37%
	Forecast Error Impact	$ 66,140,084.69	100.00%

Error Impact: $66,140,084.69

Reason for Occurence:

Mainly focused on increasing market share
Did not assess all aspects of performance
Over ordering products

innora tech

Two additional team presentation slides (not included) cover (a) the short-term, intermediate-term and long-term impact of the forecasting error on company performance (cash, profits, market share), customers (brand loyalty), employees (salesforce morale), and other stakeholders, and (b) corrective action taken as well as future actions to improve forecasts. The entire one-

hour team presentation (with the permission of the Innora Tech (C1) team members) has been recorded on Zoom, and is accessible on password-protected Google Drive to future simulation participants. The individual SMP Reports, team presentations and handouts demonstrate understanding and application of strategic marketing concepts.

Engagement metrics during the Spring 2021 (n=34 students) and Spring 2022 (n=37 students) on in-class and outside-class page views, include online PPM and PPA graphics generated, as well as downloads and usage of dss packages, ABSEL dss-related articles, and dss demo screen-share videos. These engagement metrics reveal a substantial increase in engagement during the early phases of the simulation as well as total engagement during the Spring 2022 semester.

ENGAGEMENT & LEARNING MODELS

This longitudinal study of engagement and learning draws upon (a) Keller (1983) model on the ARCS management theory of learner motivation, (b) Karasek (1979, 1982, 1990) Job Demand Control Support (JDCS) model, (c) Demerouti et al. (2001) and Baaker and Demerouti (2007) Job Demand Resources (JD=R) model, and (d) Argyris (1970) Organizational Development Intervention model.

Academic engagement is affected by the learning environment via decisions on (a) how material is presented, (b) learning activities used, and (c) feedback provided. Effective engagement needs to address the underlying psychological variables such as the needs for (a) autonomy, (b) relatedness, and (c) competence (National Research Council 2003). The learning environment is addressed by the ARCS Model of Learner Motivation. In addition, the underlying psychological variables that need to be addressed for effective engagement are covered by the JDCS, JDR and Argyris' Organizational Development Intervention models. Further, effective engagement can be augmented by use of scaffolding, collaborative learning, PBL, and co-creation of value.

ARCS Model of Learner Motivation

Student engagement can be enhanced by altering the learning environment. Most instructors recognize that student motivation leads to student engagement, which in turn leads to academic learning and achievement. The ARCS management theory of learner motivation model (Keller 1983) examines the motivational constructs of attention, relevance, confidence and satisfaction (see exhibit 3). The ARCS model represents the extent to which the course content (a) arouses student interest, (b) is relevant to learner needs, (c) builds students' confidence in their ability to achieve success, and (d) satisfies the learner. Keller (1987) identifies specific motivational objectives related to these constructs (see exhibit 3). The ARCS model is based on the expectancy x value theory of motivation which suggests that in order to motivate students to learn, instructors help them to appreciate the value of academic activities, and ensure they can achieve success on these activities if they apply reasonable effort (Brophy, 1987). In brief, the ARCS model asserts that careful instructional design can influence and improve student perceptions of value and expectancy for success.

ARCS Model of Learner Motivation – Components & Instructional Objectives
Exhibit 3

ARCS Component	Instructional Objectives
Attention	Capture learner interest Stimulate curiosity Maintain learner attention
Relevance	Address learner needs Provide appropriate choices and responsibilities for learners Tie instruction to learner's experiences
Confidence	Build positive expectation for success Support students' beliefs in their competence Communicate that success is based on effort and ability
Satisfaction	Provide meaningful opportunities for learners to use their newly acquired skills Reinforce learner successes Leave students with positive feeling for their success
Source: Keller, J.M. (1987). Strategies for stimulating the motivation to learn. *Performance and Instruction*, 26 (8), 1-7. Keller, J.M. (1987). The systematic process of motivational design. *Performance and Instruction*, 26 (9-10), 1-8.	

First, the student's attention has to be acquired, directed to the appropriate cues, and sustained. In addition, the instructor should stimulate an attitude of inquiry and generate student interest in the specific topic and the subject in general. Attention strategies include (a) use of incongruity and conflict in presenting issues, (b) using engaging instructional materials, (c) incorporating problem solving activities, and (d) providing students the opportunity to select projects or topics that reflect their interests (Fitzpatrick, McConnell, & Sasse, 2006). Accordingly, participants are oriented to the course requirements and marketing simulation, and provided 24/7 access to diverse resources on the course website and team password-protected simulation portal.

Second, relevance to learner needs refers to the students' perceived importance of the subject matter to be learned. If students perceive the material or exercises to be relevant to their personal or educational needs, the level of effort expended will increase. Relevance strategies include linking course content or concepts to the students' existing frame of reference and future goals, by using job-related examples or posing situations likely to be faced in future (Fitzpatrick, McConnell, & Sasse, 2006). Simulation participants recognize the importance of the course materials as they compete for profits, market share, quality, cost, and efficiency in the simulation. They (a) enter team decisions (price, shipments, salesforce, advertising, R&D), (b) retrieve team performance results (including team ranking on 18 performance criteria), and (c) generate online product positioning maps (PPM) and Boston Consulting Group (BCG) strategic market planning grids on their own and competitor brand portfolios, based on the simulation results. In addition, they download and use dss packages to help them (a) make better informed pricing, shipments, market segmentation and positioning, sales forecasting, and budgeting decisions, (b) develop a strategic market plan, and (c) demonstrate understanding and use of dss in weekly writing assignments (10% of course grade), team presentation (20%), and individual strategic market plan report (30%).

Third, confidence refers to the students' perception of their ability to successfully learn or perform the required concept or task. Challenging experiences that require thought and effort to succeed facilitate learning. On the other hand, vague or unstructured experiences, or those that are challenging to the degree of serious anxiety do not facilitate student motivation and learning. High confidence leads to students maintaining effort associated with performing a task, while low confidence leads to blocks that prevent students from beginning or engaging in learning activities (Smith & Ragan, 1993). Confidence strategies vary with course level and objectives. Advanced courses lend themselves to experiences or exercises with higher levels of uncertainty and challenge. In this regard, prior participants suggest 2 team meetings be required during the initial 4-trial-decisions prior to the start of competition. Accordingly, the teams are encouraged to check their trial decision results, evaluate and discuss their relative strengths and weaknesses, and get clarifications. This early investment in time, stimulates the desire to learn in order to excel.

Fourth, satisfaction occurs when students connect the achievement of learning goals with their individual effort. These connections can be made during or at the end of the course. Satisfaction is achieved when students are stimulated to maintain or increase efforts because of challenge or accomplishment. Satisfaction strategies include providing students the opportunity to compare their performance with stated expectations and see how their efforts have led to achievement of course goals. At the end of the course, satisfaction can be enhanced when students see how they are able to perform significant or comprehensive activities that they did not have the skills for at the beginning of the course. This enhanced confidence and resulting satisfaction can enhance a continued motivation to learn and/or transfer their new skills to their professional work environment. Personal attention, consistent feedback, and avoidance of negative comparisons can increase feelings of positive challenge or accomplishment (Fitzpatrick, McConnell, & Sasse, 2006).

Accordingly, simulation participants receive extensive feedback on their rankings on 18 measures (6 profitability, 3 market share, 3 quality, 3 cost, and 3 efficiency measures) of team performance for each decision period. In addition, they are able to access the performance of all competing teams on the same 18 performance measures during each of the four trial decisions. Initial briefing stimulates discussion, motivates a desire to learn relevant concepts in order to improve team performance, and instils confidence. Later, at the end of the course, the competing teams are provided with the end-game performance package which displays competitive graphics on performance measures and enables them to compare decisions made and strategies implemented with performance outcomes during the simulation competition. The simulation experience ends with a review of the strategic marketing process and the skills required to identify heavy-user target segments, understand their needs and purchase motivations, create, communicate, distribute and capture (consumer-perceived) value. This phased debriefing strategy turbocharges participant engagement early in the semester, heightens interest, motivation, confidence and understanding among simulation participants, and enhances satisfaction (Palia, 2019).

Young (2010) reviews the definition and measurement of academic engagement and investigates environmental antecedents that foster or discourage each of the dimensions of engagement. The learning environment affects engagement through decisions on (a) how material is presented, (b) which learning activities are used, and (c) what kinds of feedback are provided (see exhibit 4). However, the underlying psychological variables that need to be addressed for effective engagement are covered by the JDCS and JDR models as well as Argyris' Organizational Development Intervention model.

Academic Engagement

Exhibit 4
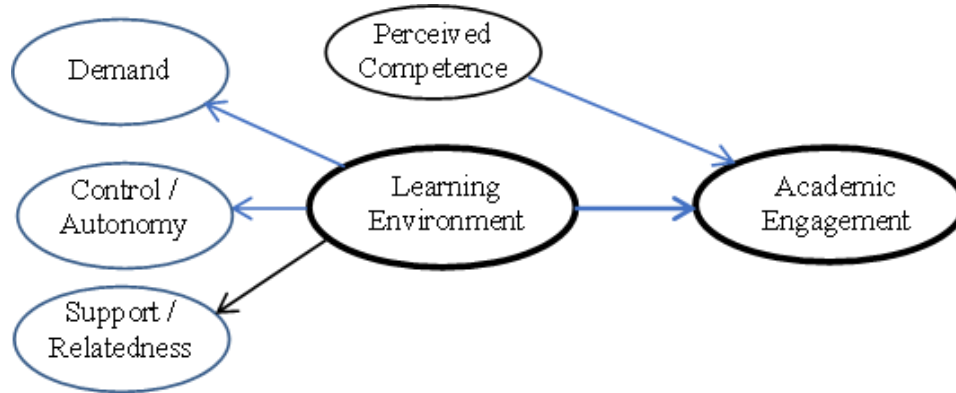
JDCS Model

The Job Demand Control Support (JDCS) Model postulates that psychological strain results from the joint effects of the demands of the work situation, the range of the decision-making freedom to face those demands, and the amount of support provided (Karasek 1979, Karasek et al. 1982, Karasek & Theorell 1990). Job demands are psychological stressors such as time pressure, heavy work load, ambiguity, and role conflict. Job control refers to individual's potential control over work tasks and is composed of decision authority, and skill discretion. Degree of autonomy, flexibility and discretion in choosing the timing and methods for performing the tasks as well as the variety and creativity in skill usage affect the degree of job control (see exhibit 4). A key feature of this well-known model on occupational stress is the synergy between job demands and discretion. A combination of high demand and lack of control produces more psychological strain than the additive effect of the two variables (Fletcher & Jones 1993). In this regard, simulation participants are exposed to a realistic job demand of decision-making in a dynamic, complex and uncertain simulation environment with incomplete information under time pressure. Yet, they have control over the dss packages they use and the decision-making freedom to face those demands, compete effectively, and improve their team performance in the simulation competition. In addition, they have access to scaffolding support as and when needed.

JD-R Model

The Job Demands-Resources Model (JD-R) Model is flexible, incorporates more working conditions, and focuses on both negative and positive indicators of employee well-being (Demerouti et al. 2001, Baaker & Demerouti 2007). It can be used to improve well-being and performance. An extension and meta-analytic test of the JD-R model to employee engagement and burnout reveals that job demands and burnout are positively associated, while resources and burnout are negatively associated. In addition, resources and engagement are consistently positive, while relationships among job demands and engagement are dependent on the nature of demand. Job demands perceived by employees as hindrances are negatively associated with engagement, whereas job demands perceived by employees as challenges are positively related to engagement (Crawford et al. 2010). This study illustrates that students, that perceive the dynamic, complex and uncertain nature of the simulation as a challenge that enhances their marketing strategy and decision-making skills, are likely to be engaged in decision-making under time pressure with incomplete information as they strive to improve team performance.

Argyris' Organizational Development Intervention Model

Lasting commitment to organizational change and personal developmental learning is facilitated by the three sequential steps of the Argyris' model: generation and use of valid information, free, informed choice based on the information produced, and the consequent outcome of internal commitment to organizational change and personal developmental learning (Argyris, 1970; Hoover et al., 2016). Based on the Argyris model, valid information generation and free, informed choice lead to lasting commitment to organizational change and personal developmental learning. Consequently, recent trends in complexity avoidance and narcissism may hinder the process of personal developmental learning (Hoover, 2011). The challenge is to get potential learners aligned with the information relevant to their learning. Failure to do so will result in simulation participants making decisions based on incorrect, faulty, or incomplete information. Narcissists are particularly challenged to generate and use valid information. Consequently, they tend to resist organizational change and personal developmental learning (Hoover et al., 2016). Accordingly, the dss packages extract relevant information needed for decision-making from the simulation results, and provide simulation participants with user-friendly and valid information. Further, this study illustrates that free

informed choice of specific dss packages used to analyze and improve team performance leads to sustained personal developmental learning.

COURSE ENGAGEMENT LEARNING ENVIRONMENT

Course engagement is fostered via course structure, simulation participation, extensive feedback, and satisfying the underlying psychological needs for autonomy, relatedness, and competence (National Research Council 2003). Further engagement can be augmented via providing participants with the dss resources needed to meet the perceived challenge of decision-making in a dynamic, complex and uncertain environment, and the decision-making freedom and scaffolding support to meet the demands of heavy workload, time pressure, ambiguity, and role conflict.

Course Structure

The undergraduate functional capstone writing-intensive Marketing Strategies course is a response to a call from the local business community to develop the analytical and communication skills of our graduates. The mission of the course is to learn and apply strategic market planning and marketing management skills to optimize overall company performance while maintaining cash in balance. Learning support is provided via scaffolding (Hogan and Pressley 1997) and collaborative learning (Bandura 1977).

The writing-intensive course designation stresses learning through writing and requires frequent writing with quality individual feedback. Phased debriefing reduces uncertainty, improves understanding of underlying performance determinants, builds confidence and engagement, and motivates teamwork to identify problems, take corrective action, and exercise marketing control (Palia 2019). The course schedule indicates that the semester is divided into 5 phases of differing length. The initial 1-week 'Startup' phase is followed by a 2-week initial debriefing 4-trial- decision 'Prepare to Compete' phase, a 7-week intermediate debriefing or 'Compete' phase, a 5-week 'Report & Present' phase, and a final debriefing or 'Wrap-Up' phase

Course Structure (Phased Simulation Debriefing)
Exhibit 5

MKT 391 - Marketing Strategies
Spring Semester, 2022

Week	Session	Date	Day	Topic	Dec	Date	Day	Time	WWAs	Date	Day	Time	Read
						Decisions			**Weekly Writing Assignments**				
1	1	11-Jan	T	Course Introduction / Website Demo									T1 + H
	2	13-Jan	Th	Overview of COMPETE / CODES Demo									C 1-21
2	3	18-Jan	T	Decisions / Markets / Products	TD1	18-Jan	T	8:00 pm					C 22-51
	4	20-Jan	Th	Financial Statements	TD2	21-Jan	F	8:00 pm					C 52-57
3	5	25-Jan	T	Strategic Market Management	TD3	25-Jan	T	8:00 pm	WWA #1	24-Jan	M	11:59 pm	T2 + H
	6	27-Jan	Th	Printout Analysis [Company & Product Names] Quiz (100)	TD4	28-Jan	F	8:00 pm					C 58-77
4	7	1-Feb	T	**Hands On (HO)** - Mktg DSS Demo	D1	1-Feb	T	8:00 pm	WWA #2	31-Jan	M	11:59 pm	Handout
	8	3-Feb	Th	HO - Mktg DSS Demo	D2	4-Feb	F	8:00 pm					Handout
5	9	8-Feb	T	Mkt Segmentation Analysis & Positioning	D3	8-Feb	T	8:00 pm	WWA #3	7-Feb	M	11:59 pm	T3 + H
	10	10-Feb	Th	VALS & VALS 2	D4	11-Feb	F	8:00 pm					T4 + H
6	11	15-Feb	T	Strategic Market Planning	D5	15-Feb	T	8:00 pm	WWA #4	14-Feb	M	11:59 pm	T5 + H
	12	17-Feb	Th	PPA Analysis - GSM	D6	18-Feb	F	8:00 pm					T6 + H
7	13	22-Feb	T	PPA Analysis - GGM	D7	22-Feb	T	8:00 pm	WWA #5	21-Feb	M	11:59 pm	T7 + H
	14	24-Feb	Th	PPA - Generic Strategies	D8	25-Feb	F	8:00 pm					T8 + H
8	15	1-Mar	T	Sales Forecasting	D9	1-Mar	T	8:00 pm					T9 + H
	16	3-Mar	Th	Regression	D10	4-Mar	F	8:00 pm					T10 + H
9	17	8-Mar	T	HO - Sales Forecast Model Building	D11	8-Mar	T	8:00 pm					Handout
	18	10-Mar	Th	PPA - Normative Position of Brands									T11 + H
		15-Mar	T	HOLIDAY - SPRING RECESS									
		17-Mar	Th	HOLIDAY - SPRING RECESS									
10	19	22-Mar	T	Strategic Market Planning Process	D12	22-Mar	T	8:00 pm	WWA #6	21-Mar	M	11:59 pm	T12 + H
	20	24-Mar	Th	HO - SMP - Internal Balance									
11	21	29-Mar	T	HO - SMP - Trends					WWA #7	28-Mar	M	11:59 pm	
	22	31-Mar	Th	HO - SMP - Competitors									
12	23	5-Apr	T	HO - SMP - Other Factors									
	24	7-Apr	Th	HO - SMP - Target Portfolio									
13	25	12-Apr	T	HO - SMP - Financial Balance									
	26	14-Apr	Th	GE Matrix & PIMS									
14	27	19-Apr	T	**Team Presentation - C1 / E1 (100)**									
	28	21-Apr	Th	Team Presentation - C2 / E2									
15	29	26-Apr	T	Team Presentation - C3 / E3									
	30	28-Apr	Th	Team Presentation - C4 / E4									
16	31	3-May	T	**Team Performance (100) & Wrap Up**									
		5-May	Th	STUDY PERIOD									
	Sect.1	10-May	T	**SMP Report (300)** [9:45 - 11:45]									
	Sect.2	12-May	Th	**SMP Report (300)** [12:00 - 2:00]									

Phased Debriefing:
- Prepare to Compete Phase - Initial Briefing
- Compete Phase - Intermediate Debriefing
- Report & Present Phase
- Wrap-up - Final Debriefing

LEGEND:
T = Strategic Market Management Text
C = COMPETE Manual available online via CODES
H = Handout available online via CODES
WWA = Weekly Writing Assignment (Submit Microsoft Word document file via e-mail)

(see exhibit 5). Scaffolding is provided when needed, collaborative learning is fostered and encouraged via thinklets and team decision-making in a PBL environment. Finally, continuing course improvements via co-creation of value are based on participant suggestions.

At the end of the semester, each participant submits a quality 10-page (narrative) Strategic Market Plan report (30% of course grade) based on performance in the COMPETE marketing simulation (Faria 2006), marketing DSS package usage, and external research. In addition, each company makes a one-hour long team presentation (10% of course grade) that is divided into two equal parts.

The first 30-minute company report covers (a) the presentation agenda, (b) company and brand name justification, and logo explanation, (c) mission statement, (d) organizational structure selected with individual responsibilities, (e) performance analysis, (f) strategic, tactical and forecasting errors made and lessons learned, and (g) sales forecast model using multiple regression analysis with forecast made and forecast error experienced.

The second 30-minute company marketing plan covers (a) strategic analysis based on the Aaker framework (Aaker, 2014; Aaker & Moorman, 2018), (b) positioning analysis and strategy using VALS psycho-geo-demographic segmentation data and product positioning maps (PPM) based on simulation performance data, (c) strategic market plan via product portfolio analysis (PPA) using the BCG strategic grids based on simulation performance data, (d) recommended evaluation and control mechanisms, and (e) conclusion with research references. In addition, each team submits a team presentation handout (10% of course grade) with dss packages and external references used.

COMPETE Marketing Simulation

COMPETE (Faria, 2006) is a marketing simulation designed to provide students with marketing strategy development and decision-making experience. Competing student teams are placed in a complex, dynamic, and uncertain environment. The participants experience the excitement and uncertainty of competitive events and are motivated to be active seekers of knowledge. They learn the need for, and usefulness of, mastering an underlying set of decision-making principles. The complex, dynamic, interactive, batch-processed COMPETE simulation is flexible, and provides participants the opportunity to experiment with different marketing strategies. The administrator can (a) select an additive, multiplicative, or multiple exponential model, (b) vary the elasticity of each of the 74 decision variables, (c) introduce stimulators (cost increases, strikes, new competition) during different decision periods, and (d) notify participants of changes via a message center.

Competing student teams plan, implement, and control a marketing program for three high-tech products in three regions Region 1 (R1), Region 2 (R2) and Region 3 (R3) within the United States. These three products are a Total Spectrum Television (TST), a Computerized DVD/Video Editor (CVE) and a Safe Shot Laser (SSL). The features and benefits of each product and the characteristics of consumers in each region are described in the student manual. Based on a marketing opportunity analysis, a mission statement is generated, specific and measurable company goals are set, and marketing strategies are formulated to achieve these goals. Constant monitoring and analysis of their own and competitive performance helps the teams better understand their markets and improve their decisions.

Each decision period (quarter), the competing teams make a total of 74 marketing decisions with regard to marketing their three brands in the three regional markets. These 74 decisions include nine pricing decisions, nine shipment decisions, three sales force size decisions, nine sales force time allocation decisions, one sales force salary decision, one sales force commission decision, twenty-seven advertising media decisions, nine advertising content decisions, three quality-improvement R&D decisions, and three cost-reduction R&D decisions. Successful planning, implementation, and control of their respective marketing programs require that each company constantly monitor trends in its own and competitive decision variables and resulting performance. The teams use the recently launched and upgraded COMPETE Portal, which has replaced the COMPETE Online Decision Entry System (CODES) (Palia, Mak, & Roussos, 2000, 2001) to enter their decisions, retrieve their results, and download and use a wide array of marketing dss packages.

COMPETE dss and Online Graphics Packages

DSS packages enable simulation participants to make better informed decisions such as target profit pricing, sales forecasting, market segmentation and positioning, market mix analysis, competitor analysis, forecast error impact analysis, ratios analysis, cash flow analysis, and strategic market planning, as they are progressively introduced during the simulation competition. Simulation participants use an array of web-based:

- strategic market planning (Palia, 1991, 1995; Palia , De Ryck, & Mak, 2002), and
- positioning (Palia, De Ryck, & Mak, 2003; Palia & De Ryck, 2013) graphic packages, as well as:
- target profit pricing (Palia, 2008),

- competitor analysis (Palia & De Ryck, 2015),
- forecast error impact (Palia, 2011),
- marketing mix analysis,
- multiple regression analysis (Palia, 2004),
- ratios analysis,
- strategic business unit (SBU) analysis (Palia, 2009),
- portfolio normative consistency analysis (Palia, 2012),
- target portfolio analysis (Palia, 2017),
- cash flow analysis (Palia, 2010),
- profitability analysis (Palia & De Ryck, 2014),
- cumulative team performance (Palia 2005),
- cost of production analysis (Palia & De Ryck, 2016),
- proforma analysis (Palia, 2007), and
- marketing efficiency analysis (Palia, 2018) workbooks that auto-extract and present relevant data from the simulation results and facilitate subsequent analysis and decision-making.

Extensive feedback is provided on team performance and weekly writing assignments. First, during each decision period, the competing teams receive cumulative team performance rankings on 18 performance measures for their own company. Next, cumulative competitor rankings on profit, market share, quality, cost of production, and efficiency is released at the end of the four trial decision periods prior to the start of simulation competition, in order to facilitate preliminary cause-effect analyses and initial simulation debriefing, as well as to establish credibility in the ranking system. The cumulative team performance rankings are released at the end of each year (4 quarterly decisions) of simulation competition for intermediate debriefing purposes (Palia 2005). Then, at the end of the 4-trial-decision 'Prepare to Compete' phase, and subsequently, at the end of competition during the 'Compete' phase, the competing teams can access the cumulative End Game Performance Package to analyze simulation results, and to prepare individual strategic market plan reports, and team presentations (Palia 2019).

The course design fosters effective engagement via focus on the underlying psychological needs for autonomy, relatedness, and competence (National Research Council 2003). Autonomy is promoted by providing competing team participants with 24/7 online access and freedom of choice of dss packages used to analyze and improve team performance. Relatedness is nurtured by providing team participants the opportunity to respond jointly to thinklets in class, and to seek clarifications and guidance during in-class or remote scaffolding sessions with the instructor. Perceived competence is enhanced as participants identify setbacks in team performance, use relevant dss packages to analyze and understand the underlying reasons, take corrective action, and exercise marketing control.

Course engagement is advanced and accelerated via early mediation of decision support. Based on insights derived from monitoring course engagement and continuing participant suggestions, the dss packages are introduced during the initial 'Startup' week and the 2-week initial debriefing 'Prepare to Compete' simulation phase of the Spring 2022 semester. The following engagement metrics monitored on a daily basis during both the Spring 2021 (n=34) and Spring 2022 (n=37) semesters indicate advanced, accelerated, and substantial increase in dss package downloads and usage during the Spring 2022 semester.

ENGAGEMENT METRICS

Online Graphics Metrics

Online product positioning map (PPM) and product portfolio analysis (PPA) graphics tied to the simulation results are generated and used by competing participant teams in positioning and strategic market planning respectively. PPM and PPA graphics generated both inside (highlighted in yellow) and outside class during each simulation phase by 34 students in Spring 2021 and 37 students in Spring 2022 are indicated in exhibit 6. PPM graphs generated increased (a) inside class from 28 in Spring 2021 to 43 in Spring 2022, (b) outside class from 1479 to 1565, and (c) in total from 1,507 to 1,608. Online PPA graphs generated (a) inside class decreased from 114 to 91, (b) outside class increased from 1023 to 1192, and in total increased from 1137 to 1283 (see exhibit 6).

PPM graphics can be generated every decision period starting with the 2-week 'Prepare to Compete' phase. However, PPA graphics can only be generated after 8 quarterly decision periods towards the end of the 7-week 'Compete' phase, as the market growth rate (from year 1 to 2) of each of the 9 strategic business units is calculated and plotted on the server. Earlier PPA plots are generated only for demonstration purposes.

MKT 391 Online Graphics Generated (Inside & Outside Class) by Simulation Phase (Spring 2021 and Spring 2022)
Exhibit 6

		Spring 2021		Spring 2022		Spring 2021		Spring 2022		Spring 2021		Spring 2022	
		n=34		n=37		n=34		n=37		n=34		n=37	
		Inside Class				Outside Class				Total			
Phase	Start Date	PPM	PPA	PPM	PPA	PPM	PPA	PPM	PPA	PPM	PPA	PPM	PPA
Pre-Startup	1/4/2022	0	0	0	0	0	0	0	3	0	0	0	3
Startup	1/11/2022	0	0	0	0	0	0	0	21	0	0	0	21
Initial Brief	1/18/2022	0	13	1	0	163	2	148	0	163	15	149	0
Intermediate	2/1/2022	13	7	8	13	542	170	591	301	555	177	599	314
Report & Pres	3/23/2022	15	94	34	78	489	576	625	598	504	670	659	676
Final Debrief	5/3/2022	0	0	0	0	285	275	201	269	285	275	201	269
Grand Total		28	114	43	91	1479	1023	1565	1192	1507	1137	1608	1283
		PPM	PPA	PPM	PPA	PPM	PPA	PPM	PPA	PPM	PPA	PPM	PPA
		Inside Class				Outside Class				Total			
		n=34		n=37		n=34		n=37		n=34		n=37	
		Spring 2021		Spring 2022		Spring 2021		Spring 2022		Spring 2021		Spring 2022	

The change in total online PPM and PPA graphics generated from Spring 2021 (by 34 students consisting of 18 participants in Industry C and 16 participants in Industry E) to Spring 2022 (by 37 students consisting of 18 participants in Industry C and 19 participants in Industry E) are shown in exhibit 7. Total PPM graphs generated increased by 101 (7%) from 1507 to 1608. Total PPA graphs generated increased by 146 (13%) from 1137 to 1283 (see exhibit 7).

MKT 391 Change in Online Graphics Generated (Spring 2021 to Spring 2022)
Exhibit 7

Semester ==>	Spring 2021			Spring 2022			Change	Change
Online Graphics	Total	Avg.	n	Total	Avg.	n	Total	Percent
Online PPMC	1046	58.1	18	862	47.9	18	-184	-18%
Online PPME	461	28.8	16	746	39.3	19	285	62%
Online PPM	1507	44.3	34	1608	43.5	37	101	7%
Online PPA	1137	33.4	34	1283	34.7	37	146	13%
Total	2644	71.5	37	2891	78.1	37	247	9%

DSS Metrics

Daily monitoring of dss downloads and usage by simulation phase during the Spring 2021 semester revealed that participants commence using the dss packages only during the 7-week intermediate debriefing or 'Compete' phase commencing 2-2-2021 (see exhibit 8). DSS downloads and usage by simulation phase (top 6 rows) of each of the 18 dss packages during Spring 2021 is followed by the highlighted (in yellow) in-class downloads by simulation phase, and outside-class downloads by simulation phase in the lower 6 rows. Relatively frequent download activity (4 or more downloads) cells are highlighted in turquoise. The total download frequency rankings of each of the 18 dss packages are indicated in the top row (see exhibit 8).

During Spring 2021, 34 students did not download and use any of the 18 dss packages during the initial 1-week 'Startup' phase or the following 2-week initial debriefing or 'Prepare to Compete' phase. They did download and use the 18 dss packages a total of 170 times during the 7-week intermediate debriefing or 'Compete' phase, 332 times during the 5-week 'Report & Present' phase, and 47 times during the 1-week 'Wrap-up' phase (see exhibit 8, last column). They downloaded and used the 18 dss packages a total of 549 times, of which 217 downloads (40%) are in-class and 332 downloads (60%) are outside class (see exhibit 8, last column).

The top dss download rankings are Multiple Regression Matrix (88), Competitor Analysis (61), Normative Position of Brands Analysis (48), Efficiency Analysis (45), Profit Analysis (43), Proforma Analysis (43), Cash Flow Analysis (28), Forecast Error Impact Analysis (28), Market Share Analysis (25), Manufacturing/Shipping Analysis (25), Target Portfolio Analysis (21), Cost Analysis (20), Marketing Mix Analysis (20), Strategic Business Unit Analysis (17), Quality Analysis (15), and Target Profit Pricing (11).

MKT 391 Spring 2021 Marketing DSS Package Downloads (In- and Out-of-Class) by Simulation Debriefing Phase
Exhibit 8

MKT 391 Spring 2021 Marketing Decision Support Package Downloads

	Forecast Error Impact Analysis	Manufacturing / Shipping Analysis	Target Profit Pricing	Profit Analysis	Market Share Analysis	Quality Analysis	Cost Analysis	Efficiency Analysis	Competitor Analysis	Proforma Analysis	Cash Flow Analysis	Multiple Regression Matrix	Profit Forecasting Analysis	Strategic Business Unit Analysis	Ratios Analysis	Target Portfolio Analysis	Marketing Mix Analysis	Normative Position of Brands Analysis	Marketing DSS Packages Total
Download Frequency Ranking ==>	7	9	16	5	9	15	12	4	3	5	7	2	17	14	18	11	12	1	
Total # of Downloads ==>	28	25	11	43	25	15	20	45	61	43	28	88	7	17	4	21	20	48	549
Startup -- 1/12/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Initial Debriefing -- 1/19/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intermediate Debriefing -- 2/2/2021	11	25	10	13	1	0	4	0	20	5	2	55	3	14	0	1	3	3	170
Report & Present Phase -- 3/24/2021	16	0	1	29	20	14	15	40	35	36	18	33	3	3	4	17	10	38	332
Final Debriefing -- 5/4/2021	1	0	0	1	4	1	1	5	6	2	8	0	1	0	0	3	7	7	47
																			40%
In-Class Downloads ==>	7	11	6	13	4	3	2	9	20	40	4	36	4	13	3	8	2	32	217
Startup -- 1/12/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Initial Debriefing -- 1/19/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intermediate Debriefing -- 2/2/2021	5	11	6	7	0	0	0	0	12	5	0	26	3	13	0	1	1	1	91
Report & Present Phase -- 3/24/2021	2	0	0	6	4	3	2	9	8	35	4	10	1	0	3	7	1	31	126
Final Debriefing -- 5/4/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
																			60%
Out-of-Class Downloads ==>	21	14	5	30	21	12	18	36	41	3	24	52	3	4	1	13	18	16	332
Startup -- 1/12/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Initial Debriefing -- 1/19/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intermediate Debriefing -- 2/2/2021	6	14	4	6	1	0	4	0	8	0	2	29	0	1	0	0	2	2	79
Report & Present Phase -- 3/24/2021	14	0	1	23	16	11	13	31	27	1	14	23	2	3	1	10	9	7	206
Final Debriefing -- 5/4/2021	1	0	0	1	4	1	1	5	6	2	8	0	1	0	0	3	7	7	47
	Forecast Error Analysis	Manufacturing / Shipping Analysis	Target Profit Pricing	Profit Analysis	Market Share Analysis	Quality Analysis	Cost Analysis	Efficiency Analysis	Competitor Analysis	Proforma Analysis	Cash Flow Analysis	Multiple Regression Matrix	Profit Forecasting Analysis	Strategic Business Unit Analysis	Ratios Analysis	Target Portfolio Analysis	Marketing Mix Analysis	Normative Position of Brands Analysis	Marketing DSS Packages Total

MKT 391 Spring 2021 Marketing Decision Support Package Downloads

The Multiple Regression Matrix dss used in sales forecasting, as well as Target Portfolio Analysis and Normative Position of Brands dss packages used in strategic market planning are introduced and used during the latter part of the 7-week intermediate debriefing or 'Compete' phase owing to performance (8 decision periods) data requirements. However, participants can benefit from early introduction, demonstration and use of other dss packages during the 2-week initial debriefing or 'Prepare to Compete' phase.

DSS usage prerequisites include familiarity with (a) the location on the course website, (b) purpose, (c) significance, (d) assumptions, (e) usage and (f) limitations of each dss package. Mediation strategies used include early introduction and progressive demonstration of (a) online PPM and PPA graphics packages, and (b) Excel-based dss packages, as well as location of relevant ABSEL dss-related articles, and trimmed dss demo videos.

Early introduction of dss packages during Spring 2022 had a substantial impact on course engagement. Statcounter is used to track (on a daily basis) the number of (a) website visitors, sessions, page-views, (b) dss packages, (c) ABSEL dss-related articles, and (d) dss demo videos during the 5 simulation phases. The server log is used to track the number of online PPM and PPA graphics generated.

The engagement metrics for both Spring 2021 and Spring 2022 during each of the simulation phases, including in-class (based on date and time of website visit) and outside-class page-views, total page-views, number of sessions, number of visitors, and number of new visitors are indicated in exhibit 9. Early introduction of dss packages during the 1-week 'Startup' and 2-week 'Prepare to Compete' phases during Spring 2022 resulted in a substantial increase in website visits from Spring 2021 (n=34) to Spring 2022 (n=37) as follows:

- Total course website page views increased by 56% from 7,675 in Spring 2021 to 11,971 in Spring 2022,
- Average visits per participant increased by 43% from 226 in Spring 2021 to 324 in Spring 2022,
- In class page views increased by 69% from 1496 to 2525,
- Outside class page views increased by 53% from 6,179 to 9,446,
- Number of sessions increased from 2177 to 2288, and
- Number of visitors increased from 1549 to 1799 in Spring 2022 (see exhibit 9).

MKT 391 Course Engagement (Spring 2021 and Spring 2022)
Exhibit 9

Phase	Start Date		In Class		Outside Class		**Page Views**		Sessions		Visitors		NewVisitors	
	2021	2022	2021	2022	2021	2022	**2021**	**2022**	2021	2022	2021	2022	2021	2022
Pre-Startup	5-Jan	4-Jan	0	0	464	517	**464**	**517**	116	175	89	152	56	115
Startup	12-Jan	11-Jan	115	421	470	470	**585**	**891**	136	132	99	107	39	48
Initial Brief	19-Jan	18-Jan	107	435	887	1968	**994**	**2403**	319	381	227	270	45	61
Intermediate	2-Feb	1-Feb	589	724	1839	2519	**2428**	**3243**	676	723	505	571	117	134
Report & Pres	24-Mar	23-Mar	656	860	1797	2899	**2453**	**3759**	690	693	484	499	132	111
Final Debrief	6-May	3-May	29	85	722	1073	**751**	**1158**	240	184	145	128	24	32
	Grand Total		1496	2525	6179	9446	**7675**	**11971**	2177	2288	1549	1727	413	501
	No. of students		34	37	34	37	**34**	**37**	34	37				
	Average		44	68	182	255	**226**	**324**	64	62				

Both the change and percentage change in engagement metrics from Spring 2021 to Spring 2022 during each of the simulation phases, including in-class (based on date and time of website visit) and outside-class page-views, total page-views, number of sessions, number of visitors, and number of new visitors are indicated in exhibit 10. A positive change in both in-class and outside class course engagement in almost every simulation phase resulted from early introduction of dss packages in Spring 2022 (see exhibit 10) including:

- a total increase of 4,296 page views, including
- an increase of 1029 in-class page views, and

Change in MKT 391 Course Engagement (Spring 2021 to Spring 2022)
Exhibit 10

Statcounter Website Tracking

Phase	Start Date	In Class	Outside	Page Views	Sessions	Visitors	NewVisito
Pre-Startup	5-Jan	0	53	53	59	63	5
Startup	12-Jan	306	0	306	-4	8	
Initial Brief	19-Jan	328	1081	1409	62	43	1
Intermediate	2-Feb	135	680	815	47	66	1
Report & Pres	24-Mar	204	1102	1306	3	15	-2
Final Debrief	6-May	56	351	407	-56	-17	
Grand Total		1029	3267	4296	111	178	8

Percent Change in MKT 391 Course Engagement (Spring 2021 to Spring 2022)

Statcounter Website Tracking

Phase	Start Date	In Class	Outside	Page Views	Sessions	Visitors	NewVisito
Pre-Startup	5-Jan	#DIV/0!	11.4%	11.4%	50.9%	70.8%	105.4%
Startup	12-Jan	266.1%	0.0%	52.3%	-2.9%	8.1%	23.1%
Initial Brief	19-Jan	306.5%	121.9%	141.8%	19.4%	18.9%	35.6%
Intermediate	2-Feb	22.9%	37.0%	33.6%	7.0%	13.1%	14.5%
Report & Pres	24-Mar	31.1%	61.3%	53.2%	0.4%	3.1%	-15.9%
Final Debrief	6-May	193.1%	48.6%	54.2%	-23.3%	-11.7%	33.3%
Grand Total		68.8%	52.9%	56.0%	5.1%	11.5%	21.3%

- an increase of 3267 outside-class page views, and
- a 56.0% increase in total page views, including
- a 68.8% increase in in-class page views, and
- a 52.9% increase in outside-class page views.

Total dss downloads and usage in both Spring 2021 and Spring 2022 as well as the change and percentage change in downloads from Spring 2021 to Spring 2022 in descending order (for Spring 2022) reflect increase in course engagement (see exhibit 11).

- Total dss package downloads increased by 85% from 549 in Spring 2021 to 1016 in Spring 2022,
- Manufacturing/Shipping Analysis dss package registered the largest (3-digit) 424% increase from 25 Spring 2021 downloads to 131 Spring 2022 downloads. This package was demonstrated during the 1-week Startup phase in order to (a) systematically decide on shipments, and (b) prevent decision entry error during the 2-week 'Prepare to Compete' simulation phase.
- 9 dss packages registered a 3-digit 114% to 424% increase, and
- 8 dss packages registered a 2-digit 15% to 96% increase in download and usage during Spring 2022.
- Only 1 of the 18 dss packages (Proforma Analysis) registered a 44% decline in downloads and usage (see exhibit 11). Given semester time constraints, the complex Proforma Analysis, used in budgeting, is introduced and demonstrated towards the end of the semester.

Participants are advised to prioritize dss packages when demonstrated, and to use them when needed based upon perceived relevance and importance.

MKT 391 Change in DSS Package Downloads (Spring 2021 to Spring 2022)
Exhibit 11

Marketing DSS Package Downloads	Sp 2021 Total	Sp 2022 Total	Change Sp 2021 - 2022	Percent Change Sp 2021 - 2022
Manufacturing/Shipping Analysis	25	131	106	424%
Multiple Regression Data Matrices	88	101	13	15%
Market Share Analysis	25	87	62	248%
Profit Analysis	43	79	36	84%
Competitor Analysis	61	72	11	18%
Normative Position of Brands Analysis	48	71	23	48%
Efficiency Analysis	45	59	14	31%
Marketing Mix Analysis	20	57	37	185%
Forecast Error Impact Analysis	28	55	27	96%
Cost Analysis	20	50	30	150%
Quality Analysis	15	50	35	233%
Strategic Business Unit (SBU) Analysis	17	49	32	188%
Target Portfolio Analysis	21	45	24	114%
Cash Flow Analysis	28	38	10	36%
Proforma Analysis	43	24	-19	-44%
Target Profit Pricing	11	17	6	55%
Profit Forecasting Analysis	7	16	9	129%
Ratios Analysis	4	15	11	275%
Total DSS Package Downloads ==>	549	1016	467	85%

DSS Article Metrics

Engagement and learning are fostered by providing simulation participants with dss-related articles that cover the purpose, usage, and underlying marketing concepts, and dss demo videos. Participants read relevant sections of ABSEL dss-related articles to better understand the purpose of each dss package and the related marketing concepts. They watch trimmed dss demo videos (recorded in Zoom class sessions during the COVID-19 pandemic) to better understand the related concepts, analysis and decision-making process. In addition, questions, doubts, and/or clarifications are addressed during scaffolding sessions at the end of class or during virtual office hours. Individuals or teams set up Zoom meetings, share their dss

workbooks, ask specific questions, and resolve specific issues or problems related to team performance. Virtual office hours are convenient, discussions are focused, and use time effectively and efficiently via synchronous two-way communication.

ABSEL dss-related article downloads and usage in both Spring 2021 and Spring 2022, as well as change and percentage change from Spring 2021 to Spring 2022 in descending order (for Spring 2022) reflect increase in course engagement (see exhibit 12).

- The Proforma Analysis (ABSEL 2007) article registered the largest 380% increase from only 5 Spring 2021 downloads to 24 Spring 2022 downloads. This article introduces the 'Proforma Analysis' dss package used in (a) budgeting and (b) strategic market planning.
- The SMP Cash Flow Analysis (ABSEL 2021) article registered a significant 200% increase from 16 Spring 2021 downloads to the highest 48 Spring 2022 downloads. This article introduces the 'Sources and Uses of Cash' dss package used to (a) identify reasons for bankruptcy, (b) assess cash surplus or deficit, and (c) check financial balance of the strategic market plan.
- The Normative Position of Brands Analysis (ABSEL 2012) article registered a substantial 207% increase from 14 Spring 2021 downloads to 43 Spring 2022 downloads. This article covers the 'NPB and Trends' dss package used to assess consistency between the normative and actual SBU positions when checking the internal balance and trends of the SBU portfolio in strategic market planning.

MKT 391 Change in DSS Article Downloads (Spring 2021 to Spring 2022)
Exhibit 12

Marketing DSS Article Downloads	Sp 2021 Total	Sp 2022 Total	Change Sp 2021 - 2022	Percent Change Sp 2021 - 2022
SMP Cash Flow Analysis (ABSEL 2010)	16	48	32	200%
Normative Position of Brands Analysis (ABSEL 2012)	14	43	29	207%
Positioning Analysis (ABSEL 2013)	12	39	27	225%
Proforma Analysis (ABSEL 2007)	5	24	19	380%
Competitor Analysis (ABSEL 2015)	8	23	15	188%
Multiple Regression Analysis (ABSEL 2004)	18	20	2	11%
Strategic Business Unit (SBU) Analysis (ABSEL 2009)	9	20	11	122%
Profitability Analysis (ABSEL 2014)	11	17	6	55%
Efficiency Analysis (ABSEL 2018)	9	15	6	67%
Cost of Production Analysis (ABSEL 2016)	5	13	8	160%
Target Portfolio Analysis (ABSEL 2017)	9	11	2	22%
Sustaining Engagement in Pandemic (ABSEL 2021)	3	10	7	233%
Target Profit Pricing (ABSEL 2008)	8	9	1	13%
Enhancing Experiential Learning (ABSEL 2019)	8	7	-1	-13%
Forecast Error Impact Analysis (ABSEL 2011)	5	7	2	40%
Sustained Student Engagement (ABSEL 2020)	6	5	-1	-17%
Augmenting Engagement & Learning (ABSEL 2022)	0	4	4	#DIV/0!
Total DSS Article Downloads ==>	146	315	169	116%

DSS Demo Video Metrics

Trimmed dss demo videos can effectively boost participant engagement and learning and accelerate dss package usage during each of the simulation debriefing phases. Following coverage of the purpose, significance, assumptions (if any), usage, and limitations of each dss package in class, students can review the dss demo videos when needed on a 24/7 basis, learn how to (a) access and download the dss packages, (b) transfer the simulation results, (c) analyze the antecedents of team performance, and (d) build confidence in decision-making. The dss packages, dss-demo videos, and/or dss-related articles constitute a comprehensive user-centered knowledge database that can be accessed 24/7 and used by each student in the preferred sequence when needed. In addition to the dss demo videos, students can access and review course introduction, simulation orientation, dss package location, as well as course website and simulation portal navigation videos on a 24/7 basis.

Based on student suggestions, dss package demo videos were progressively recorded, trimmed, and uploaded to the server beginning Spring and Fall 2021. Total dss video downloads during Spring 2022 in descending order of magnitude by simulation phase, are indicated in exhibit 13.

- The 'Regression Data Matrices' and Excel Add-In videos registered the largest total 63 Spring 2022 downloads (53 in the 'Compete' phase, 9 in the 'Report & Present' phase, and 1 in the 'Wrap-up' phase). These videos are used to prepare 9 SBU data matrices used in Multiple Regression Analysis with the Excel Add-ins Statpak and StatpakVBA towards the end of the 7-week 'Compete' phase.
- The 'DSS Package Usage' video was downloaded 45 times (3 times in the 'Startup' phase, 27 times in the 'Prepare to Compete' phase, 14 times in the 'Compete' phase, and once in the 'Report & Present' phase).
- Manufacturing/Shipping Analysis dss video registered 39 downloads (35 in the 'Prepare to Compete' phase and 4 in the 'Compete' phase).

The data reflect when dss packages are used, and suggest when students need video support in order to effectively use the dss packages (see exhibit 13).

MKT 391 Spring 2022 Marketing DSS Video Downloads
Exhibit 13

DSS Video Downloads	Total	Simulation Debriefing Phase				
		Startup Week	Prepare to Compete	Compete Phase	Report & Present	Wrap-up Phase
Regression Data Matrices	**63**	0	0	53	9	1
DSS Package Usage	**45**	3	27	14	1	0
Manufacturing/Shipping Analysis	**39**	0	35	4	0	0
Competitor Analysis	**31**	0	7	20	4	0
Multiple Regression Analysis	**28**	0	0	21	7	0
DSS Usage on Mac	**25**	4	14	4	2	1
Performance Analysis	**15**	0	4	2	9	0
DSS Package Location	**14**	0	9	4	1	0
Forecast Error Impact	**13**	0	4	7	2	0
Ratios Analysis	**12**	0	0	12	0	0
Normative Position of Brands	**10**	0	0	0	5	5
Product Portfolio Analysis	**9**	0	2	4	0	3
Cash Flow Analysis	**8**	0	2	4	2	0
Target Profit Pricing	**8**	0	5	3	0	0
Proforma Analysis	**7**	0	0	3	4	0
Download COMPETE Results	**4**	0	3	1	0	0
Product Postioning Map	**4**	0	1	1	0	2
SBU Analysis	**4**	0	0	3	1	0
Transfer Results & Launch	**4**	0	4	0	0	0
Profit Forecasting Analysis	**3**	0	0	3	0	0
Target Portfolio Analysis	**3**	0	0	0	3	0
Debriefing Phase Total ==>	**349**	**7**	**117**	**163**	**50**	**12**

Early introduction of dss and availability of online dss videos, based on prior student suggestions, during Spring 2022 is reflected in the dss video download data by simulation phase (see exhibit 13). Twenty-one dss videos were downloaded a total of 349 times.

First, during the one-week 'Startup' phase, 7 (2% of 349) dss video downloads include

- 3 'DSS Package Usage' video, and
- 4 'DSS Usage on Mac' video downloads.

These videos review the process used to access, download, transfer team data, and launch the dss package to extract and analyze team performance. The dss video downloads during this initial 1-week 'Startup' phase and the subsequent 2-week 'Prepare to Compete' phase advance and accelerate dss usage as well as engagement and learning through the remainder of the semester.

Next, during the 2-week 'Prepare to Compete' phase consisting of 4 quarterly trial decisions (one year of operation), 117 (33.5%) dss video downloads include:

- 35 'Manufacturing/Shipping Analysis' video,
- 27 'DSS Package Usage' video,
- 14 'DSS Usage on Mac' video, and
- 9 'DSS Package Location' video downloads (see exhibit 13).

Then, during the 7-week 'Compete' phase consisting of 12 quarterly decisions (three years of operation), 163 (46.7%) dss video downloads include:

- 53 'Regression Data Matrices' and 'Excel Add-In' video,
- 21 'Multiple Regression Analysis' video,
- 20 'Competitor Analysis' video,
- 14 'DSS Package Usage' video, and
- 12 'Ratios Analysis' video downloads.

Accordingly, by the end of the 'Compete' phase (10 semester weeks) participants download and view 287 (82.2% of 349) dss videos (see exhibit 13).

Later, during the 5-week 'Report & Present' phase, 50 (14.3%) dss video downloads include:

- 9 'Regression Data Matrices' and 'Excel Add-In' video,
- 9 'Performance Analysis' video,
- 7 'Multiple Regression Analysis' video, and
- 5 'Normative Position of Brands' video downloads.

These videos help participants prepare their team presentation and individual reports.

Finally, during the one-week 'Wrap-up' phase consisting of the last class period and the finals week, 12 (3.4%) dss video downloads include:

- 5 'Normative Position of Brands' video,
- 3 'Product Portfolio Analysis' video and
- 2 'Product Positioning Map' video downloads.

These videos are useful in preparation of the final individual Strategic Market Plan (SMP) report worth 30% of the course grade.

Accelerated Engagement Metrics by Simulation Phase

Early introduction of dss packages during the initial 'Start-up' week, the 2-week 'Prepare to Compete' phase, and 7-week 'Compete' phase yields substantial increases in dss usage, and augments engagement and learning. A comparison of total, in-class, and outside class downloads of 18 dss packages by simulation phase during the Spring 2021 and Spring 2022 reveal a substantial increase in engagement during the early simulation phases, as well as accelerated engagement throughout the Spring 2022 semester (see exhibit 14).

DSS downloads and usage by simulation phase during the Spring 2021 and Spring 2022 semesters are indicated in the upper and lower matrices respectively. In both the upper Spring 2021 and lower Spring 2022 tables:

- the frequency of total downloads for each of the 18 dss packages are ranked in the top row,
- total dss downloads of each dss package in each of the 5 simulation phases are shown in the top 6 rows,
- in-class downloads in each of the 5 simulation phases are highlighted in yellow in the middle 6 rows, and
- outside class downloads in each of the 5 simulation phases are shown in the lower 6 rows.

Relatively heavy use of each dss package (4 or more downloads) in each simulation phase is highlighted in turquoise (see exhibit 14).

The data in exhibit 13 reveal that early dss mediation during the 'Startup' phase in Spring 2022 had a substantial impact on engagement and learning throughout the course. Early dss introduction and demonstration in Spring 2022 during the 'Startup' phase together with 24/7 online availability of dss-related articles and dss demo videos resulted in heavier dss usage (4 or more downloads colored in turquoise) in every simulation phase (see exhibit 14, lower table).

Spring 2021 & Spring 2022 DSS Package Downloads (In- and Out-of-Class) by Simulation Phase
Exhibit 14

MKT 391 Spring 2021 Marketing Decision Support Package Downloads

	Forecast Error Impact Analysis	Manufacturing / Shipping Analysis	Target Profit Pricing	Profit Analysis	Market Share Analysis	Quality Analysis	Cost Analysis	Efficiency Analysis	Competitor Analysis	Proforma Analysis	Cash Flow Analysis	Multiple Regression Matrix	Profit Forecasting Analysis	Strategic Business Unit Analysis	Ratios Analysis	Target Portfolio Analysis	Marketing Mix Analysis	Normative Position of Brands Analysis	Marketing DSS Packages Total
Download Frequency Ranking ==>	6	1	16	5	12	8	Cost	8	3	14	8	2	18	13	17	7	14	4	
Total # of Downloads ==>	28	25	11	43	25	15	20	45	61	43	28	88	7	17	4	21	20	48	549
Startup -- 1/12/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Initial Debriefing -- 1/19/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intermediate Debriefing -- 2/2/2021	11	25	10	13	1	0	4	0	20	5	2	55	3	14	0	1	3	3	170
Report & Present Phase -- 3/24/2021	16	0	1	29	20	14	15	40	35	36	18	33	3	3	4	17	10	38	332
Final Debriefing -- 5/6/2021	1	0	0	1	4	1	1	5	6	2	8	0	1	0	0	3	7	7	47
																			40%
In-Class Downloads ==>	7	11	6	13	4	3	2	9	20	40	4	36	4	13	3	8	2	32	217
Startup -- 1/12/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Initial Debriefing -- 1/19/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intermediate Debriefing -- 2/2/2021	5	11	6	7	0	0	0	0	12	5	0	26	3	13	0	1	1	1	91
Report & Present Phase -- 3/24/2021	2	0	0	6	4	3	2	9	8	35	4	10	1	0	3	7	1	31	126
Final Debriefing -- 5/6/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
																			60%
Out-of-Class Downloads ==>	21	14	5	30	21	12	18	36	41	3	24	52	3	4	1	13	18	16	332
Startup -- 1/12/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Initial Debriefing -- 1/19/2021	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Intermediate Debriefing -- 2/2/2021	6	14	4	6	1	0	4	0	8	0	2	29	0	1	0	0	2	2	79
Report & Present Phase -- 3/24/2021	14	0	1	23	16	11	13	31	27	1	14	23	2	3	1	10	9	7	206
Final Debriefing -- 5/6/2021	1	0	0	1	4	1	1	5	6	2	8	0	1	0	0	3	7	7	47
	Forecast Error Analysis	Manufacturing / Shipping Analysis	Target Profit Pricing	Profit Analysis	Market Share Analysis	Quality Analysis	Cost Analysis	Efficiency Analysis	Competitor Analysis	Proforma Analysis	Cash Flow Analysis	Multiple Regression Matrix	Profit Forecasting Analysis	Strategic Business Unit Analysis	Ratios Analysis	Target Portfolio Analysis	Marketing Mix Analysis	Normative Position of Brands Analysis	Marketing DSS Packages Total

MKT 391 Spring 2021 Marketing Decision Support Package Downloads

For instance, total dss downloads (see exhibit 14, last column) increased:

- from 0 in Spring 2021 to 15 in Spring 2022 during the 1-week 'Startup' phase,
- from 0 to 209 during the 2-week 'Prepare to Compete' phase,
- by 77.6% from 170 to 302 during the 7-week 'Compete' phase,
- by 47.6% from 332 to 490 during the 5-week 'Report & Present' phase, and
- by 25.5% from 47 to 59 during the 1-week 'Wrap-up' phase.

In addition, total usage of the 18 dss packages (see exhibit 14, last column) increased:

- by 85.1% from 549 to 1016 in Spring 2022 (see exhibit 14, last column).

Simulation participants in Spring 2022 commence usage of the Manufacturing/Shipping Analysis (9 downloads) and Profit Analysis (3 downloads) dss packages during the initial 1-week 'Startup' phase. This early start:
(a) boosts confidence in access, download, and usage of dss packages,
(b) results in relatively heavy usage (turquoise color) of all dss packages during the following simulation phases, and
(c) advances and accelerates engagement and learning.

CONCLUSION

Aggregate website tracking is used to monitor in-class and out-of-class page-views, and downloads of (a) dss packages, (b) ABSEL dss-related papers, and (c) dss demo videos during Spring 2021 (n=34) and Spring 2022 (n=37) semesters. The monitored data indicate advanced, and accelerated student engagement during all simulation phases following early introduction of dss packages in Spring 2022.

Despite the job demands of decision-making in a dynamic, complex and uncertain simulation environment with incomplete information under time pressure, simulation participants exercise control via decision authority, autonomy, flexibility and discretion in decision-making, and are provided with scaffolding support as and when needed. They access online dss packages, dss-related articles and dss demo videos when needed, in order to improve team performance. Heavy job demands are offset by 24/7 access to online dss resources, decision-making control, and scaffolding support provided.

First, early demonstration of the PPM and PPA graphics packages in Spring 2022 during the initial 1-week 'Startup' phase resulted in increased generation of product positioning maps used in segmentation and positioning during the 2-week 'Prepare to Compete' and subsequent simulation phases. In addition, early demonstration of the BCG growth share and growth gain matrices used in strategic market planning (a) during the initial 1-week 'Startup' phase, and (b) after the 8th decision in the latter part of the 7-week 'Compete' phase resulted in increased generation of the BCG matrices during the 'Compete' and subsequent simulation phases.

Next, early introduction and progressive demonstration of the Excel-based dss packages in Spring 2022 during the 1-week 'Startup' and 2-week 'Prepare to Compete' phases resulted in a substantial 56% increase in total website page views, including a 69% increase of in-class page views, and a 53% increase in outside class page views. In addition, 9446 outside class page

views in Spring 2022 constituted 79% of 11,971 total page views, reflecting substantial outside class behavioral engagement. Further, both in-class and outside class course engagement increased in most simulation phases.

The results support (a) the National Research Council (2003) prescription that dss-induced user autonomy, relatedness and competence foster engagement, (b) the JDCS Model (Karasek 1979, Karasek et al. 1982) proposition that heavy workload demands under time pressure on simulation participants can be offset by range of decision-making freedom via 24/7 availability of and access to dss packages tied to the simulation, (c) the JDR Model (Demerouti et al. 2001, Baaker & Demerouti 2007) proposition that job demands perceived as challenges are positively related to engagement, and (d) the Argyris' Organizational Development Intervention Model (Argyris 1970) proposal that valid information generation and free, informed choice can lead to lasting commitment to engagement and learning.

In addition, the results confirm that accelerated engagement and learning are enhanced by (a) early introduction of decision support, (b) scaffolding support (Hogan & Pressley 1997) via 24/7 access to dss-related articles and dss demo videos, and clarification of concepts when needed, (c) collaborative learning (Bandura 1997) via team strategy discussion and decision making, (d) problem-based learning (Anderson & Lawton 2004) via thinklets posed in class, and simulation participation, and (e) co-creation of value (Vargo & Lusch 2004, 2014; Geddes et al. 2015, 2017) via listening, learning, responding to, and implementing participant suggestions.

In summary, early introduction of dss packages and trimmed dss videos tied to the business simulation, 24/7 access, scaffolding support, and phased simulation debriefing accelerate and boost overall participant engagement throughout the simulation competition. The ability to monitor results, identify problems, use relevant dss packages, understand the reasons for sub-par performance, take corrective action and improve performance, heightens interest, motivation, confidence and understanding among simulation participants.

Given the current AACSB International mission "to foster engagement, accelerate innovation, and amplify impact in business education," and the enhanced engagement and motivation of simulation participants that has resulted from use of phased simulation debriefing and the early introduction of decision support based on student suggestions, ABSEL is well positioned to play a leading role in the innovation and dissemination of simulation and experiential learning pedagogy in business education.

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