The Role that Large Scale, Integrative Business Simulations Can Play in Assurance of Learning and Assessment

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This paper illustrates how large-scale, integrative business simulations (LSIBS) can be used for course-embedded assessment while also augmenting student learning and contributing towards a school's assurance of learning requirements. The measured assessment outcomes include the ability to examine cross-functional skills and the students' higher order thinking abilities, among others. More specifically, this manuscript illustrates an assortment of enhancements and assessment tools that can be overlaid on the typical LSIBS to expand the learning opportunities and provide systematic documentation regarding the degree to which learning has occurred at the individual and team level. Furthermore, this manuscript presents extensive data gathered from observation and assessment of student activities. Finally, this manuscript illustrates how this data can provide within-course and programmatic feedback to accounting and business schools to improve teaching and learning outcomes, thus closing the loop on assurance of learning.

INTRODUCTION

Recently, there has been a growing interest in assurance of learning. In part, it has been spurred on by accrediting bodies such as the Association to Advance Collegiate Schools of Business (AACSB) and the European Quality Improvement System (EQUIS), among others. The real momentum, however, derives from the desire of many business schools to support and encourage excellence in management education. At its core, assurance of learning is a quality control process. It requires that business schools define their learning objectives, measure how well they are meeting these objectives, and complete the feedback loop by updating and refining programmatic activities and course requirements.

This new thrust heralds a landmark change in how business schools conduct themselves. Historically, the focus has been on the inputs to education. That is, educators have been concerned with designing and offering courses to provide the necessary skills to be successful in business. Now, the focus has been expanded to include measurement of the outputs. That is, how well have the skills been developed within its student body?

This change requires that as educators, we also change our mindset. Historically, we tested (or used other classroom methodologies and requirements) to determine if our students met our learning objectives. If they did not, the responsibility was theirs. As a result of the recent interest in AOL, professors and program directors must continue to determine if students meet the learning objectives. However, if students do not meet those objectives, the responsibility is also ours. Those involved must examine the process to determine why the intended outcomes did not materialize and make adjustments, refinements, and any other changes to ensure student success.

The purpose of this paper is to examine the role that simulations can play in attaining a school's learning goals. The setting for this examination is an enhanced, large scale, integrative simulation (LSIBS) that was course–embedded by the University of Tennessee (undergraduate and graduate business students) and West Virginia University (masters of professional accountancy and executive MBA students).

With this setting as the backdrop, we will start by explaining how LSIBS inherently contribute to important learning goals. Next, we will describe the progression of the typical integrative simulation. Then, we will introduce several activities and assessment tools that were overlaid on a LSIBS at Tennessee and West Virginia and describe how they can help to achieve an even broader set of learning objectives.[1]

Our attention will then zero in on the assessment tools. We will document their development and application, notably the processes and indicators that were used to monitor performance. We will then present the resultant assessment data and the conclusions that were drawn for both individuals and teams.

The process is concluded with illustrations on how the obtained information can lead to refinements in student efforts, instructor course management, and curriculum design, thus "closing the loop." In closing, we offer our insights from conducting the entire assurance of learning process.

In summary, our findings demonstrate that an LSIBS fortified with value-added activities and assessments can play a major role in student, course and programmatic assurance of learning. The regimen can reinforce what are perceived to be the major benefits of assessment, including continuous quality improvement, greater confidence in higher education, seamless transitions for transfer students (Moskal, Ellis and Keon 2008), and creativity and flexibility in curriculum design and delivery (Romero 2008). It can help overcome the major objections by faculty regarding time, complexity, unfamiliarity, and money (Pringle and Michel 2007). The complete set of assessments can also provide a broader view of business learning than observed with major field tests (Terry, Mills and Sollosy 2008, Krathwohl 2002). And, because the activities and assessments are delivered within a cross-functional context, they address a concern among schools that deliver an integrative learning experience regarding traditional assessment processes which tend to be narrowly-focused, special topic assessments (Athavale, Davis, and Myring 2008).

Our results also suggest that no single tool can provide a complete assessment of a school's curriculum. Each tool views a slice of the whole picture. In order to obtain a 360° view of learning, educators should consider multiple tools. An advantage of LSIBS is that many learning objectives can be pulled together and assessed in one integrated learning experience.

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[1] The activities and assessment tools were developed and tested at the University of Tennessee and most were further tested and refined at West Virginia University. The University of Tennessee used the assessment data reported in this manuscript in its 2012 AACSB accreditation maintenance review. West Virginia utilized LSIBS strategies extensively to assess learning in its 2005 AACSB Maintenance of Accreditation. Both schools collect data as described herein and utilize it internally to assess student, course and programmatic outcomes.

Finally, the process and indicators can address many of the assurance of learning requirements of accrediting bodies such as AACSB and EQUIS. As Shaftel and Shaftel (2007) observed, "a close relationship exists between the appraisal of student achievement and the evaluation of educational programs, because evaluating student outcomes may reveal the success or failure of educational programs."

THE ROLE OF LARGE SCALE, INTEGRATIVE BUSINESS SIMULATIONS IN ACCOMPLISHING ASSURANCE OF LEARNING GOALS

Stephen, Parente, and Brown (2002) previously noted the value of LSIBS in a capstone, integrative course. Furthermore, (Faria 2001), Feinstein and Cannon (2002), Gosen and Washbush (2004), Stephen, Parente, and Brown (2002), and Wolfe (1997) have concluded that LSIBS are effective due to the realism and control that they provide. The goal of this paper is not to further explore this issue, but to propose that LSIBS inherently provide

information for assessment purposes and, as such, when properly documented contribute to assurance of learning requirements.

LSIBS provide students the opportunity to manage a complex organization over an extended period of time in the face of great uncertainty. Students are required to apply their knowledge by thinking and acting in an integrative manner as they adapt to changing business conditions. As noted by Springer and Borthick (2004), Duffy and Jonassen (1992) and Fornot (1996), rather than inheriting a teacher's words, simulations require learners to construct their own understanding, raise questions, generate and explore their own models and build representations that organize their experiences. From an accounting perspective, they are grounded in managerial, financial and non-financial accounting information and emphasize communication skills, alternative viewpoints, the impact of assumptions on decisions, and the usefulness and importance of accounting information to business decision makers (Springer and Borthick, 2004). Several LSIBSs fit this description and can be found in Table 1.

Table 1   Large-Scale, Integrative Business Simulations

Simulation Name (alphabetical)	Website
The Business Strategy Game by GLO−BUS Software, Inc.	http://www.bsg-online.com/
Capstone Business Simulation by CapSim Management Simulations, Inc	http://www.capsim.com
Glo-Bus by GLO−BUS Software, Inc.	http://www.glo-bus.com
The Global Business Game by Innovative Learning Solutions	http://onlinegbg.com/
LINKS Enterprise Management Simulation and Supply Chain Management Simulation by Randall G Chapman	http://www.links-simulations.com
Marketplace, a family of integrative simulations, by Innovative Learning Solutions, Inc.	http://marketplace-simulation.com/
Mike's Bikes-Advanced by SmartSims, Inc.	http://www.smartsims.com/simulations/mikes bikes-advanced
Topsim-General Management simulation by TATA Interactive Systems	http://www.tatainteractive.com/topsim.html

AACSB has specified a number of desired learning outcomes for undergraduate and graduate programs in its *Eligibility Procedures and Accreditation Standards for Business Accreditation* (2011) and *AACSB Assurance of Learning Standards: An Interpretation* (2007). EQUIS has proposed similar outcomes in its *EQUIS' European Quality Improvement System* (January 2012) and in the *Guidelines &* *Position Papers: Supporting Materials for the EQUIS and EPAS Accreditation Systems* (January 2011). After carefully reviewing these sources and the available LSIBS, we have identified several learning goals to which LSIBS can significantly contribute at the undergraduate and graduate levels. These goals and the manner in which LSIBS can contribute to them are summarized in Table 2. [2]

Table 2   Learning Goals to Which LSIBS Can Contribute

AACSB Learning Goal	Means By Which The Goal Is Accomplished
Creation of Value (*AACSB Standards*, p. 72).	LSIBS require students to determine how to create and deliver value to customers via managing the entire value chain, including most or all of the following activities: marketing, procurement, production, human resources, sales, and distribution. Furthermore, the value creation process typically includes origination, management, and application of marketing, operational, and financial information to efficiently manage the process, and ultimately, create wealth for its stockholders. The creation of value is not a single event, but an evolutionary endeavor with unexpected opportunities and threats that require constant adaptation to unfolding events and information.
Management-specific Knowledge and Skills (*AACSB Standards*, p.71). (*EQUIS Standards*, p. 19)	Students apply their functional knowledge over multiple periods. At the outset, they form a business and determine organizational structure and team leadership. Students also analyze the market intelligence, operational information, and financial data with the goal of developing a business strategy. As the simulation progresses, students may need to 1) examine product design issues to meet their target customers' needs, 2) build or expand infrastructure, such as supply and distribution channels, 3) perform cost-benefit, cost-volume-profit, and risk-reward analyses in concert with their goals and strategy, 4) consider multi-cultural, societal, jurisdictional and international legal issues, and 5) revise, refine, and adjust their strategy and tactical decisions in response to their company's evolving SWOT.

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[2] Due to the frequent references to the AACSB and EQUIS assessment documentation, we will use a short-hand approach to identifying the relevant documents. AACSB's *Eligibility Procedures and Accreditation Standards for Business Accreditation* (2011) will be referred to as *AACSB Standards* and the *AACSB Assurance of Learning Standards: An Interpretation* (2007) will be referred to as *AACSB Interpretation*. Similarly, the *EQUIS' European Quality Improvement System: EQUIS Standards and Criteria* (January 2012) will be referred to as *EQUIS Standards* and in the *Guidelines & Position Papers: Supporting Materials for the EQUIS and EPAS Accreditation Systems* (January 2011) as *EQUIS Guidelines*.

Analytical Skills (*AACSB Standards*, p.72) (*EQUIS Standards*, p.19)	The data provided by most LSIBS is rich and complex. Students are challenged to properly prepare market research, profitability, cost-benefit, capital structure, HR, and operational analyses in a systematic and disciplined manner or face the prospect of making erroneous or less-than-optimal decisions. The data affords students the ability to use spreadsheet tools, graphical analysis tools, statistical packages, and management-science techniques to analyze their data.
Financial Theories, Analysis, Reporting and Markets (*AACSB Standards*, p 71)	Students are often required to apply various financial theories as they contemplate the firm's value, their investment options, capital structure, and risk. Certain simulations incorporate exchange rates, hedging opportunities, and financial markets to which theoretical considerations and calculations can be applied. All deal with financial reporting and analysis which are key inputs to SWOT analyses and often provide impetus for change in strategy and tactics. Students must understand that any venture has risks, but that those risks can be managed. "The numbers will seldom identify *the* optimal choice, but they will often eliminate many bad choices."
Use of Information Technology (*AACSB Standards*, p. 71) (*EQUIS Standards*, p. 58-59)	Students are expected to use computer and information technology within LSIBS for problem-solving and to perform functions commonly seen in managing businesses and other organizations. For web-based LSIBS, students can team in cyberspace to prepare them for the virtual firm. Furthermore, students are embracing social media to communicate and work together.
Ethical Understanding and Reasoning (*AACSB Standards*, p. 71) (*EQUIS Standards*, p. 25)	LSIBS tend to elicit the best and worst in some individuals and teams because their choices have real financial impact on the participants. Ethical dilemmas may arise in advertising, intelligence networks, and strategic partnerships with competitors.
Teamwork Skills and Collaborative Behaviors (*AACSB Standards*, pp. 56, 57) (*EQUIS Standards*, p. 19)	LSIBS include many complex activities, requiring the division of responsibility, development of functional expertise and collaboration to be successful. Also, the teams face considerable stress because 1) teams can fail, 2) everything is interconnected, and 3) the market is dynamic as competitors adapt to each other's tactics. These factors force team members to deal with each other, preferably on a professional basis. They need to work to find the decision balance that will yield the highest performance. They frequently have to explain how a decision in someone else's area will affect performance in their area. They must listen to business arguments and respond in kind as everyone attempts to resolve the many issues facing the firm. The extensive discussion, debate, and sharing contribute to teamwork and collaboration.
Successful Performance in a Complex Environment (*AACSB Standards*, pp. 58-59) (*EQUIS Standards,* p. 26)	LSIBS require complex and comprehensive decision-making supported by appropriate business analyses. Students must apply their skills while recognizing that any action plan has certain benefits, shortcomings, and risks. Due to a continuing scarcity of

	resources (faced by all businesses), students must choose courses of action that they have analyzed and judged likely to be most effective; such decisions inherently involve trade-offs. In addition, market, competitive, operational, and financial conditions unfold over time, causing problems and opportunities that cannot be fully anticipated. Continuous skillful adjustment is required to be successful. Inherently, much ambiguity, uncertainty, and anxiety occurs.
Problem Solving (*AACSB Standards*, p. 4) (*EQUIS Standards*, p. 19)	LSIBS help develop critical thinking skills so that graduates can better address new business problems in any of the business disciplines. Each decision period brings about new challenges and opportunities, many caused by competitor moves and innovation, some caused by their own misjudgments. Repeatedly, students must analyze each aspect of the business to maximize value. They must also innovate, develop operational fixes, and formulate effective competitive responses to improve performance in later periods.
Strategic Management and Decision making in an Integrative Environment (*AACSB Standards*, p. 70) (*EQUIS Standards*, p. 18)	Strategic decision-making and integration are hallmarks of LSIBS. As Stephen et al's (2002) concluded, LSIBS can develop management skills of students by giving them an integrated perspective of the entire business operation. Furthermore, students learn that strategy formulation is insufficient; instead, the business graduate must skillfully execute that strategy, adapting to unforeseen problems and opportunities. In other words, the student must execute a consistent, coherent, and integrated set of business decisions over time, using all the management tools to keep the firm on course or to change course as necessitated by unfolding situations.
Perseverance (*AACSB Standards*, p. 58)	Perseverance is essential to LSIBS. Success is not accomplished easily or quickly. Skillful adjustment is constantly required to remain on course and to get ahead. First, students must track customer satisfaction and competitive moves while continuously investing in new product development, quality, and distribution channels. Second, competitors become increasingly aggressive as they learn how to succeed in the market and, in particular, how to attack a firm's weaknesses. Third, investors are challenging as they coldly seek the maximum return on their investment; they never seem to be satisfied with yesterday's accomplishment. Fourth, many tactical decisions must be mastered and mistakes can be made as individuals make decisions without considering the impact on other areas of the firm. Fifth, knowing how a decision will precisely play out is impossible as the students' knowledge of the market is imperfect and competitors can make unexpected decisions. Last, cash is always a constraint forcing tradeoffs and suboptimal decisions, which can often create new challenges later.

ACTIVITIES TO ENHANCE THE SIMULATION EXPERIENCE

As highlighted above, LSIBS provide an environment within which many of the learning experiences desired by a business school and accrediting agencies can naturally occur. LSIBS also provide a platform upon which several activities and assessment tools can be overlaid, adding to the learning achievements and contributing to a comprehensive, perhaps even a 360°, learning assessment. These tools were developed in conjunction with the *Marketplace*$^®$ simulation but can be applied to most LSIBS. Our goal in reviewing these activities and assessments is to help educators see how the simulation experience can be enhanced to greatly expand its role in achieving a school's learning goals. To help the reader envision the totality of the learning and assessment experience, we have created a timeline depicting the typical progression through a simulation experience. Within this timeline, we have overlaid the activities and assessments that can be used to enhance the value of a simulation. See Figure 1.

Figure 1   Expansion of Simulation Pedagogy to Achieve AACS Learning Goals and a 360° Assessment of Learning

Time Line (periods)	P1	P2	P3	P4	P5	P6	P7	P8	P9
Typical Life Cycle of Large Scale Simulations	**Startup phase** Organize management team and learn to work together. Learn the business and formulate initial strategy. Test the market and operations. Conduct SWOT using management tools. Skillfully adjust strategy and tactics				**Transition phase** Conduct comprehensive SWOT. Consolidate strategy to accelerate growth and profitability	**Growth phase** Continually assess strategy and tactics using tools of management. Skillfully adjust in response to assessment plus unforseen probems & opportunities			**Accountability phase** Prepare & present report reflecting on accomplishments and future
Activities Overlaid On Integrative Simulation to Enhance Learning									
Deliverables	Executive Briefing with Business Coach	Executive Briefing with Business Coach	Executive Briefing with Business Coach	Executive Briefing with Business Coach	Comprehensive business plan with tactical plan and pro forma financial statements Present plan to outside investors who review plan, ask tough questions, and negotiate equity investment		Executive Briefing with Business Coach	Executive Briefing with Business Coach	Stockholder report to board Present to original investors who ask tough questions regarding plan execution & ROI
Leadership Rotation	1st President	2nd President			3rd President	4th President			5th President
Assessments Overlaid On Integrative Simulation to Enhance Learning and Achieve 360° on Learning									
Game Performance (group)			Balanced Scorecard		Balanced Scorecard	Balanced Scorecard	Balanced Scorecard	Balanced Scorecard	Cumulative Balanced Scorecard
Ownership of BS (individual)			2 metrics		2 metrics	2 metrics	2 metrics	2 metrics	Cumulative BS 2 metrics
Use of Rubrics	Briefing (individual)	Briefing (individual)	Briefing (individual)	Briefing (individual)	Business plan (group)		Briefing (individual)	Briefing (individual)	Report to Board (group)
Peer Feedback (individual)				1sr year Peer Evaluation - Teamwork - Interpersonal skills - Work contribution - Detrations from team		Business Plan Peer Eval - Teamwork - Interpersonal skills - Work contribution - Detrations from team			2nd Year Peer Evaluation - Work contribution Leadership Evaluation - Behaviors - Traits - Ranking
Objective (individual)						Customized, online, assessment of learning			

As shown in the chart, a Startup Phase usually occurs during which students organize themselves and learn the rules for the simulation. As students refine their understanding of the business, many will develop a comprehensive strategy to carry them through the end of the exercise. We call this second phase, the Transition Phase. The third phase, Growth, usually arrives as the teams deploy their strategy and make skillful

adjustments responding to unfolding market and competitive conditions. Finally, most simulations include an Accounting Phase during which student teams report on the effectiveness of their strategy and tactics. The timing of these phases will depend upon the simulation selected, but they occur in most LSIBS.

Importantly, this natural progression allows a business school to overlay a number of activities designed to enhance a simulation's value. At Tennessee, the following features were added to the simulation learning experience for both undergraduate and MBA programs: executive briefings, a formal business plan, a report to the Board, and rotation of the team's leadership. West Virginia utilizes each of these activities with the exception of leadership rotation which is used in the Masters of Professional Accountancy but not the Executive MBA program. These activities also created opportunities to capture assessment information. To that end, three rubrics, a series of peer and leadership evaluations, an objective test, and a performance scorecard were developed for assessment as well as student evaluation and feedback.

Table 3   Contribution of Value-added Assignments and Assessments to Learning Goals AAC

Contributions to Learning	Executive Briefings	Business Plan	Stockholder Report	Rotation of Leadership	Peer and Leadership Evaluation	Balanced Scorecard	Ownership of Balanced Scorecard	Customized Online Learning Assessment
Instructor Interaction and Feedback (*AACSB Standards*, pp.73, 76)	X	X	X		X			X
Student Involvement/ Engagement (*AACSB Standards*, pp. 56, 57)	X	X	X	X	X			
Reflective Thinking (*AACSB Standards*, p. 71) (*EQUIS Standards*, p. 19)	X	X	X					X
Analytical Skills (*AACSB Standards*, p. 71) (*EQUIS Standards*, p. 19)	X	X	X					
Financial Analysis/ Reporting (*AACSB Standards*, p 70, 71)	X	X	X					X
Integration (*AACSB Standards*, pp. 70, 74) (*EQUIS Standards*, p.18)	X	X	X			X		X
Knowledge Application (*AACSB Standards*, pp. 54, 74) (*EQUIS Standards*, pp. 15, 19)	X	X	X			X	X	X
Communication Skills (*AACSB Standards*, pp. 62, 71) (*EQUIS Standards*, p. 19)	X	X	X	X				
Conceptual Reasoning (*AACSB Standards*, p 4) (*EQUIS Standards*, p. 19)	X	X	X					
Leadership Development (*AACSB Standards*, p. 74) (*EQUIS Standards*, pp. 19, 26)	X			X	X			
Teamwork and Collaborative Behavior (*AACSB Standards*, p. 68) *EQUIS Standards*, p. 19)				X	X	X		
Value Creation (*AACSB Standards*, pp. 70, 72)						X		
Management-specific Knowledge and Skills (*AACSB Standards*, pp. 62, 72, 74) (*EQUIS Standards*, p. 19)	X					X	X	X

In light of all of these activities and assessments, the role of the instructor can change. For the executive briefings, the instructor can serve as the chairperson of theboard. When key concepts, principles, or ways of thinking are not well understood, the professor can provide mini-lectures or chalk talks, serving as both mentor and business coach. As the students prepare for their business-plan presentation and final report, the instructor can serve as a coach, helping the students to focus on key issues and how to professionally tell their story. When evaluating deliverables, the instructor can provide constructive feedback. Finally, the instructor can help teams frame the problem so that they understand how to properly think about their choices, and realize that they have parallels in the real world. Considering these activities and roles, the instructor's official title can be changed to Business Coach, whose primary goal is to monitor and develop the business capabilities of each student and team.

In the following sections, we will review these activities and assessment tools. Each one provides opportunities to contribute to the learning goals typically sought by both undergraduate and graduate business programs. A list of relevant goals is presented in Table 3 along with an indication of which activity and tool contribute to each goal. A more comprehensive explanation is available from the authors.

To further illustrate how the assessment tools can be linked to specific learning goals, the discussion will also include a review of the learning goals at Tennessee and how the College's Learning and Assessment Committee used the assessment data to make recommendations for curriculum improvement. This information is summarized in Table 4.

Table 4   Closing the Loop on the University of Tennessee's Learning Goals

Goal	How Measured	Conclusion	Actions to be Taken
Strategic Leadership: Students will develop an understanding of how a manager selects, evaluates, and implements strategies to position an organization in its environment and will be able to provide recommended strategies and actions for complex business situations.	Executive Briefing Rubric Business Plan Rubric Report to Board Rubric	Observations: a large portion of student body performed well, and with coaching and continuous emphasis on the goal by Coaches, there was good progression throughout semester.	No further action is required beyond continuous monitoring.
Business Communication Skills: Each student is able to communicate in oral and written form at an acceptable level for business professionals.	Business Plan Rubric Final Report Rubric	With feedback and repetition, most students attain good performance. However, too many students have difficulty with the professional delivery and mechanics of their presentations.	- Work with communication course faculty to augment training (experience) in how to make a professional presentation. - Within LSIBS course, have students submit materials in advance for review; encourage trial presentations with Coaches. - Recommend the use of rubrics in other core courses to standardize the evaluation process and help students understand the evaluation metrics as they prepare their work.
Integrated Value Chain Management: Students will develop a comprehensive understanding of how to manage the integrated value chain as well as how	Cumulative Balanced Scorecard (Q5, Q6, Q7, Q8)	- Observation: 80% of undergraduates perform satisfactorily or better, but 20% fail or struggle - Weak teams are not able to coordinate activities across functions (integrate) and manage resources in a dynamic	- In finance/accounting, add or reinforce content dealing with such topics as resource management, activity based costing, and cost/benefit analysis.

		situation. They have difficulty drilling down into the root causes of their performance and understanding how to fix their problems. - All students need more training in the dynamic management of business strategies, especially management by the numbers. Concomitantly, they need help with how to think through their decisions.	- Within the LSIBS, reduce the number of teams from 5 to 4 so that Business Coaches have more time to delve into and work on how students make tactical choices to pursue strategic objectives and use business metrics to discover areas to improve. - For reinforcement and repetition, expand the emphasis and measurement of this goal within the capstone course, possibly adding another simulation.
business functions interact to affect the firm's performance.			
Business Decision Making in a Team Context: Each student recognizes the need to include diverse perspectives in the decision making process and is able to operate effectively in a team context.	Peer and Leadership Evaluations	Data suggests that the vast majority of individuals work well on a team and are respectful of others with diverse backgrounds	No further action is required beyond continuous monitoring.
Using Business Metrics to Assess Performance: Students will be able to access data, calculate performance measures, and evaluate business entities and business processes.	Customized Objective Learning Assessment (COLA)	- Observations: Undergraduates perform as well as MBA students in marketing, manufacturing, and sales channels but are not as strong in finance and accounting. - The core courses contain substantial technical information that is a challenge to retain. The courses emphasize the fundamentals and not their application. There is one less accounting and finance course in the core compared to peer-schools.	- Initiate assessment activities in the accounting and finance core in order to correct weaknesses before students move on. - Emphasize key learning points from accounting at start of the core finance course to reinforce and transition the accounting content into finance. - Emphasize the practical use of accounting/finance information in the LSIBS course and in the capstone strategy course. - Add online tutorials and exercises to give students more hands-on practice in computing, understanding, interpreting and applying accounting and finance metrics. - Place more emphasis on analytics in marketing courses.

Executive Briefings

Just before the teams complete their work for each decision period or quarter, they conduct an Executive Briefing with a Business Coach, as portrayed in the first row of the value- added activities in Figure 1. The Coach acts in a capacity similar to that of the chairperson of the board and tends to play the role of devil's advocate. During these briefings, the teams review their 1) performance during the prior quarter, 2) SWOT analysis, 3) strategy for the current quarter and going forward, 4) new or revised tactical decisions, and 5) pro forma financial projections for the current quarter.

The Executive Briefing provides an opportunity to monitor the work and thought processes of each person and team participating in the simulation. It also provides opportunities for the instructor to coach students in a meaningful context at a time when students are receptive to this coaching. As such, these briefings provide substantial opportunity for student/faculty interaction as desired by many schools and accrediting bodies. See Standard 9 in *AACSB Standards*, p. 39 for example.

The Business Coach's role during these meetings is to challenge the students' thinking and analysis by looking for inconsistencies and

holes in logic, incompatibilities across functions, and various other problems and/or opportunities that the students might have overlooked. The Coach is instructed never to indicate the right decision to make, but to ensure that students have considered the relevant issues, options and tradeoffs related to their strategic and tactical decisions. If students do not understand a certain point, the Coach gives a mini-lecture explaining the relevant issues and options.

Ultimately, the Business Coach should help teams frame the problem so that they understand how to properly think about their choices, while emphasizing that the choices are still the team's to make and the outcomes are the team's responsibility. Maintaining the perception of a fair playing field is critical to the integrity of both the simulation and the instructor.

The briefing simulates staff meetings with supervisors and senior managers to train students in professional meeting preparation and management (such as setting agendas, keeping to the schedule, and transitioning speakers), thus preparing students for their professional future.

Comprehensive Business Plan

At the midpoint of the exercise (noted under the value-added activities in Figure 1), the teams can be asked to prepare a Business Plan and present it to a group of independent judges, who may serve, depending upon the simulation setup, as venture capitalists, senior executives from a parent company, or the board of directors. The judges can be drawn from the business community, Ph.D. programs, and/or faculty. For this comprehensive and complex assignment, the students must develop a formal strategy and think through the tactical details and cash flow requirements to execute it, including all the linkages.

Regarding the presentation itself, the team is expected to be "professional" by using an assortment of visual aids. Moreover, the details

of the market analyses, strategy, tactical plans, and pro forma financial statements must be carefully explained in appropriate handouts. Finally, the students are expected to defend their plan as they respond to an assortment of far-ranging questions from "experts" in different business fields. When using a new venture scenario, the student teams participate in a Venture Capital (VC) Fair and also negotiate an equity investment in their firms.

The preparation, delivery, and defense of the business plan are keys to attaining several important learning goals as highlighted in Table 3. In terms of its business-world counterpart, the activity simulates a budget-request situation wherein a business team would request to start or expand a project with supervisors or senior managers.

Stockholder Report

At the end of the exercise, there is frequently some kind of final accounting of the team's performance. See the last column under value-added activities in Figure 1. Most importantly, there is opportunity to invite back outside evaluators to serve as key investors, the Board of Directors, or senior executives from a parent company. The stage setting may be the first shareholders' meeting, a Board meeting, or a meeting with the "Top Brass." Importantly, teams must look these evaluators in the eye and provide an accounting of their actions and performance in the periods since the plan was initially presented. Specifically, the teams are asked to 1) recap their business plan, 2) review their financial, market, operational and human resources performance during the period since the business plan presentation, 3) assess their business strategy and performance, and 4) evaluate their ability to compete in the future.

As part of their assessment of their business strategy and performance, the teams need to 1) compare their actions taken against the business plan, 2) discuss any departures from the business plan and their justification, 3) review significant events that affected the company and/or market, and 4) explain why

they did or did not achieve their goals. The report can be concluded with a focus on reflective learning. The students can be asked how they benefited from participating in the simulation and if any lessons were learned that could be taken into the business world.

In terms of accountability, the outside evaluators are eager to discover their return on investment and why the plan went well or badly. They can ask far-ranging questions about performance, strategy, tactics, competition, and the business logic behind all of these issues. The learning goals that are relevant are identified in Table 3.

Rotation of Leadership

One of the goals of most business schools and accrediting bodies is to develop the capacity to lead in organizational situations (*AACSB Standards*, p 74 and *EQUIS Standards*, p. 19). In the normal course of team-based projects, natural leaders tend to emerge and take a dominant role in managing the work. Without intervention, other team members are left in a follower role. In developing leadership and teamwork skills, everyone needs to obtain experience in being both a leader and a supporter (follower). To achieve this objective, the role of leadership can be rotated throughout the exercise. Note the last row within the value-added activities in Figure 1.

With almost any LSIBS, the president's position can be rotated among the team members as the company goes through each phase. The first person can organize the formation phase of the business (Period 1), including 1) the selection of team members, 2) deliberations regarding team norms, decision-making process and roles, and 3) the formulation of the team's initial business strategy (Period 2). The second person can organize the test market phase (Periods 3 and 4). The major focus of this phase is the implementation and refinement of the firm's initial strategy. The third leader can oversee the preparation of the business plan and its

presentation to the outside investors (Period 5). The fourth can implement the business plan (Periods 6 to 8). The fifth can organize the final presentation to the Board of Directors (Period 9). If there are fewer team members, some of these responsibilities can be merged. The rotation of leadership can contribute to several assurance of learning goals as highlighted in Table 3.

SIMULATION ASSESSMENT TOOLS FOR ASSURANCE OF LEARNING

While LSIBS and the value-added activities described above can contribute to a wide variety of learning goals, the work is not finished. An effective quality control process requires an assessment or evaluation of how well the desired outcomes have been achieved. AACSB asks, "How do we demonstrate that we are accomplishing our learning goals (*AACSB Standards*, p. 64)?" And, EQUIS asks, "What methods does the School use for tracking progress and completion of individual objectives (*EQUIS Standards*, p. 13)?"

There are many types of assessment tools. See *EQUIS Standards*, pp. 17 – 24. Course-embedded assessments can be particularly attractive for AOL. Normally, assessments are included to insure that the requirements and learning objectives of that course have been met. To this end, they are useful in marking or assigning grades. If properly designed, they can also help students understand their shortcomings and how to improve. With advance collaboration with program directors, they can also be designed to evaluate how well the learning outcomes of a curriculum have been achieved. Importantly, AACSB has deemed them acceptable for accreditation purposes (*AACSB Standards*, p. 65, *Interpretation*, p. 9). Although not explicitly stated, it would appear they are acceptable to EQUIS as well (*EQUIS Standards*, pp. 17 – 24).

Given that course-embedded assessments are viable, educators can use LSIBS and the

courses in which they are conducted as platforms for 1) the delivery of curriculum-relevant learning, 2) the assessment of learning associated with that course, and 3) the assessment of learning related to the broader curriculum. Towards these ends, a number of course-embedded assessment tools have been developed and tested for LSIBS. These assessments are collectively portrayed in the bottom half of the timeline within Figure 1.

In general, assessment methods fall into two categories: team- and individual-based tools. Team-based assessments are useful for overall curriculum outcomes. However, they are not sufficient for assessing individual student outcomes (*Interpretation*, p. 15). Therefore, separate tools for the team and the individual were created. They include the following team assessment tools: 1) a rubric to evaluate the Business Plan that teams present to outside evaluators midway through the exercise; 2) a rubric to evaluate the Stockholders' Report that teams present to the same outside investors at the end of the exercise; and 3) a balanced scorecard to evaluate a team's performance overall and within each business function.

Individual student assessment tools include: 1) a rubric to evaluate each student's business acumen as evidenced during weekly Executive Briefings with the instructor; 2) student ownership of specific performance criteria within the performance scorecard; 3) a peer evaluation assessing each student's teamwork and interpersonal skills; 3) a leadership evaluation providing feedback to the student regarding his/her leadership traits and behaviors exhibited during the exercise; and 4) an objective test evaluating each student's knowledge of business.

Note that individual level assessments are generally more beneficial for student grading but can be used to identify systematic deficiencies where an unexpected number of students appear to need additional development regarding particular skills or abilities. Although not favored by some accrediting

bodies, team-based assessments can provide very useful information at the course and curriculum level, as will be shown.

In this section, we describe the methods and indicators for tracking progress and completion of individual objectives. Collectively, they represent a formal mechanism for internal quality assurance sought by AACSB (*AACSB Standards*) and EQUIS (*EQUIS Standards*). We discuss how each assessment tool captures a different aspect of learning. We also note those situations in which the assessment tool can contribute to learning goals in its own right. See Table 3. Finally, we report the data obtained by each assessment and illustrate how it can be used as feedback to faculty, students, and administrators.

Rubrics

What is a rubric? According to Andrade (2002), a rubric is a scoring tool that lists the criteria for a piece of work or "what counts." Typically, a rubric lists items students must include to receive a certain score or rating on a particular task or project. Rubrics also specify the performance level required for several levels of quality. Rubrics can help students and teachers define "quality," Finally, rubrics can help students judge and revise their own work before submitting assignments.

The characteristics of effective rubrics have been discussed extensively in the learning literature (Hafner (2003), Mertler (2001), Nitko (2001), and Swan, Shen and Hiltz (2006)). Drawing upon these sources, rubrics were created for the enhanced LSIBS for assessing the following: 1) the executive briefing, 2) the business plan, and 3) the final report. The rubric for the executive briefing focuses on the student's ability to thoughtfully present his/her tactical decisions based on a concise analysis of relevant market, operational, and/or financial data as well as a consideration of how these decisions will impact the firm's overall strategy, other functional areas, costs, revenues, and the firm's future capabilities. We also determine if the student can think on his/her feet and respond to questions and challenges in

Table 5   Executive Briefing Rubric

POINTS	EVALUATION
-5	Does not attend (no valid excuse provided)
No Score	Limited or no participation during the briefing: there is insufficient information to evaluate the student's contribution to the team's decisions or performance. Student was present but did not have an opportunity to speak and share his/her ideas.
1 **Weak**	Terse presentation of conclusions or actions taken; no analysis, data, justification, or integration with the decisions in the other areas of the firm. Student simply listed the decisions in his/her area of responsibility. No rationale was provided for how the decisions were made. Limited responses to questions or was unable to answer questions.
2 **Needs to Improve**	Presented actions taken with occasional reference to market, operational, and financial data to support the decisions; the logic for decisions was only partially developed and/or sometimes weak. Student was comfortable with reviewing the actions taken, but may not be sure of the reasoning behind the decisions. When prompted for further explanation, the student may need to consult other members of the team for help.
3 **Effective**	Decisions were supported by an analysis of market, operational, and/or financial data; a logical argument was presented that supported the courses of action taken. The student was well versed within his/her area of responsibility, demonstrating judgment, analytic skills, and planning but, he/she did not demonstrate a clear understanding of how his/her work affected the other areas of the business and/or its strategy and performance.
4 **Very Effective/ Strong**	Thoughtfully presented actions taken based upon a concise analysis of relevant market, operational and/or financial data as well as a consideration of how these decisions will impact other functional areas, costs, revenues, and the capabilities of the firm in the future. The student presented his/her tactical decisions in light of the overall strategy, including consideration of alternative courses of action, potential outcomes [forethought], integration of other functions, and contingencies. The student was able to think on his/her feet and respond to questions and challenges in a thoughtful, confident manner. He/she had the trust of the team to successfully handle his/her area of responsibility.

a thoughtful, confident manner. The rubric itself is presented in Table 5. As shown, students are evaluated on a four-point score from weak to very effective.
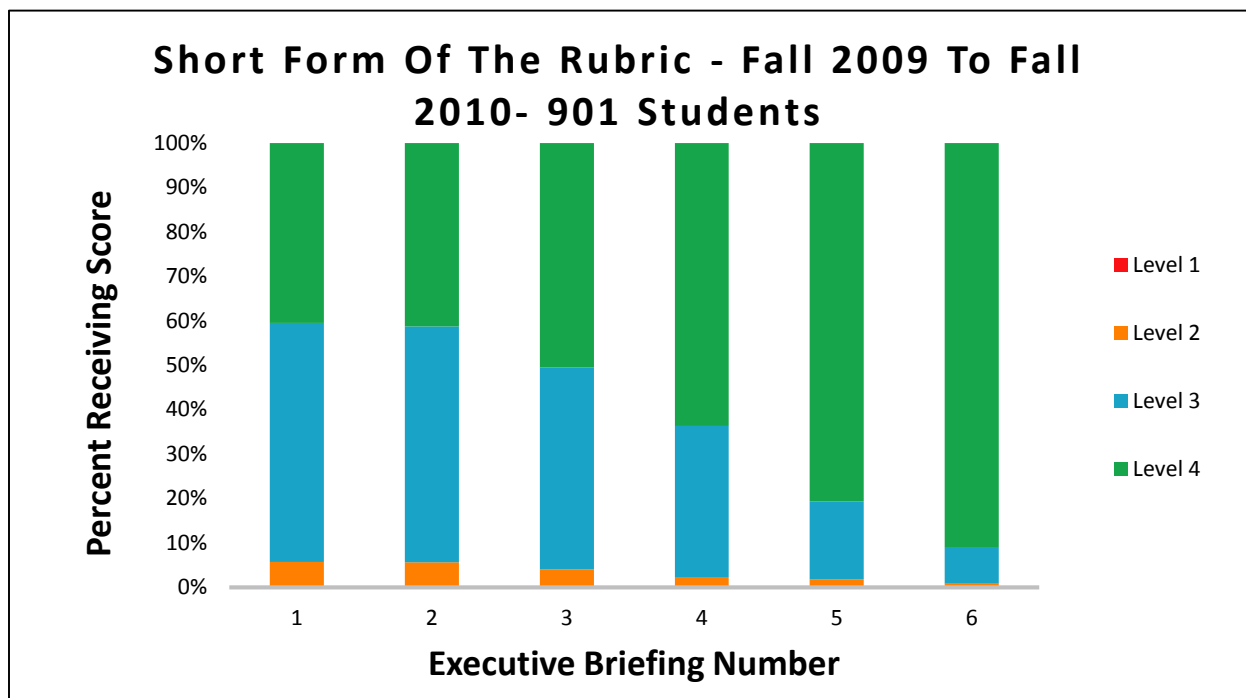
Executive Briefing Rubric

The students are given the rubric in advance and provided with guidance by the Coach in terms of the requirements to achieve a level 3 or a level 4 evaluation. By providing the rubric ahead of time, students can use critical thinking skills to evaluate their own deficiencies going into each briefing Athanassiou, McNett and Harvey 2003). Pintrich (2002) found that students learn best when they are able to use meta-cognitive processes to determine what they do not know in relation to a given task.

To further reinforce this learning, Coaches will frequently provide additional commentary right after a briefing on areas in which each student needs to improve going forward. The grades are promptly communicated to the students for their timely review. Figure 2a contains a summary of the percent of students receiving a score of one, two, three and four over the course of six executive briefings during two semesters at the University of Tennessee.

A total of 901 undergraduate students were evaluated with this rubric. As can be seen from the chart, the majority of students began at level 3, effective, at the outset of the simulation, which suggests that they were well prepared. The percent of very effective ratings grew steadily until the vast majority achieved the highest rating by the end of the exercise.

*Figure 2a Executive Briefing Grade Distribution by Rubric*

From this pattern, it appears that students can develop effective skills when provided with clear instructions at the outset and systematic feedback over time.

We have concluded that the executive briefings provide a systematic and highly informative window into the knowledge, skills and thought processes of students, especially the higher order skills as posited by Bloom et al (1956). To better capture this information, a more comprehensive rubric was tested in the spring and fall 2010 semesters that parses out performance along the dimensions of strength of logic, depth and breadth of understanding,

Figure 2b Executive Briefing Grade Distribution by Rubric
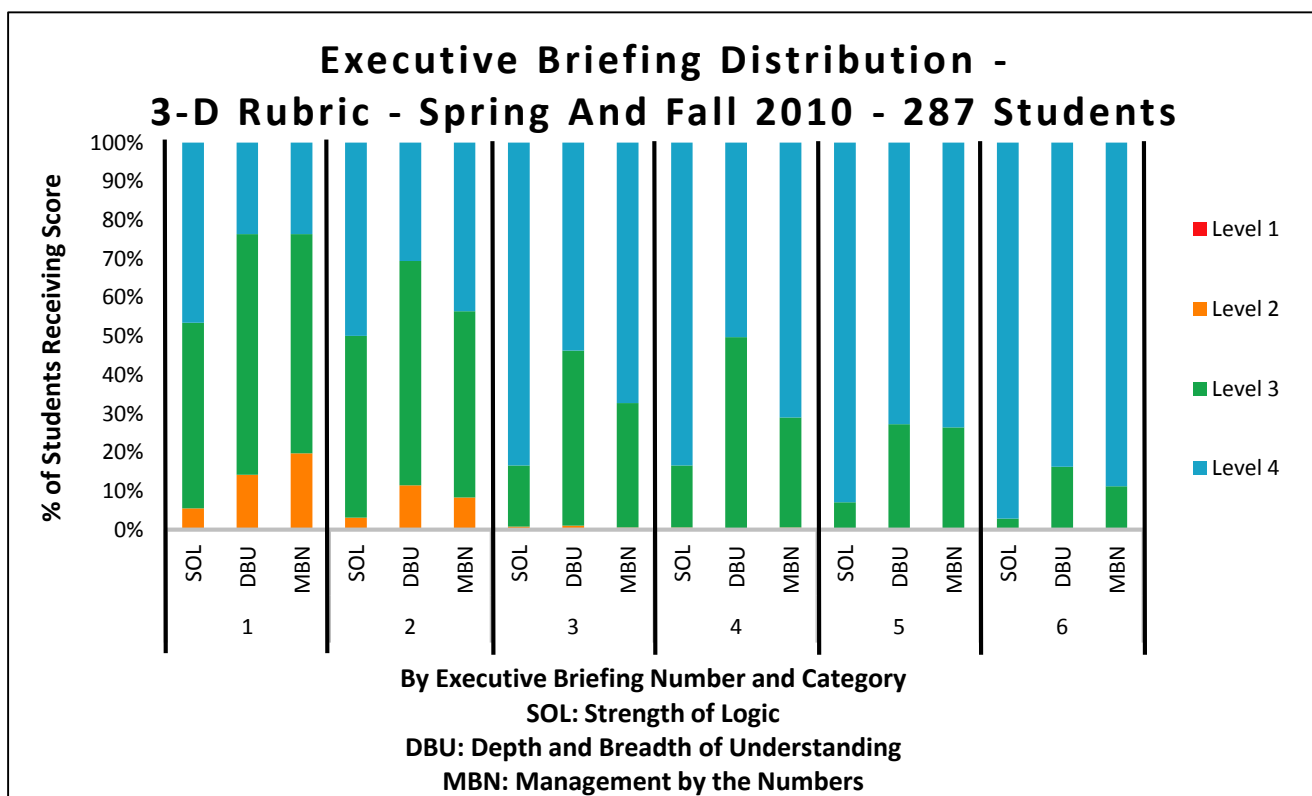
and management by the numbers rather than the blended score that is was previously currently used.

As shown in Figure 2b, there is a similar pattern to the development of the students, but the longer rubric provides more detail for both the students and the administration. Interestingly, the average scores between the short and long form are very close. However, the long form clearly indicated in the early executive briefings that further work on depth of business understanding and management by the numbers was warranted.

Business Plan Rubric

The business-plan rubric contains thirteen dimensions, as shown in Figure 3. The business plan is the single most important component of the course, representing 25% or more of the total grade. In addition to grading, at Tennessee and West Virginia, the quality of the presentation and Q&A has business-like consequences for the students. Strong performers can sell stock to fund growth at a higher price which reduces the number of stock shares issued, which in turn, affects the

students' financial performance (earnings per share) on the performance scorecard (discussed in more detail later in this paper).

To help prepare students for this event, they are given multiple lectures in terms of content, analysis, and delivery. They are also given the rubric in advance so that they fully understand what is required of them. Finally, at Tennessee, they submit a draft of their tactical plan, pro forma statements and business plan presentation to the Coach for feedback prior to the actual presentation. The goal of this pre-work is to help the students be successful in making their pitch for investment capital.

Each outside participant at Tennessee completes the rubric evaluation. These scores are shared in an anonymous fashion with the students for feedback and the Coach seriously considers them in the final grade. However, only the Coach's scoring is used in grading. Figure 3 contains a summary of the percent of student teams receiving a score of one, two, three and four for each metric in the rubric. The data is based upon 206 undergraduate teams that were evaluated over three semesters.

Figure 3   Business Plan Rubric Scores
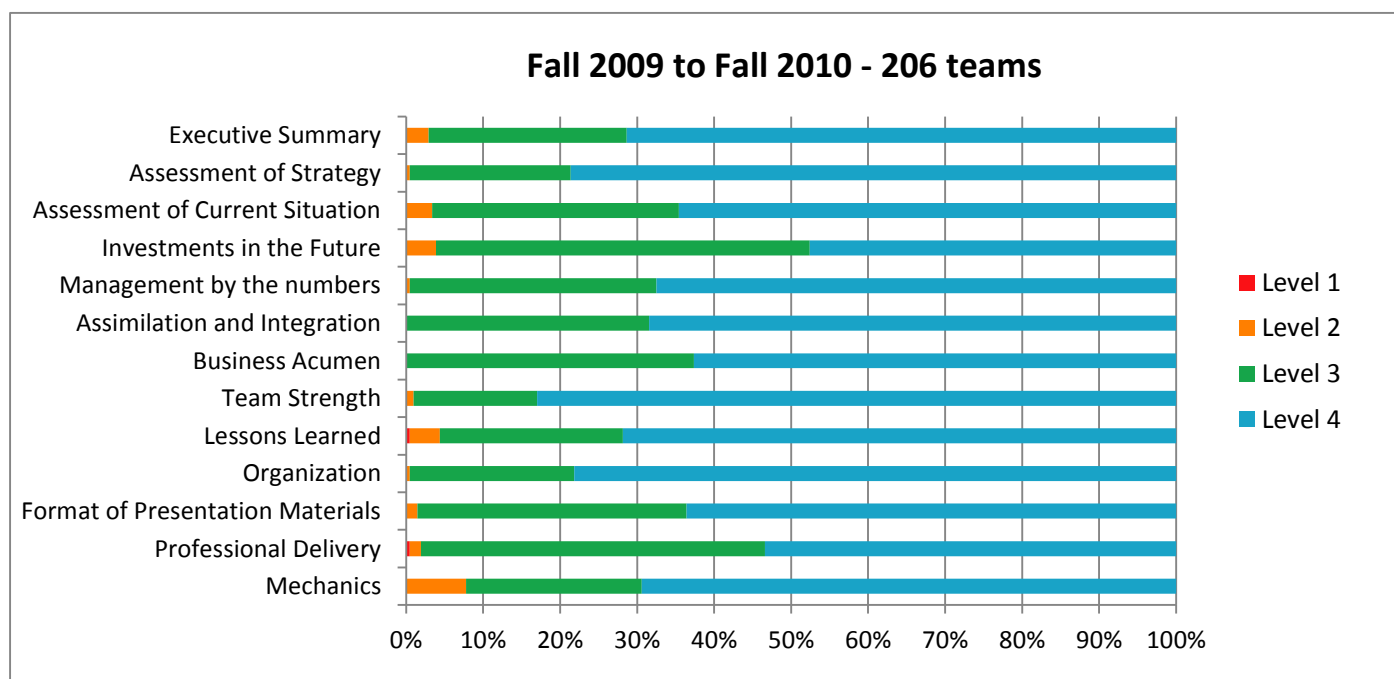
It is noteworthy that the vast majority of ratings are 3s and 4s. These scores reflect the seriousness assigned to the exercise and the extensive preparation given by both the students and their Coach. In terms of specifics, we can see that students do well in the areas of assessment of the current situation, assimilation and integration, team strength, organization, and format of presentation materials. In other words, the students appeared to be adept at the knowledge and analysis aspects of the Bloom taxonomy (Bloom et al 1956). Areas needing the greatest improvement include assessment of risk and return (viewed from the investors' viewpoint), strategic thinking (the synthesis aspect of the Bloom taxonomy), management by the numbers (Bloom's evaluation dimension), and the delivery and mechanics of the presentation. In some ways, deficiencies in these higher order cognitive processes might be expected given that they may be uncommon among junior-level students.

The rubric for the final report contains thirteen dimensions. Figure 4 contains the percent breakdown of the performance scores for each of the metrics. Compared to the Business Plan rubric, there are three unique dimensions that relate to the purpose of the report. On two of these, assessment of strategy and lessons learned, the students did well. They were not judged as well on their investments to prepare the firm for the future.

Figure 4   Report to the Board Rubric Scores
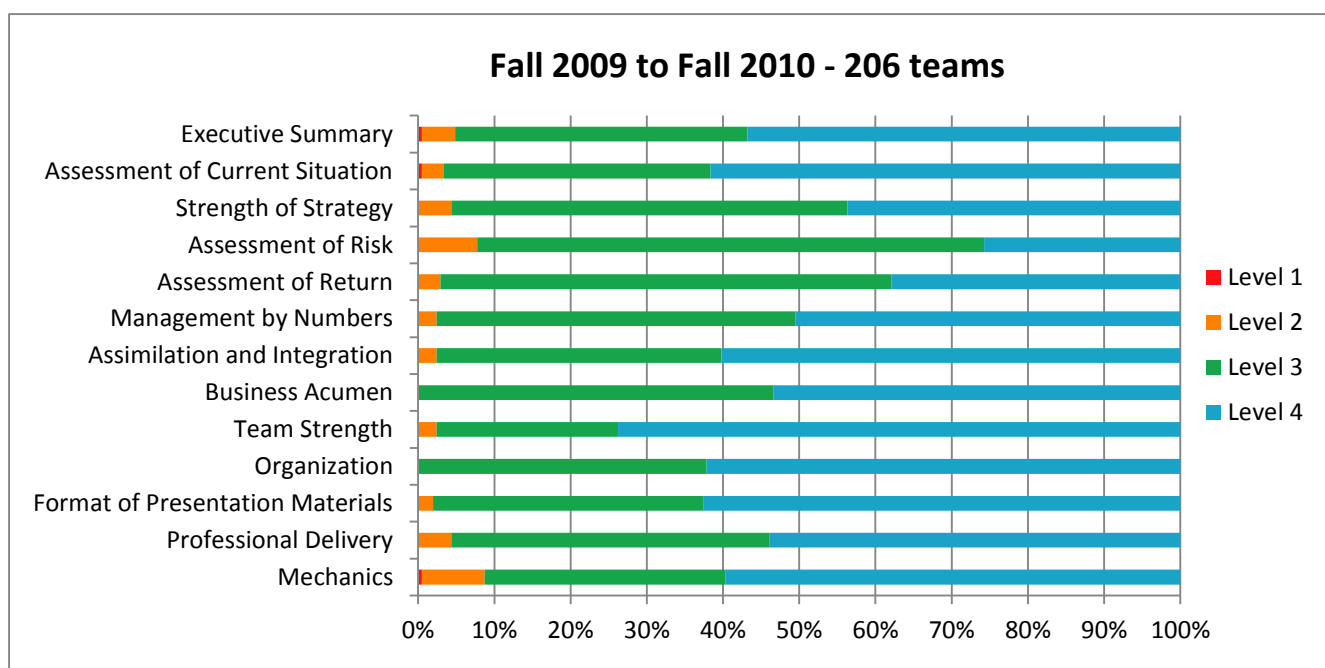
Perhaps the real value of the rubrics lies in the data they provide to assess the learning goals of the college. In the current case, the rubrics were instrumental in evaluating two specific goals at Tennessee, strategic leadership and communication skills. See Table 4.

With respect to strategic leadership, the students showed good progression in their executive briefings over the course of the semester. Early on, there were noteworthy deficiencies in depth and breadth of understanding and management by the numbers but students were able to improve as they gained more experience in managing their business and received feedback from their Coaches.

The metrics to watch in the Business Plan were assessment of current situation, strength of strategy, assessments of risk and return, management by the numbers, assimilation and integration, and business acumen. With all of the preparation and feedback by the Coaches,

the students did reasonably well. However, the investors did not give many high marks for the assessments of risk and return and reported some weakness in strength of strategy and management by the numbers. These findings suggest that the attainment of the strategic leadership goal eluded a fair number of teams at the midpoint of the exercise.

Final Report Rubric

For the Report to the Board, the key metrics were assessments of the current situation and the strategy, investments in the future, management by the numbers, assimilation and integration, and business acumen.

For this retrospective analysis, the students performed satisfactorily. The notable weakness was in their investments in the future, a forward-looking activity. The Report to the Board rubric had a number of metrics in common with the Business Plan rubric. In those metrics common to both, the teams improved in all areas. See Figure 5. In a fashion similar to the executive briefings, the students appeared to exhibit a deeper understanding of the management of their simulated firms by the end of the exercise. This is not to say that all were successful in the management of the firms, but understood the process and what they had done right and wrong and needed to do to improve their performance.

Figure 5 Average Scores on Common Rubric Metrics between the Business Plan (a period 5 activity) and the Report to the Board (a period 9 activity)
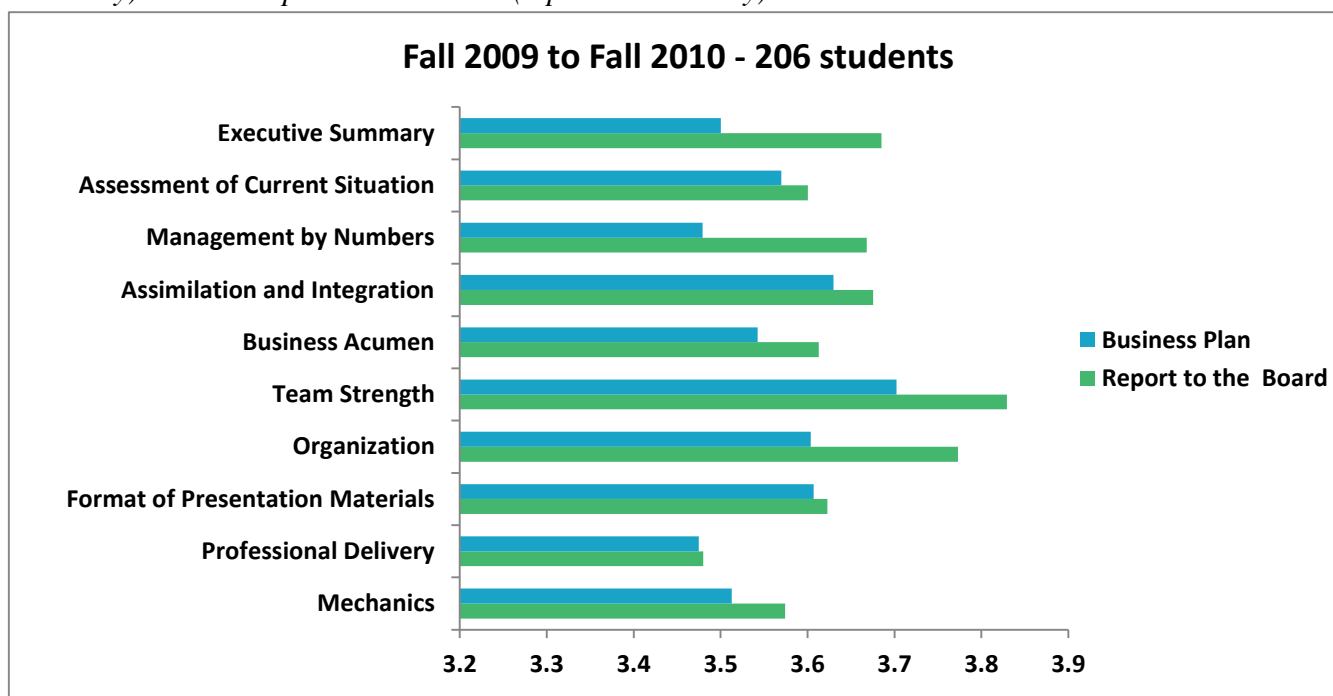
In terms of the overall conclusion, the goal that students should develop an understanding of how a manager selects, evaluates, and implements strategies to position an organization in its environment and be able to provide recommended strategies and actions for complex business situations was largely attained. No adjustments were recommended for the curriculum or the course pedagogy.

Turning to communication skills, the rubric data indicate that most students performed satisfactorily on the business plan and performed better on the report to the board. However, the committee saw weaknesses in the professional delivery and mechanics of the presentation. It was disappointing that there was little improvement in these areas from the first to the second presentation. As a result, the committee recommended additional training

within the College's core communication course and the use of rubrics in other courses requiring formal presentations. Within the LSIBS course, the lead instructor at Tennessee now requires students to submit their presentation materials in advance for written review and encourages the teams to do trial runs with their Coaches before a presentation. These course-related adjustments have already proven helpful.

Conclusions Regarding Rubrics

As we reflect on our experience with rubrics, we have concluded that they help with the assurance of learning in many ways. First, they provide better-defined sets of expectations and requirements for students. As such, they enable the students to prepare and conduct themselves in a more professional fashion. Even when the standards are set very high, the rubric's guidance enables students to rise to the occasion.

Second, in the early stages of rubric development, there is an ongoing need to revise and refine the metrics. Effective rubrics take time, effort and lots of trial and error before they can provide the needed data for reviewing learning goals.

Third, rubrics are easier to execute than detailed written feedback. Once structure and content are well understood, an assessment can be performed quickly. Rubrics are very helpful if an instructor or outside expert is listening to many presentations and has only a short time to do an evaluation between each presentation.

Fourth, rubrics encourage uniform grading across multiple evaluators. If the evaluators come from different disciplines, both inside and outside the university, each will apply standards based upon their experience and training. The systematic format of the rubric tends to reduce unwanted variance based upon the evaluator's background. To further reduce this variance, we recommend a norming session during which each instructor presents his/her marks for each person and team and the

rationale for them. This format is especially helpful when a course contains many sections with many different instructors.

Fifth, rubrics provide clear feedback to the students so they can make skillful adjustments to their future work. With repetitive application of the rubrics for executive briefings and presentations, the students quickly adjust the content and delivery of the information provided.

Sixth, with a large number of students and teams, patterns can be discerned as to what the students understand or are capable of doing. One can quickly see which performance dimensions consistently receive low scores. This information has helped the course coordinators at Tennessee and West Virginia to adjust lectures, readings, and coaching. The data also provides feedback to other instructors and administrators regarding the curriculum that precedes the LSIBS course.

For example, the instructor at West Virginia was able to cause a change in a prerequisite finance course because of feedback from the external venture capitalists. These investors consistently marked his students down because they did not know how to value their firm. When the instructor queried the students, he discovered that they did not understand the techniques for firm valuation. The LSIBS instructor then contacted the finance professor to discuss the problem and found that the finance professor had offered instruction on valuations. Jointly, it was determine that the material was adequate but that the students were not making the connection between the relatively sterile classroom activities in finance and the chaotic real world scenario set out in the LSIBS. Going forward, the finance professor agreed to adjust his approach to ensure that the students would develop their skill set in an environment that embraces the complexities and ambiguities of the real world.

Seventh, collectively, these rubrics facilitate attainment of the objective of requiring that students perform to the standards

set by the school (*AACSB Standards*, p. 58; *EQUIS Standards*, p. 20). They help clarify for both faculty and students those activities and thought processes necessary to be successful in the program and provide an evaluation mechanism allowing the school to document the degree to which these standards have been met.

In the same vein, rubrics allow the school to raise or lower the bar depending upon the program level, ability of the students, and their rate of improvement during a course or throughout a program. The requirements specified at each level can be modified to fit the goals of the school or applied with more or less rigor. Thus, the requirements for a junior level course might be different than a capstone, senior course or an EMBA course. For example, West Virginia's Master of Professional Accounting program uses similar rubrics as Tennessee for the business plan and report to the board, but applies a tough interpretation of the metrics since they are being used to evaluate graduate students.

Performance Scorecard

For some time, businesses have been using a critical tool to help measure performance across a myriad of dimensions and functional areas of the firm. This tool, commonly known as a balanced scorecard (BSC) (Kaplan and Norton 1992), allows managers to take a more holistic view of the business (Atwater, Kannan and Stephens 2008; Dilla and Steinbart 2005), as opposed to optimizing certain areas to the detriment of others.

While a balanced scorecard and similar tools have proven invaluable for managers in the field, they also hold great promise for assessing students engaged in an LSIBS. In fact, most, if not all, LSIBS employ a performance scorecard in some form. Typically, the scorecard is used to evaluate a team's overall performance based upon achievements within each business function. The objective criteria specific to the *Marketplace* simulation include measures of financial performance, market performance,

marketing effectiveness, investments in the future, asset management, manufacturing productivity, creation of wealth, human resource management, and financial risk.

While standardized scorecards are often provided, formulating one's own scorecard is possible. For example, in West Virginia's accounting and executive MBA programs, the instructors place more emphasis on profitability and liquidity. Its scorecard (developed by course instructors) includes measures on profitability, financial conditions, customers' perceptions, productivity and efficiency, and investments in the company's future (e.g., locations, size, R&D).

Regardless of how the performance scorecard is formulated, success in each area requires a solid understanding of how functional decisions affect performance in both related and indirectly related areas. Therefore, the scores provide a good indication of how well the students manage each functional area and the firm as a whole, as suggested by (Stephen, Parente and Brown 2002).

Balanced Scorecard Administration

The BSC is calculated at the start of each new decision period based on the previous period's results. In Figure 1, quarters 3 through quarter 8 are presented. Each team receives both an overall performance score and detailed scores on individual performance criteria. They also receive comparative numbers for the competition to facilitate benchmarking. Delving into the underlying calculations for each metric is possible to discover the root causes of any performance shortfalls.

In addition to the report for the most recent business quarter or period, a cumulative balanced scorecard (CBS) can be derived from each performance metric's moving average for a set of prior periods. The advantage of the CBS is that it averages spikes or dips in performance over time. As a result, a cumulative scorecard is recommended for grading.

Contribution to Learning and Assessment

The BSC contributes to several learning goals, as highlighted in Table 3. Most importantly, the BSC provides an important feedback loop for assurance of learning. Using objective data, students can monitor their performance, delve into the causes of shortfalls and successes, and adjust strategy and tactics accordingly for all aspects of the firm. If they do not understand how to make certain business decisions or how the decision options affect their performance or the other team members' ability to make good decisions, they can seek information sources such as teammates, instructor, help files, and textbooks to fill in the gaps. Through self-monitoring, most students skillfully adjust their knowledge and decision-making over time to improve performance. The instructor can also use the performance scorecard for troubleshooting and teaching.

At Tennessee, the CBS is used as the dominant measure of its learning goal related to Integrated Value Chain Management. The goal is for students to develop a comprehensive understanding of how to manage the integrated value chain and to understand how business functions interact to affect a firm's performance.

Figure 6 contains the distribution of scores for 244 teams on the CBS. The definition of the categories on the y-axis reflects our collective experience with hundreds of teams. While the breakdown and labeling is subjective, it is helpful in identifying which teams have had difficulty and which have had acceptable and even exceptional performance.

On the positive side, 80% of the teams performed satisfactorily or better; however, 20% can be classified as struggling, weak or poor. Further analysis has revealed that their primary problem is that they could not earn a profit over the course of the exercise. This limitation was, in turn, driven by an inability to 1) satisfy customer needs, 2) develop widespread distribution, 3) drive production costs down via economies of scale, lean operations, and quality, 4) manage their financial resources, and ultimately, and 5) execute a successful business strategy.

Figure 6   Distribution of Cumulative Balanced Scorecard Scores for 244 teams
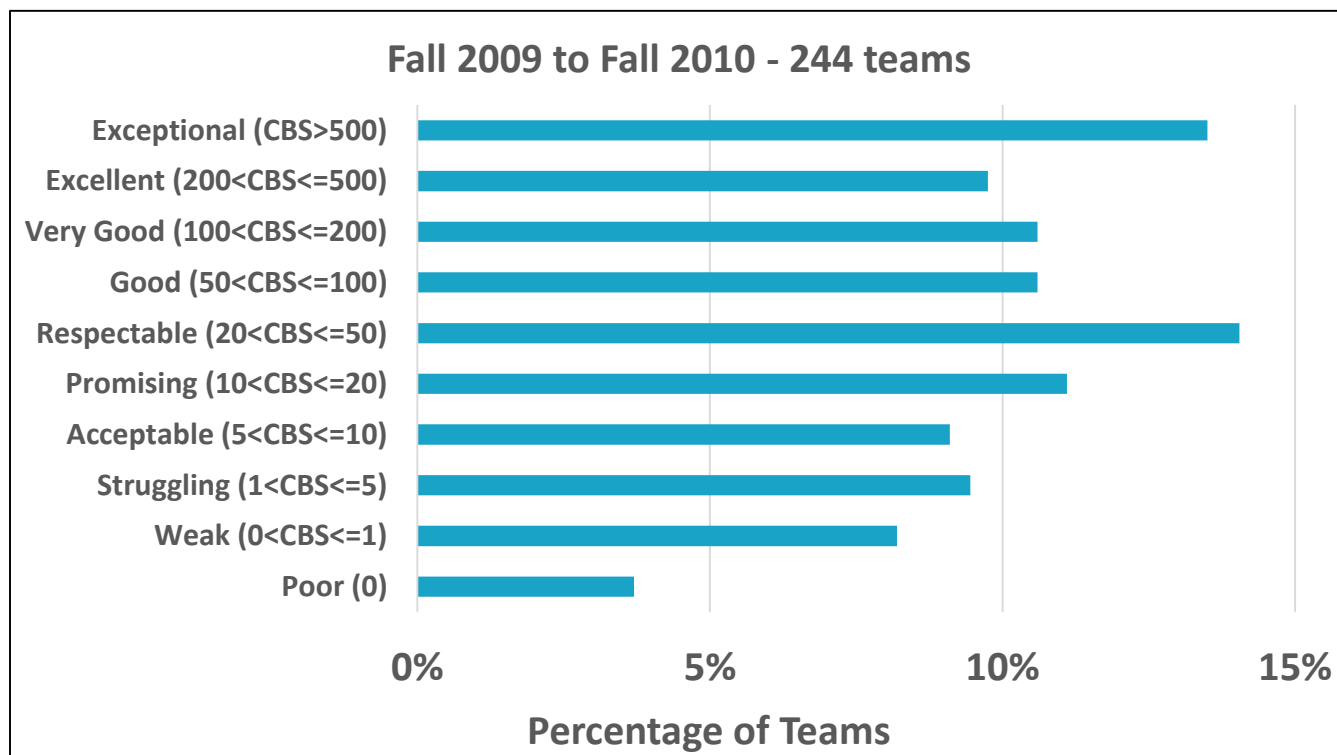
If there is one underlying weakness, it is that these teams do not fully understand cause and effect in the operation of a business. They cannot readily see how individual tactical decisions impact many other operational aspects of the business. They also have difficulty drilling down into the root causes of their problems and understanding how to adjust specific tactics to improve performance. Even though the rubric scores suggest they understand how to manage by the numbers, they find it challenging. It is not unlike a difficult dance routine or football play, understanding how it is to be done is not sufficient; you must be able to actually do it, and that takes practice. We can say that even decent teams have difficulty in this area.

These findings present a fundamental challenge to Tennessee's learning goal. A large proportion of the students need more training in the dynamic management of business strategies, especially management by the numbers. Concomitantly, they need help with how to think through their decisions. To help address these shortcomings, the Tennessee committee has recommended adding or reinforcing content in the accounting and finance core that deals with resource management, activity-based costing, and cost/benefit analysis. Within the LSIBS, the number of teams is to be reduced from 5 to 4 per universe so that Business Coaches will have more time to delve into how students make tactical choices to pursue strategic objectives and use business metrics to discover areas to improve. The resulting understanding should help Coaches decide where further training is required, usually in the form of brief tutorials during the executive briefings. For reinforcement and repetition, the Tennessee committee would like to expand the emphasis and measurement of this goal within the follow up capstone course, including the possible addition of another simulation.

Ownership of the BSC

The performance scorecard is primarily a team-based metric for assessment. AOL also requires individual-level assessment tools. Towards this end, each student can be asked to take ownership of specific metrics that make up the total scorecard. Part of each person's evaluation is then determined by how well the firm does in the selected areas of responsibility. Comparisons can be made among individuals in different companies that have assumed similar responsibilities.

In addition to making students responsible for part of the business, this metric also drives home the issue of the tradeoff between what is good for the individual versus what is good for the firm. For example, the firm might benefit from spending money on R&D while the person responsible for maximizing shareholder wealth might be disadvantaged in the short-term. The tradeoff issue provides fertile ground for a discussion of how to serve multiple stakeholders and the complexity of managing a firm towards diverse long-term goals. In future examinations, we plan to analyze how a student's disciplinary focus, prior coursework, experience, and age affect performance in the areas selected.

Peer Evaluation Assessment

An important goal of all schools and accrediting bodies is to encourage teamwork, interpersonal skills, and collaborative learning. As shown in Table 4, Tennessee has a related goal that each student recognize the need to include diverse perspectives in the decision making process and is able to operate effectively in a team context. In order to determine how well these behaviors are evident in a team-based LSIBS, a peer evaluation assessment tool was created.

The merits of peer evaluations have been extensively discussed in the literature. See for example, Falchikov (1995), Gueldenzoph and May (2002), Cederblom and Lounsbury (1980), Dochy, Segers and Sluijsmans (1999), and Topping (1998). Our focus here is on how a peer-evaluation system can be used as part of the assurance of learning assessment and feedback process with LSIBSs.

With an LSIBS, Tennessee uses three peer evaluations: at the end of the startup phase, after the strategic planning phase, and after the accounting phase. See the fourth row under assessment activities in Figure 1. The workload is approximately equal across these three periods. The timing of the first peer evaluation allows the teams to settle into their roles; discover how to work together; and largely progress through the forming, storming, and norming phases of the team life cycle. The second peer evaluation follows an extremely stressful and intensive work period while the students prepare and deliver their business plan to outside evaluators. Several teams will enter or re-enter the storming phase. The third evaluation focuses on all activities following the business plan, a far less stressful period as students attempt to fine tune their tactics in pursuit of their strategic plan and goals.

In terms of content, the first two peer evaluations focus on the types of behaviors that the school either encourages or discourages. The Tennessee evaluation questionnaire is intended to shape the students' expectations for themselves as they work in teams. For example, a student is asked if another student completes his or her share of the work, is willing to work outside his or her assigned area of responsibility, attempts to resolve disagreements between team members, expresses an opinion honestly even though others disagree, speaks with an unpleasant tone when in disagreement with another team member, and so forth. Overall, Tennessee wants to know: 1) how effective each person was in doing his/her work (seven items); 2) how professional and supportive each person was (6 items); 3) how often each person was proactive in resolving problems, finding new solutions, and helping teammates (7 items); and 4) how often the teammate displayed behaviors disrupting or limiting the team's effectiveness (8 items). The evaluator can also offer comments about the teammate's performance, strengths, and areas for improvement. The third peer evaluation focuses primarily on leadership (discussed below); however, it does include a reduced set of items (six) dealing with work contribution and professionalism which are sufficient for grading. The West Virginia version collects fewer data points to address each area.

The Tennessee experience has been that students tend to be fairly positive about their teammates. Over the course of three semesters (Fall 2009, Spring 2010, Fall 2010), the average scores have been 4.71, 4.71 and 4.74 on a five-point scale for the first, second and third evaluation, respectively. Also, the evaluations for individual students are fairly consistent across the entire exercise with correlations ranging from 0.22 to 0.81. The high peer evaluations may reflect 1) the strong emphasis placed on teamwork throughout the exercise via lectures, exercises and coaching, 2) the student's knowledge that his/her contribution and professionalism will be evaluated by his/her teammates, and/or 3) the student wanting to avoid personal problems and their repercussions.

At Tennessee, added attention is given to outliers at the low end of the performance scale, some requiring a Business Coach's intervention. Over this three-semester time period, approximately 5% of the students continuously underperformed as measured by their peers. Equally concerning, 12% received progressively weaker evaluations over the course of the exercise. Fortunately, 37% percent of the students showed continuous improvement. We find that serious-minded students that are marked down for their underperforming or unhelpful behaviors tend to adjust going forward.

Finally, there is a special interest in the items that might signal problems with diversity.

Tennessee tracks questions that deal with how the students treat each other in terms of respect, fairness, equality, tone of voice, etc. Occasionally, interventions have been necessary to deal with problems. For example, Coaches have scheduled special team meetings to address how members interact, including listening skills, ways to properly challenge an idea, body language and what it can communicate, and so forth. To increase the sensitivity of the class to diversity issues, the LSIBS instructor has devoted a class to showing and discussing the documentary, *A Class Divided* (1985). It is hard to trace how the emphasis on teamwork and interpersonal skills and the efforts to document any potential problem affects what happens between students, but the data suggests that nearly all students are very conscious of being respectful. With the exception of continuous monitoring, the Tennessee committee has concluded that no further action is required.

Leadership Evaluation Assessment

A goal shared by all business schools and accrediting bodies is the development of the leadership skills of our students (*AACSB Standards*, pps. 53, 63 and *EQUIS Standards*, pps. 25 26). As feedback to the students, the third Tennessee Peer Evaluation was primarily focused on leadership. See the last column under assessments in Figure 1. The leadership evaluation instructions noted that leadership can arise on many occasions, not just when a person is assigned the leadership spot. In fact, during these other times, true leadership can shine. Therefore, students at both Tennessee and West Virginia University were asked to reflect on everyone's leadership throughout the exercise. At West Virginia only, the leadership results are used for grading.

The leadership questions were divided into three parts. Part I asked students to indicate how often a teammate engaged in thirteen activities typical of leaders. The goal was to give students feedback on how often their teammates thought they were doing what leaders are often credited for doing. In Part II,

students were given a list of 17 adjectives that leading authors on leadership consider to be traits of good leaders. Students had to judge each other on how well the adjectives described each teammate. Part III asked students to rank order the other members of the team in terms of the leadership that each had demonstrated during the exercise. This forced-ranking indicated how highly a person was regarded as a leader relative to his/her teammates.

The Tennessee results for 1168 undergraduate students over three semesters indicate that the students tend to view each other in a positive light relative to leadership. Although not as positive as the peer evaluations, the scores are positively skewed with the average on the first and second leadership question sets equal to 4.58 and 4.57 respectively on a 5-point scale. The most discerning indicator was the forced-ranking question. Not infrequently, we found that the person a Coach thought was the top leader was not picked by the team members. We surmise that it is easy to focus on those students that are the most articulate during executive briefings and presentations while leaders are not always the most outgoing people.

In its own right, the leadership evaluation contributes to the attainment of AACSB and EQUIS goals as highlighted in Table 3. First and foremost, it signals to the students what is important in leading and supporting a team. By measuring these things, it increases the odds that the students will do them. Second, it provides feedback to the students so they can adjust how they work with others as they go forward in their career. As feedback to the instructor, it provides additional insight into why certain people are considered leaders on the team. As feedback to the Tennessee curriculum managers, trend lines are being established to ascertain how well certain skills, behaviors, and attitudes are reported by the students. This information can help administrators target what to improve or reinforce throughout the curriculum.

Objective Learning Assessment Tool

Business schools require objective assessments of individual students relative to their attainment of the learning goals specified in a school's curriculum. To this end, the authors and the developers of the *Marketplace* simulation developed a Customized Objective Learning Assessment (COLA) tool to test the students' higher order cognitive processing (Krathwohl 2002) including, the ability to: 1) apply business concepts, principles, and tools; 2) comprehend the information and decisions within each functional area; and 3) develop an integrative perspective on business.

Theoretical Background for COLA

The human factor and cognition literature provided a theoretical foundation for COLA, especially Endsley's (1995) work on situational awareness. *Situational Awareness* (SA) is defined as the ability to perceive elements within the environment (level 1), to comprehend the meaning of these elements (level 2), and to project the status of these elements in the future (level 3) (Endsley 1995; 2000).

The concept originated in the aviation industry. The industry wanted a procedure to evaluate a pilot's situational awareness in highly dynamic situations. With Endsley's methodology (1995), flight personnel stepped into an aviation simulation requiring multiple decision-making opportunities. At one or more points, the simulations were frozen and subjects were asked a battery of questions related to the three levels of SA. Their responses were compared to objective truth to arrive at a measure of SA.

Measures of SA have been developed for flying an aircraft, a space shuttle, and going into battle. They measure the trainee's ability to absorb and successfully use information about his/her environment. In all cases, the more that an individual (or a team) is aware of his/her situation, the more likely he/she will have a successful outcome. The same assessment approach can be applied to business. Building off of Endsley's (1995) work, situational awareness in business is defined as the manager's ability to perceive, comprehend and predict elements in the marketplace (Bonney 2008).

We note that situational awareness was not originally developed for use in business education contexts yet it parallels nicely with Bloom's knowledge, comprehension, analysis, synthesis and evaluation dimensions of learning (Bloom et al. 1956; Krathwohl 2002). Thus, we suggest that measures of situational awareness provide unique and novel measures of higher order cognitive processes salient to business education (Schwandt 2005).

Measurement Strategy

A multi-step process was undertaken by faculty at Tennessee and West Virginia and the developers of the *Marketplace* simulation in order to develop the battery of questions designed to measure situational awareness. By taking different perspectives on the same pool of situational awareness questions, the process also created items to measure functional knowledge and the students' total or integrative view of their business. Although the assessment tool is designed for a specific simulation, the methodology can be used to develop an objective assessment tool for any simulation.

The details of COLA are discussed in Appendix A but key attributes are as follows:

1) The assessment tool is delivered through multiple choice and fill-in-the-blank type question formats;
2) The assessment is objective in that all COLA questions have a correct answer;
3) Objective questions refer to a) facts about the performance and actions of the firm and its competition as reported in numerous functional reports, b) assessments of current conditions based upon the available facts, and c) predictions of firm and competitor performance in the business period about to be completed; and

4) Students do not have access to the simulation during the assessment and therefore must rely upon their prior efforts to understand and interpret the available information.

Table 6 contains a sample of the items ultimately selected for inclusion in the assessment.

Table 6   Sample Questions Relating Situational Awareness to Functional Content

Situational Awareness Level	Functional Focus	Example
Level 1: Perception	Manufacturing	*Which firm had the lowest average production cost across all brands?*
	Accounting/Finance	*Which market region contributed the most to the firm's bottom-line profitability?*
Level 2: Comprehension	Marketing	*Our ability to compete on price was a (strength or weakness)?*
	Accounting/Finance	*Was the brand which generated the most demand also the most profitable?*
Level 3: Projection	Marketing	*Our ability to compete on price will be a (strength or weakness)?*
	Manufacturing	*Which firm will have the greatest fixed capacity in Q6*

Note that each item is customized to the student's firm, customers and competition. For example, when asked which company has the highest market share in the industry, the choices include company names from their industry. Or when asked which brand makes the largest contribution to the profitability of their firm, students are given a list of their own brands. It is believed that this customization added to the salience of the assessment, which addressed one of the limitations of standardized tests. See Banta and Pike (1989); Barksdale-Ladd and Thomas (2000); Hendel (1991); and Sacks (1997).

Online Assessment Administration

The administration of the assessment was also a multi-step process. First, the assessment was scheduled near the end of the exercise, after about ¾ of the simulation has been completed. See the last row in Figure 1. A later period was thought to be better because 1) the students' knowledge of their business, competition, and market would probably be at its peak, 2) their focus would be on making marginal adjustments to their tactics as they worked to achieve their business goals,

3) they were encouraged throughout the later periods to use the various management reports and tools to look for strengths, weaknesses, opportunities, and threats and then to act upon them; and 4) they would no longer be distracted by the new software, business environment, and team. They would have achieved a steady state within their business setting.

The assessment was graded after the current period was processed so that responses could be compared against actual data from the subject's game. Students could see how they performed 1) in each functional areas, 2) at each level of situational awareness, and 3) overall (across all functions and awareness levels). These reports were provided to instructors as well. Finally, instructors received a team-summary report providing the average assessment scores as well as each team's performance scorecard. In a test of criterion validity, Bonney (2008) found the correlation between the team assessment scores and the final cumulative balanced scorecard was 0.67, based upon approximately 300 teams (p. 125). This finding supports the expectation that the more an individual (or a team) is aware of his/her situation, the more likely he/she will have a successful outcome.

Situational Awareness Results

Figure 7 contains a set of graphs indicating the performance of 1153 undergraduate students and 142 graduate students in each of the six question sets for the three levels of situational awareness. The data are presented as the percent of correct items to allow comparisons between sections, each of which had a different number of items. Furthermore, the data is presented in increments of 20 to smooth out the trend lines and therefore allow for an easier interpretation.

Several conclusions can be drawn from these results. First, the test is very difficult as reflected in the average score of 52.8% correct (standard deviation (SD) = 8.6). Second, undergraduate students performed significantly worse than graduate students with regards to their knowledge of change in competitor tactics, knowledge of market leaders, and prediction of future strengths and weaknesses but equivalently well in the other areas.

Figure 7   Performance by Level of Situational Awareness
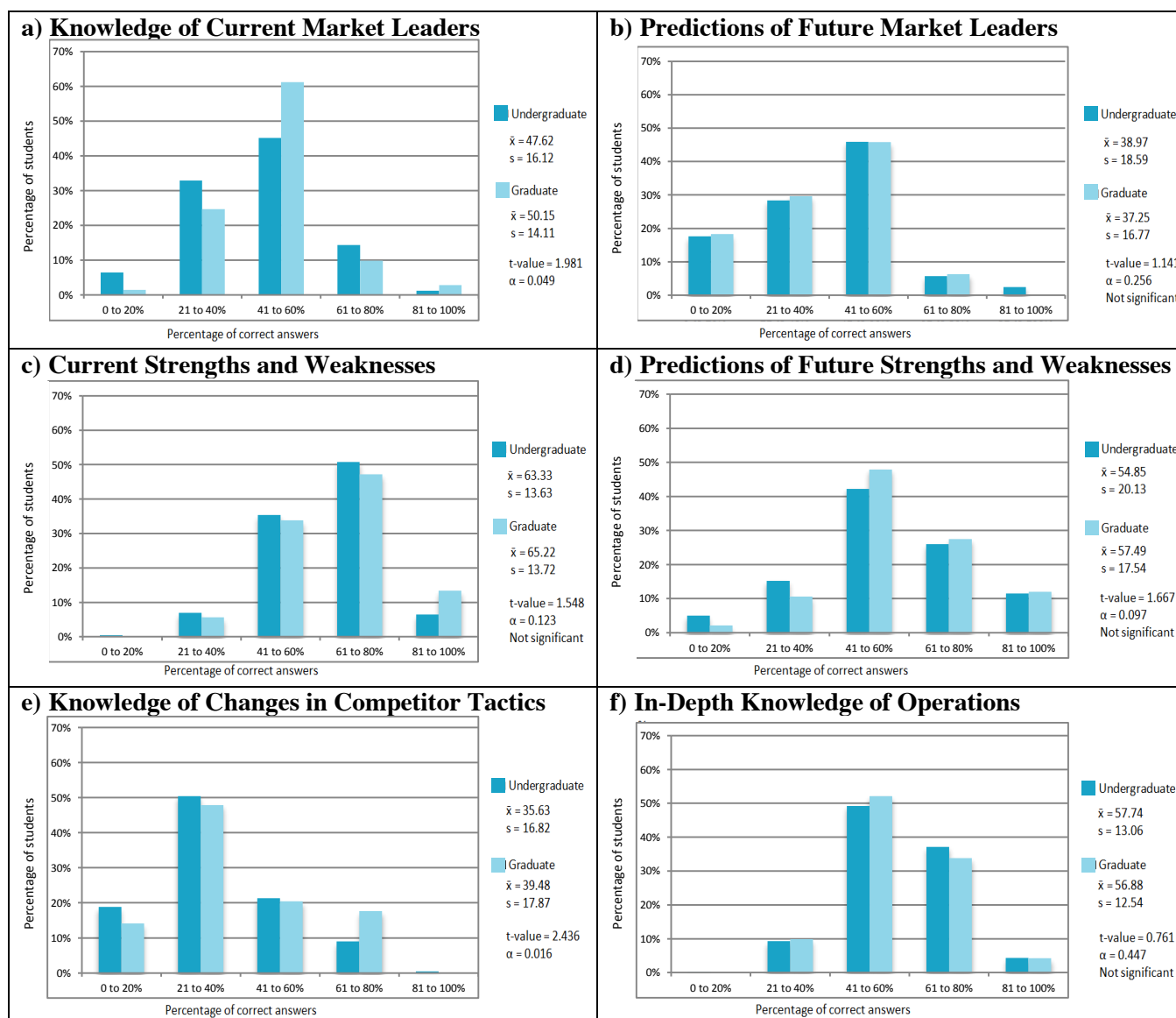
Third, students varied in their proficiency across areas of situational awareness. As can be seen in Table 7, students are the weakest in understanding the competition, whether it be their awareness of who is leading or will lead the industry or which competitors have made the greatest change in their tactics from one decision period to the next. In contrast, they are the strongest in their knowledge of themselves.

That is, undergraduates and graduates do comparatively well in assessing their own strengths and weaknesses. Their predictions in this respect are not quite as strong, though similar between the groups. Surprisingly, both groups have comparatively high knowledge of their detailed operations. These were difficult questions requiring familiarity with the data in many management reports.
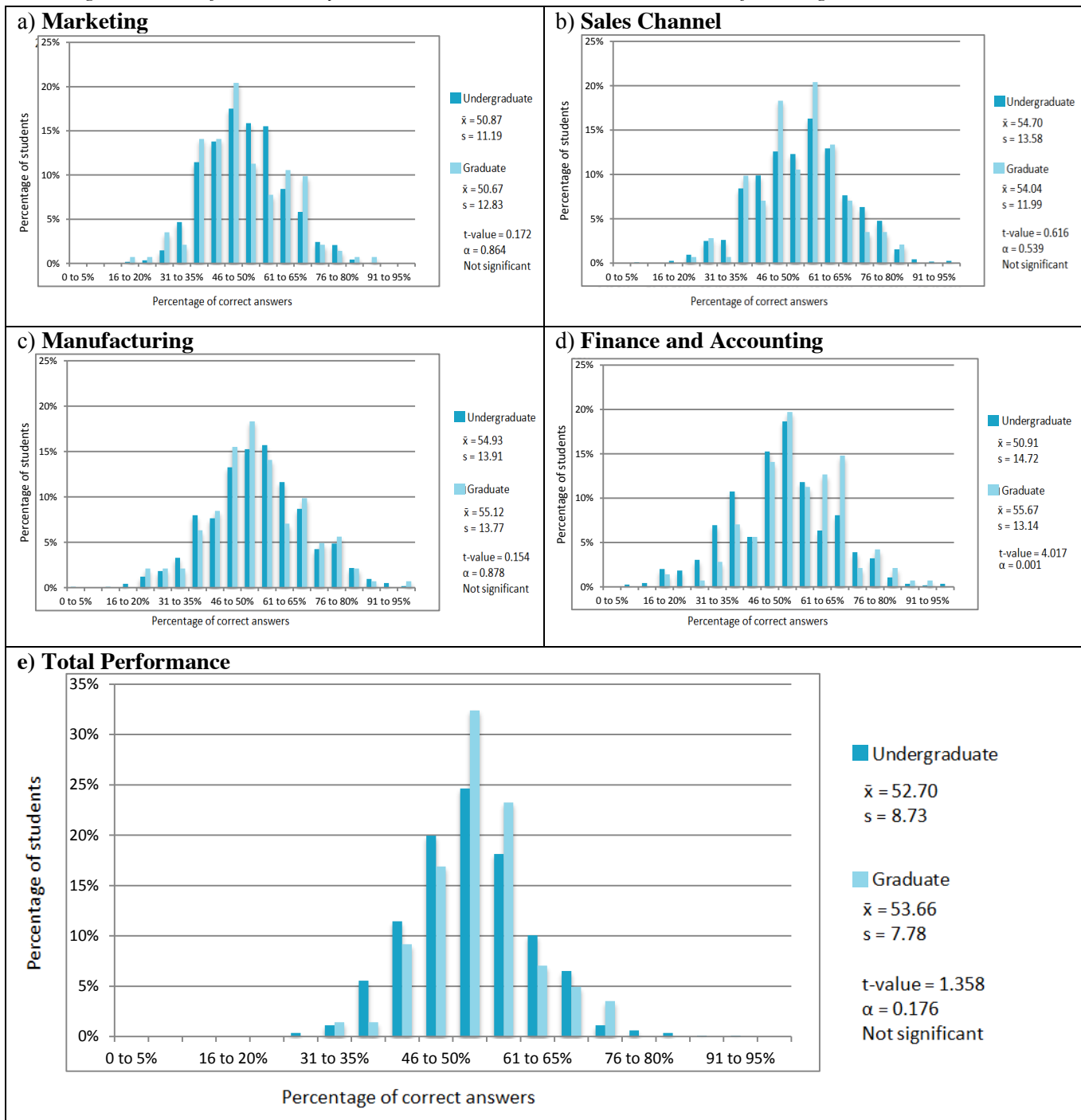
Table 7   Performance in Each Part of the Objective Assessment by Program Level

Level of Situational Awareness	UG Mean	UG Standard Deviation	MBA Mean	MBA Standard Deviation	T-Test
Current Strengths and Weaknesses	63.33	13.63	65.22	13.72	t-value = 1.548 α = 0.123 Not significant
n-Depth Knowledge of Current Operations	57.74	13.06	56.88	12.54	t-value = 0.761 α = 0.447 Not significant
Prediction of Future Strengths and Weaknesses	54.85	20.13	57.49	17.54	t-value = 1.667 α = 0.097 Weakly significant
Knowledge of Market Leaders	47.62	16.12	50.15	14.11	t-value = 1.981 α = 0.049
Prediction of Future Market Leaders	38.97	18.59	37.25	16.77	t-value = 1.141 α = 0.256 Not significant
Knowledge of Change in Competitor Tactics	35.63	16.82	39.48	17.87	t-value = 2.436 α = 0.016

In summary, we see that students have greater situational awareness as it relates to internal issues and less awareness of external market events, which makes them vulnerable to competitive surprises. Knowledge and comprehension of the current situation is also better than their ability to predict how things will change, as might be expected. And, their use of many management reports and tools is encouraging. Perhaps the academic focus on teaching students to use a broad assortment of management tools is effective.

Functional Understanding Results

As explained above, items were developed to measure each student's perception, comprehension, and predictions for each functional area. Figure 8 contains a set of graphs indicating the COLA performance of the undergraduate and graduate students in each functional area and overall. The reconfiguring of the data into four functional categories and a total score resulted in more items per category and allowed a finer breakdown of the data in the graphs.

Figure 8   Performance by Function, Overall and with the Tools of Management

a) Marketing

b) Sales Channel

c) Manufacturing

d) Finance and Accounting

e) Total Performance

The data collected for each functional area were used to assess the last learning goal for Tennessee; Using Business Metrics to Assess Performance. The goal of the College is that students should be able to access data, calculate performance measures, and evaluate business entities and business processes.

Once again, several conclusions can be drawn from the data. First, a greater aggregation of the data suggests that the underlying distribution of performance scores approximates a normal distribution. Second, the two groups were comparable in marketing, sales and manufacturing, but the graduate students performed significantly better in accounting/finance. Third, there was more variance in performance in the traditionally numerical areas of finance/accounting and manufacturing. Fourth, the largest variance occurred with undergraduates in the area of

accounting/finance. Finally, the two student groups performed differentially based upon the functional area measured. The undergraduate sample was comparatively stronger in manufacturing and sales and weaker in marketing and finance/accounting.

The graduate population had comparable scores in manufacturing, finance/accounting and sales but had lower scores in marketing, on par with undergraduates.   See Table 8.

Table 8   Average Scores by Program Level and Function

Functional area	UG Mean Sample	UG Standard Deviation	MBA Mean	MBA Standard Deviation	T-Test
Manufacturing	54.93	13.91	55.12	13.77	t-value = 0.154 α = 0.878 Not significant
Sales	54.70	13.58	54.04	11.99	t-value = 0.616 α = 0.539 Not significant
Marketing	50.87	11.19	50.67	12.83	t-value = 0.172 α = 0.864 Not significant
Finance/Accounting	50.91	14.72	55.67	13.14	t-value = 4.017 α = 0.001

Integrative View of the Firm Results

One of the goals of many business schools is to impart an integrated view of the business. Given that there are questions that span the key functional areas of business, it is possible to estimate a student's familiarity with the entirety of the enterprise that he/she is helping to manage. As indicated in Figures 7 and 8, we see that graduates have a small, but significant, advantage over undergraduates in knowledge of the competition, predictions of their future strengths and weakness and accounting/finance. As all of the charts tell us, there is a great deal of variability in what the students know.

Drilling Down

In light of the comparatively low scores in accounting/finance and the fact that 21% of the teams had difficulty managing their firm

relative to the balanced scorecard, the Tennessee committee decided to investigate a potential problem in accounting/finance among undergraduates. In reflecting on the course work, faculty from accounting and finance observed that the core courses contain substantial technical information that can be a challenge to retain. Also, they noted that the courses emphasize the fundamentals of these disciplines and not their application. As a result, these courses do not fully prepare students for the LSIBS and COLA because both require the knowledge of the fundamentals and its application. Finally, the Director of the Undergraduate Program reported that the curriculum includes only one accounting and one finance course where peer schools have three courses across the two disciplines.

Next, the Committee investigated if there was any pattern to the low performance scores on COLA. With the Fall 2010 administration, 333 students were asked to identify their major within business. It was discovered that finance and accounting majors did the best on the accounting/finance questions while the marketing and management majors did the worst, with logistics majors in between. Overall, the assessment favored the quantitative majors over the non-quantitative majors; a finding not totally surprising given that the students had to read and interpret reports that all contained numbers and graphs.

As further follow up on this issue, 426 undergraduate students in Spring 2011 were asked how much confidence they had in making various types of business decisions. Specifically, they were asked: "Assume for the moment that your training at this business school came to an end today. If you had to enter the business world tomorrow, how much confidence would you have to make real world decisions in the following areas?" The functional categories were accounting, marketing, finance, manufacturing, sales channel, and team management. The response categories were on a scale from 1 (no confidence) to 10 (complete confidence). As shown in Table 9, only accounting and finance majors had any confidence in their ability to make accounting and finance decisions; all other majors exhibited very little confidence in these areas. Interestingly, the non-quantitative majors had little confidence in their quantitative skills.

Finally, students were asked the following question at the end of the COLA: **How can the school improve your education?** Reflect on all of the training that you have had at this business school. What should the school do to improve your ability to make real world decisions? Feel free to offer suggestions to improve individual courses or the curriculum as a whole.

Table 9   Decision Confidence Results – Undergraduates – 426 students

MAJOR		Accounting decisions	Finance decisions	Manufacturing decisions	Marketing decisions	Sales channel decisions	Team management decisions	AVERAGE SCORE
Logistics (120)	MEAN	4.40	4.86	7.51	7.54	7.66	8.43	6.73
	ST. DEV.	2.24	2.24	1.94	1.86	1.74	1.61	
Accounting (111)	MEAN	7.88	7.41	4.97	6.66	6.76	8.07	6.96
	ST. DEV.	1.63	1.70	2.33	2.17	2.09	1.61	
Finance (55)	MEAN	6.87	7.80	5.00	6.71	7.29	8.35	7.03
	ST. DEV.	2.06	1.71	2.41	2.27	2.11	1.88	
Marketing (52)	MEAN	3.94	4.52	4.85	8.81	7.69	8.25	6.34
	ST. DEV.	2.09	2.39	2.09	1.37	1.96	1.75	
Management (45)	MEAN	4.44	5.00	5.18	7.91	7.96	8.84	6.56
	ST. DEV.	1.80	2.15	2.49	1.62	1.48	1.04	
Human Resources (20)	MEAN	3.45	3.75	3.50	7.90	7.90	8.85	5.89
	ST. DEV.	1.90	1.89	2.19	1.52	1.80	1.31	
Other (23)	MEAN	4.35	4.87	5.13	7.13	7.61	8.52	6.27
	ST. DEV.	2.74	2.51	2.96	2.62	2.46	2.09	
	Average Score	5.05	5.46	5.16	7.52	7.55	8.47	6.54

Color Code
<5
>=5 and <7
>=7

SCALE OF 1 (no confidence) to 10 (complete confidence)

The most frequent curriculum suggestions were for the following:

- More training in manufacturing/logistics/operations: including demand forecasting;
- More accounting and finance, including the understanding of financial ratios and the interpretation of financial statements;
- More hands-on experience, more simulation exercises, more teamwork opportunities
- A greater focus on managing by the numbers (financial ratios, balanced scorecard, how to interpret formulas); and
- More presentations.

Closing the Loop

The Learning and Assessment Committee concluded that there was not sufficient data to request the addition of another accounting/finance course, especially given the high demands for space in the undergraduate curriculum. To address the issue in the short-term, five actions would be taken. First, assessment activities would be initiated in the accounting and finance core in order to correct weaknesses before students move on. Second, the finance faculty would emphasize the key learning points from the introduction to accounting course at start of the introduction to the finance course in order to reinforce and transition the accounting content into finance. Third, tutorials and exercises would be placed online to give students more hands-on practice in computing, understanding, interpreting and applying accounting and finance metrics. Fourth, the faculty in the LSIBS course capstone strategy course would place additional emphasis on the practical use of accounting/finance information in their lectures and assignments. Last, the Marketing faculty of the College elected to place more emphasis on business metrics within the major, with a special emphasis on data mining.

Additional Benefits of the Customized Online Learning Assessment

As illustrated above, a customized assessment can contribute insight into the students' ability to use business metrics to assess performance. As highlighted in Table 3, it can contribute to a number of other AACSB and EQUIS learning goals. There are also practical benefits to students. In terms of competitive benchmarking, the assessment provides a clear indication of how much individual students know about their business vis-à-vis the competition. Although most students think they have a good understanding of their business, they are often surprised at how much they do not know or how much more their competition knows. If they are lacking functional knowledge of their operations or the ability to assess the competition's strengths or predict what the competition is likely to do, they are working at a serious disadvantage.

For instructors, the online assessment tool is particularly useful in coaching. For example, a particular team or individual might be below the average in manufacturing knowledge. The instructor can delve deeper to determine who if anyone on the team, especially the production manager, has sufficient knowledge to adequately manage its operations. Interventions might include requiring additional readings, an instructor tutorial, and even reassigning personnel.

Another advantage of the assessment is the independent verification of each student's involvement in the exercise. In team-based assignments, a student can drift into the background and let others do the work. Since the answers to the assessment are based upon conditions of the firm and its industry, a student cannot perform well if he/she has not studied the firm's situation and drawn meaningful conclusions from the data.

WHAT HAVE WE LEARNED?

Based upon our experience at Tennessee and West Virginia, we are learning, step by step, how to "close the loop." First and foremost, the very process of developing learning goals and collecting assessment data is creating a mindset that encourages curriculum improvement. Also, having a process and data is affecting change, especially as it facilitates communication among students, instructors and program leadership. Also, we have found that closing the loop is easiest within a single course. It becomes more challenging, but doable, as instructors try to coordinate their efforts across courses. It is the most challenging at the program level where even small changes can have far ranging effects on course content, faculty assignments, and budgets. In terms of LSIBSs, we have concluded that they represent an important

medium to help achieve a school's learning and assessment goals. We have been able to overlay a variety of value-added activities and assessments to further enhance the learning experience and assess learning at the course and college level. Since many schools currently employ an LSIBS in integrative courses, the incremental costs of employing one for these purposes is low.

We have also discovered it is impossible to design or select a single assessment tool to evaluate all of a school's learning outcomes. As illustrated in Figure 9, each tool is good for a particular set of purposes and settings. The advantage of an LSIBS is that its complexity and duration allow for a variety of assessments tools which, when combined, can potentially contribute towards a 360º perspective on learning outcomes.

Figure 9   360º Assessment of Learning

We have learned that if specific performance outcomes are measured and everyone knows how they are measured, students will strive to do well in those areas. While rubrics, peer evaluations, balanced scorecards, and tests provide good feedback, they also positively shape the behaviors and learning that they are supposed to measure.

We have also learned that team-based assessments can provide important information for course and curriculum review. Educators do not need to rely only on individual assessments for this purpose. Moreover, in life, there are many team-based activities for which the entire team is responsible and receives appropriate credit based on the outcome. Certainly, team-based assessments are appropriate in these cases.

We have further learned that comprehensive and integrative learning is a difficult goal to attain. Notwithstanding the limitations of our metrics, they indicate that we are a good distance from achieving the integration goal for all students. Their ability to apply the knowledge transmitted is uneven at best. As we come to grips with this realization, we are challenged to "close the loop" and improve the learning process and outcome. This is new territory and we are searching to find the answers.

Finally, we have discovered a few things that we were not looking for. First, managing resources (especially cash) is not the same as reading financial statements. Students are challenged to manage their assets and require additional training to succeed. To deal with this deficiency, more emphasis needs to be placed upon working on the margin to improve performance. Specifically, students need additional training in evaluating marginal costs and marginal benefits and making choices that maximize the overall performance of the firm. Similarly, more training is needed in managing the whole firm, especially in an integrated fashion. Students need to consider all of the relevant stakeholders and the tradeoffs inherent across stakeholder outcomes. Students still have a tendency to focus on a few metrics and it is difficult for them to understand the extended ramifications of all of the firm's decisions.

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Appendix A: Description of the Methodology to Develop the Customized Objective Learning Assessment (COLA) Measure

The faculty at Tennessee and West Virginia collaborated with the developers of the *Marketplace* simulation in order to create the Customized Online Learning Assessment. The following provides a detailed description of the development process and the measures employed. This description should enable other schools and simulation providers to create a similar assessment tool.

Step 1: Define and Operationalize Key Measurement Constructs.

Perception - the students' belief or state of knowledge about their business, market and competition at any given point of time (Sarter and Woods 1991; Adams, Tenney, and Pew 1995). This construct was operationalized in three parts. One set of questions asked the students to identify which firm was the best in the market on ten key operational metrics. A second set of eight items asked students which firm showed the greatest change in their tactical decisions and performance from one operational period to the next. The third set of 22 items asked for detailed knowledge of their firm's operations in all of the functional areas.

The desired information could only be obtained by using a comprehensive set of operational, market, finance and accounting reports provided within the software. In a sense, these reports are similar to the dials and indicators that flight personnel use to understand the conditions of their aircraft and surrounding area. These reports include;

- Market performance reports
  - Market share
  - Segment shares
  - Unmet demand
- Market feedback reports
  - Brand ratings
  - Ad ratings
  - Price ratings
  - Reliability ratings

- Competitor analysis reports
  - Market share
  - Segment shares
  - Tactical decisions
- Employee productivity reports
  - Sales people
  - Factory workers
- Manufacturing reports
  - Efficiency
  - Changeover
  - Quality/reliability
  - Unit costs
  - Inventory
- Accounting reports
  - Cash flow
  - Income statement
  - Balance sheet
- Industry financial benchmarks (industry financial ratios)
- Profitability analysis reports
  - Brands
  - Channels
  - Regions
- Balanced scorecard reports
  - Competitive benchmarking
  - Drill down capabilities to discover root causes

Comprehension – the students' ability to build a holistic picture of the market by integrating elements in the environment and understanding their meaning (Endsley 1995). Awareness is not only noticing elements in the marketplace but also being able to make connections between market events and/or being able to recognize patterns in the marketplace (Baron and Endsley 2006; Dutta and Crossan 2005). This construct was operationalized by asking students to assess whether their actions or performance in fifteen key areas were strengths or weaknesses relative to the average among all competitors.

Prediction - the students' ability to project the future state of elements in the environment, at least in the near term. Students must not only detect and understand patterns in the marketplace, but must be able to interpret the patterns in a way that allows them to see where markets are headed in the future *(Kirzner 1997; Baron and Ensley 2006).* This set of items was

operationalized by asking students to project the outcome of the current period after the decisions for all teams were finalized and processed. One set of questions asked the students to predict which firm would be best in seven market performance categories. The second set asked students to predict whether their performance in seven business performance categories would be strengths or weaknesses relative to the average among competitors.

Step 2: Create a Question Pool.

There were several goals to be satisfied in the creation of a pool of questions or items for the final assessment. First, items needed to represent each of the firm's functional areas and each level of situational awareness. Second, the content needed to reflect the disciplinary material addressed in the students'

business core. Third, the questions should focus on the application of the student's knowledge of concepts, principles, ways of thinking and tools. Last, there had to be an objective truth in order to check the answers.

Working from a matrix of the three levels of situational awareness (perception, comprehension and prediction) by the functional areas of marketing, finance/accounting, manufacturing/operations, and sales channels, multiple items were created to tap into the convergence of function and level. In the end, 90 situational awareness questions were created to fill the cells, although not equally.

Table 6 contains a sample of the items ultimately selected for inclusion in the assessment.

Table 6   Sample Questions Relating Situational Awareness to Functional Content

Situational Awareness Level	Functional Focus	Example
Level 1: Perception	Manufacturing	*Which firm had the lowest average production cost across all brands?*
	Accounting/Finance	*Which market region contributed the most to the firm's bottom-line profitability?*
Level 2: Comprehension	Marketing	*Our ability to compete on price was a (strength or weakness)?*
	Accounting/Finance	*Was the brand which generated the most demand also the most profitable?*
Level 3: Projection	Marketing	*Our ability to compete on price will be a (strength or weakness)?*
	Manufacturing	*Which firm will have the greatest fixed capacity in Q6?*

Note that each item is customized to the student's firm, customers and competition. For example, when asked which company has the highest market share in the industry, the choices include company names from their industry. Or when asked which brand makes the largest contribution to the profitability of their firm, students are given a list of their own brands. It is believed that this customization added to the salience of the assessment, which addressed one of the limitations of standardized tests. See Banta and Pike (1989); Barksdale-Ladd and Thomas (2000); Hendel (1991); and Sacks (1997).

Step 3: Pre-test and Refine Question Pool.

The third step in the development was to pre-test the items at both the undergraduate and graduate level using standard item evaluation techniques. Nine US schools and approximately 800 students participated. We revised, discarded, or replaced weak items until a satisfactory set of items were available for each functional area and each level of situational awareness.