

Full length Research Paper

Engaging undergraduate business students in experiential learning through a required term project in operations management course

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This paper examines the effect of an experiential learning term project and a well-designed instructional guideline on students' achievement of pre-established course learning objectives of a required core undergraduate business course—Operations Management (OM). The data are collected from reserved student project papers over the last 5-year period. The course learning objectives are based on the primary course standard well-received by AACSB for undergraduate OM courses, and students' learning outcomes are assessed with a pre-designed assessment rubric. Over 100 student project papers are randomly selected and evaluated in this research. Possible inter-rater inconsistency was controlled through a pilot testing with all participating raters. The objectives of this research are: (1) to examine the use of an experiential learning project at undergraduate level and the facilitating roles assumed by the instructor in the process, and, (2) to identify possible correlations between students' ability to follow the provided guideline and the quality of their completed project paper. The results of this research show that there is a strong positive relationship between students' achievement of pre-designed learning objectives and the degree to which they follow the instructor-provided guideline.

Keywords: Instructional innovation, learning objective assessment, course term project guideline, empirical study.

INTRODUCTION

One of the challenges that business educators face is how to bridge the gap between the world of college business classrooms and the world of real business. The primary goal of business education is to prepare students for working in real business situations in their future careers. Surveys of employers show that content knowledge was ranked low on their requirement list; whereas students' abilities to solve problems, think critically, communicate effectively in oral and written forms, and work collaboratively on a team were considered the most essential qualities for employability (Forman, 2006; Hansen, 2006; Taylor, 2003). The design of business curriculum and the corresponding pedagogy should be aligned with the goal of business education and the requirements of

future employers (Chakrabarti and Balaji, 2007). Therefore, today's business educators are expected to depend less on the traditional lecture format in which students tend to be passive learners and receivers of knowledge and rely more on active, skill-based learning grounded in real-life contexts (Hakeem, 2001).

Traditional-age undergraduate students in business typically lack the real-world experiences that allow them to make connections between the theories and concepts they have learned from business schools and the real world business applications (Joshi et al., 2003). Unlike the questions typically examined in college business classrooms and those on the college exams, real-world business problems are not nearly as well-defined. Problem-solving in real world typically requires sifting through a large body of information, some relevant and others not, and making decisions within a limited time frame (Braun, 2004). Undergraduate-level business educators must provide students with opportunities to

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practice their critical thinking skills in decision making and to contextualize their skills in the real business world (Braun, 2004). Otherwise, students may see their coursework as irrelevant of their future careers and bearing no meaning beyond the grades on their transcripts (Athanassiou et al., 2003).

Case method has been a popular pedagogical tool for helping business students develop the capacities required by their future employers. Case method can bring business classes to life by demanding students to apply their content knowledge to real business circumstances and to weigh their decisions in varied situations and scenarios, a process very similar to real business decision making (Forman, 2006; McCarthy and McCarthy, 2006). Unlike problems in engineering, business problems tend to be messier and less clear cut. Case method reinforces this reality by requesting more than a "right/wrong" answer, but rather, solutions that are suitable for a particular situation (Chakrabarti and Balaji, 2007).

Case method can take many forms: traditional written case, simulated case, and live case. One limitation of traditional written cases is that most of these cases were written several years ago before they are published (Ackerman et al., 2003; Forman, 2006). Simulated cases typically can involve only a limited number of variables and therefore, fail to reflect the full complexity of the real business world (Tvaronavicien, 2003). The live case method, in the business education context, is a type of experiential learning which involves students with real life business organizations and engage them in solving real life problems (Elam and Spotts, 2004). Live cases represent a degree of realism that cannot be achieved through traditional written or simulated cases (Klebbba and Hamilton, 2007). The live case method provides an immediate and direct link between issues in real firms and concepts or theories covered in business courses in a highly integrated fashion (Hershey and Walker, 2006; Mahar and Salzarulo, 2008). Textbook knowledge is usually presented in a linear, sequential order; whereas the world of real business is messy, complex, integrated, holistic, and uncertain (Forman, 2006). However, research activities that engage students' in studying real life business cases often are restricted to graduate-level programs such as master's and PhD (StoBlein and Kanet, 2008). This could be the reason that many college graduates feel disconcerted in the face of the real world. The major advantage of live cases as compared to traditional written cases is the ambiguity and uncertainty reflected in live cases which forces students to process incomplete and sometimes irrelevant information, test the sensitiveness of their decisions in different circumstances, and take real control and responsibility for their learning (Elam and Spotts, 2004; Hamer, 2000; Kennedy et al., 2001). The live case method provides business students

with both challenges and opportunities and often leads to improved learning outcomes, increased motivation, interest, enthusiasm, and an attitude of lifelong learning (Maher and Hughner, 2005; StoBlein and Kanet, 2008). Despite the various strengths of the live case method, it is still an underutilized method in today's business programs (Kennedy et al., 2001). As the Association to Advance Collegiate Schools of Business (AACSB) International placed more emphasis on the importance of experiential learning and included active student involvement as part of its criteria for accreditation, business schools interested in receiving the accreditation from AACSB International respond with increased use of the live case method as part of their curriculum and pedagogy (Elam and Spotts, 2004).

The primary objective of this study is to examine how to engage undergraduate business students enrolled in an operations management course in experiential learning through a required live case project and the various factors that make this experiential learning experience successful and valuable. In particular, a specially designed project guide is used as an instructional tool (see Appendix A) to help students prepare for a required class term project--writing a case study about a real world business and describing and analyzing how this business uses its operations as a competitive weapon in the market place. Three basic research questions for this research are: (1) How has this instructional tool helped students improve the quality of their project paper? (2) How did students use this instructional tool to apply what they had learned in the classroom to a real world business using their business analytical skills? And (3) How can this instructional tool be further improved? In addition, based on the primary research questions of this study, the following five hypotheses are constructed below:

H1: The better the students followed the professor-provided instructional case study guide, the better comprehension of the required course materials the students demonstrated in their case reports.

H2: The better the students followed the professor provided instructional case study guide, the better application of course materials to the situations described in the case study the students demonstrated in their case reports.

H3: The better the students followed the professor provided instructional case study guide, the higher quality of provided case analysis in relation to the course materials the students demonstrated in their case reports.

H4: The better the students followed the professor provided instructional case study guide, the better capacity of synthesis in relation to the course materials the students demonstrated in their case reports.

H5: The better the students followed the professor provided instructional case study guide, the better

evaluation about the selected cases in relation to the course materials the students demonstrated in their case reports.

Next section presents a summarized literature review of the theoretical frameworks that guided this research, along with a discussion of the pedagogical issues involved in the live case method. Section 5 briefly describes the research methodology and data collection process. This is followed by Section 6 which covers the results analysis and five hypotheses testing discussion. Finally, Section 12 presents the conclusions from this research with the implications for future research.

Literature Review and Theoretical Frameworks

Kolb (1984 p. 38) defined learning as “a process whereby knowledge is created through the transformation of experience”. His experiential learning cycle contains four essential components: having a concrete experience, reflecting on those experiences, conceptualizing the experiences, and testing the model or theory (Hickcox, 2002; Kolb, 1984). Effective experiential learning must be student-centered and requires students’ full commitment to the learning process “cognitively, affectively, and behaviorally” (Hoover and Whitehad, p. 25, as cited in Elam and Spotts, 2004). Two other learning theories related to experiential learning are social constructivism and self-efficacy (Dewey, 1938; Vygotsky, 1978). In other words, learning occurs when a person actively interacts with ones’ environment. The social-cognitive theory emphasizes self-efficacy as a perceived attribute independent of objective ability (Bandura, 1997, p. 3; Sweet and Michaelsen, 2007). Perceived self-efficacy refers to “the beliefs in one’s capabilities to organize and execute the courses of action to produce given attainments” (Bandura, 1997). According to Bandura (1997), without such perceived self-efficacy, people do not have the incentive to perform a certain action. However, the perceived self-efficacy or confidence can be gained from successful real-world problem solving (Alhourani, 2008).

Experiential Learning and Business Education

In consistent with all the above theories, experiential learning is a pedagogy that takes into consideration of both the content and the context of learning (Hawtrey, 2007). It has both cognitive and affective impacts on learning (Johnson and Johnson, 1982). Cognitively, experiential learning can alter a person’s existing cognitive structure or mental model by exposing one to a larger range of experiences (Joshi et al., 2003). Experiential learning also narrows the gap between the knowledge and skills

learned in classrooms and those required by the real world.

Experiential learning projects adopted by business schools enhance knowledge transfer because it places students into real world business environments where knowledge and skills are gained through direct experiences and applied right back to the real world problems. An experiential learning project often requires skills at the higher end of the learning hierarchy according to the Bloom’s taxonomy, including application, analysis, synthesis, and evaluation (Athanassiou et al., 2003). These higher-order thinking skills are the building blocks for the critical thinking skills required of the real business world. Thus, experiential learning projects respond to two of the primary learning theory’s concerns: realization of knowledge transfer and design of learning experiences of true educational value.

John Dewey (1938) argued that the attitudes developed through a learning process may be more enduring than the content associated with the learning process. Affectively, experiential learning can change a person’s attitudes by giving more personal control of the learning process and a sense of ownership and pride as a result of students’ increased responsibility of their own learning (Hawtrey, 2007). For example, students often have the freedom to choose a firm or a particular industry to investigate in an experiential learning project, and this gives them a higher level of motivation to complete their projects than if they are given a ready-made written case to study (Forman, 2006). Polito et al. (2004) observed that many students enrolled in required operations management (OM) survey courses are not motivated to learn the course material because they often consider the course content not relevant to their future careers as accountants, marketers, or financiers. A couple of studies conducted in Australia and the United States show that using experiential learning projects in OM courses resulted in improved recollection of OM concepts and higher levels of student satisfaction with the courses (Alhourani, 2008; Polito et al., 2004). In addition, some of additional benefits of experiential learning are improved communicative and interpersonal skills, teamwork skills, and leadership skills. These skills are often considered as important as quantitative analytical skills in the real business world.

Pedagogical Issues Related to Experiential Learning

As a student-centered pedagogy, experiential learning requires that the instructor give up the total control of the classroom environment (Gremier et al., 2000). However, in order for an experiential learning project to be a truly valuable experience for students, the instructor’s role must be changed from “the lecturer” to “the facilitator”

(Gremler et al., 2000; Helle et al., 2006; StoBlein and Kanet, 2008). It is safe to say that experiential learning requires a whole new set of instructional skills and even greater commitment from the instructor. Research in experiential learning must address the various pedagogical issues in order to make students' experiences with this particular pedagogy more successful. Two most important pedagogical issues that are paramount for the success of experiential learning are selected for this research for further discussions: the role of the instructor and appropriate assessment of experiential learning.

The Role of the Instructor

Experiential learning requires a shift in the role of the instructor from *teaching* the content to *helping* students learning the content (Gremler et al., 2000). In order to successfully perform the role of a "facilitator", the instructor must know how to provide effective scaffolding. Klebba and Hamilton (2007) define scaffolding as "a process by which the student progressively moves from lower to higher-order thinking". We believe that scaffolding from the instructor is utmost important during an experiential learning project at the undergraduate level. This is because traditional-age undergraduate students typically do not have the working experience and the mental framework to make connections between the knowledge and concepts they have learned from the classroom and the skills required for the real-life tasks. And most of the undergraduate coursework does not require students to practice higher-order thinking skills. Therefore, the instructional tool (Appendix A) designed for this class project actually serves as a scaffolding device to keep students on the right track of their final projects. In this instructional guide, students are asked critical questions under each of the aspects of operations such as products, process, and capacity so that students would consciously seek answers for these critical questions during their own research.

In order for an experiential learning project to be a successful experience for students, the instructor must also make sure that the project will require students to perform a real life situational analysis, other than to simply summarize the case facts (Forman, 2006). Undergraduate students typically are not familiar with this type of analysis. Therefore, it is critical for the course instructor to provide additional guidance in helping students develop the analytical skills. For example, in the instructional tool designed for this class project (Appendix A), students are asked to provide an evaluation of the compatibility between the product strategy of the company they chose to study and the market place. If student believe that the above two are not compatible

with each other in this selected company, then they are asked to provide their recommendations for improvement. Scaffolding, such as this instructional guide, can help students develop meta-cognition - "self-awareness of one's own cognition", viewed as the highest level of higher-order thinking because it allows a learner to not only identify and practice various critical thinking skills but also to consciously control the use of these skills (Kleppa and Hamilton, 2007). Without such instructional guide, the students might not have pursued certain critical questions in operations management and might not have practiced critical thinking skills to their full potential. While the live case method is widely considered a loosely structured teaching approach, but we believe that the instructor needs to bring some structure into the messiness and chaos especially when experiential learning projects are used with the undergraduate-level students.

Appropriate Assessment of Experiential Learning

Bigg's (1996) theory of constructive alignment states that instruction, learning, and assessment need to be compatible with each other in order for teaching to have a positive impact on students. Simple paper-and-pencil tests in the forms of multiple-choice and true-or-false questions are not sufficient for assessing the outcomes of experiential learning - a pedagogical approach striving for higher-order thinking skills such as application, analysis, synthesis, and evaluation (Bartels et al., 2000; Burley and Price, 2003). Since experiential learning is grounded in real-life experiences and contexts, the evaluation of any experiential exercise must also require a comparable degree of realism. Thus, authentic assessment, in which students are required to actively perform one or more tasks under real-life contexts, is the most appropriate evaluation tool for effectively assessing the learning outcomes associated with experiential exercises (Herrington and Herrington, 1998). This means that evaluating the outcomes of experiential learning may require a substantial time investment on the part of the instructor in terms of both designing an appropriate assessment tool and giving more elaborated feedback to students (Gremler et al., 2000).

Appropriate assessment for experiential learning is to use process-oriented evaluations including multiple tasks and indicators, such as oral presentation, written report, and feedback from the clients or business partners (Gremler et al., 2000). To evaluate the learning outcomes of this particular class project, we considered multiple sources of data such as students' oral presentations and their final written reports. One challenge that comes with

Table 1. Company Information in Case studies

		No.	%
Company type	Manufacturing	34	32.38%
	Service	71	67.62%
Company Size	Small	41	39.05%
	Medium	16	15.24%
	Large	48	45.71%
Company Location	GA	69	65.71%
	Other States	22	20.95%
	Other Countries	6	5.71%
	Not Mentioned	8	7.62%
Final Performance	Poor	1	0.95%
	Bad	3	2.86%
	Neutral/No information	35	33.33%
	Fair	15	14.29%
Industrial Position	Good	51	48.57%
	Leader	56	53.33%
	Follower	35	33.33%
	Not Specific	14	13.33%

using authentic assessment is how to deliver clear expectations to students. Since authentic assessment tend to be more ill-defined or loosely structured, business educators may also have the tendency to give students' more ambiguous and holistic directions. In this class project, the instructional tool is designed not only to serve as a scaffolding device to help students in gaining deeper understanding of operations management concepts and develop critical thinking skills and meta-cognition, but also to serve as a rubric for assessing students' learning outcomes. Since critical questions are included in this instructional guide under each of the important categories of operations management, students were given clear expectations of what content should be included in their final projects. In addition, this instructional guide is also intended to provide students a template or a framework in organizing their final oral presentations and written reports.

RESEARCH METHODOLOGY

Sample

In this research, 105 previous student case reports are randomly selected from over 500 collected during 2003 – 2008 from students who attended an undergraduate-level, semester-long Operations Management course at Georgia College & State University (GC&SU). These student case studies have covered the manufacturing and service companies of various sizes (large or small), locations (local, regional, national, or international), financial standings, and industry positions (for details, see Table 1).

Assessment Rubric

An assessment rubric (Appendix B) is designed in this research as

the analytical framework for assessing and rating the selected sample student case reports. The data collected through this assessment rubric are then analyzed to address the proposed research questions in this research - the positive effect of the course instructional tool on students' performance.

The assessment rubric has three sections. The first focuses on the content and the structure of the case studies. This rubric is to determine whether each of the students followed the instructional guide by addressing each of the eleven required components on the guideline. Four levels of ratings are used in this research: very satisfactory, satisfactory, somewhat satisfactory, and not satisfactory. Section 2 of the rubric is designed to determine the success of this experiential learning project in terms of building students' higher-order thinking skills. This part of the rubric is based on the Taxonomy of Education Objectives, also called the Bloom's Taxonomy of Learning (Bloom et al., 1956). Bloom's Taxonomy of Learning is chosen as our theoretical basis because the learning outcomes specified in the taxonomy are in congruence with the educational objectives and activities represented in our experiential learning project (Krathwohl, 2002). Experiential learning as an instructional method emphasizes problem-solving in real-life contexts, knowledge transfer, and higher-order thinking skills (Elam and Spotts, 2004). Therefore, in order to properly assess the effectiveness of an experiential learning project, such a framework allows us to determine the degree of those more complex cognitive processes.

There are six major categories (knowledge, comprehension, application, analysis, synthesis, and evaluation) in Bloom's Taxonomy ranging from simple to complex and from concrete to abstract (Bloom et al., 1956). These six categories represent a cumulative hierarchy, i.e., achievement of any lower category of the learning outcomes on the taxonomy is considered necessary before achievement of any higher category of the learning outcomes (Anderson, 2005). Knowledge is demonstrated through recalling or recollecting terminology, facts, and other specific information. Comprehension is demonstrated through the ability to understand and interpret the meanings of a learning material. Application is demonstrated through using what one has previously

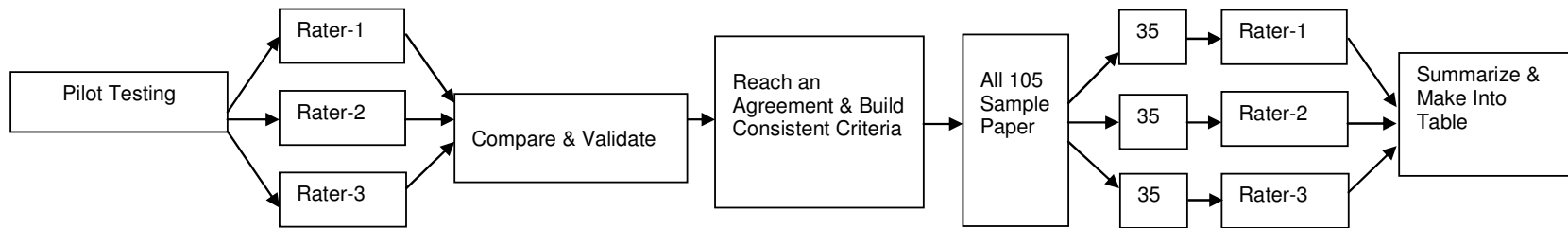


Figure 1. Data validation and Analysis process

learned in a new and concrete situation. Analysis means to break down a learning material into component parts in order to establish relationships and reveal the underlying structure. Synthesis is reflected in the ability to create a whole from parts in order to generate new knowledge. Evaluation is reflected in the ability to judge the quality of materials learned based on certain criteria or standards. For this research, we retained the five categories from *comprehension* to *evaluation* in our assessment rubric and omitted the *knowledge* category because recall or recite course information is not an objective for this particular class assignment. Mayer (2002) aligned the above six categories with nineteen cognitive processes with an identifier to each of these nineteen cognitive processes. When defining the assessment rubric used in this research, we adopted most of these identifiers as our own indicators of student mastery of each of the learning outcomes as specified on Bloom's Taxonomy. Four levels of ratings are employed for each of the five categories (excellent, good, fair, and poor). For a specific definition for each of the above five categories and a description for each of the above four classifications, please see Appendix B.

The final section of the assessment rubric focuses on the format and the appearance of the sampled student case reports. In particular, we checked whether each of the students provided references and appendices. In addition, we also examined whether each of the student papers chose to use comics and graphic displays to enhance the readability of the required case report. Furthermore, we made a distinction between those references, appendices, comics, and graphic displays that are supportive and those that are not supportive of the overall case report.

Data Validation and Data Analysis Process

As shown in Figure 1, to ensure the validity and

consistency of student report evaluation and rating process, a pilot-testing was conducted before distributing these 105 case reports to three raters. First, 10 student reports were randomly selected as the "sample" independently and rated by each of the three raters. Then, the three ratings were compared and validated through peer reviewing and debriefing in order to build credibility and reliability among the three raters for the later formal rating result. In the process, for each item in the assessment rubric, at least two of three ratings must be in agreement, and the rating provided by the third rater must not be more than one point apart from the other two. When a larger discrepancy occurred, all three raters compared their research notes, deliberated and clarified the definition and criteria associated with each of the items, and reached a final agreement at the end. These agreed criteria were applied by all three raters on a consistent basis throughout the rating process for all 105 selected sample student project reports. In addition, to further reduce any potential bias, the 105 student case reports were assigned evenly (one-third to each rater) among three raters - who evaluated these student reports independently. (figure 1)

Upon the completion of rating process, first, all data collected from the rating process are summarized into three tables with related descriptive discussions and some quantitative analyses (to be presented in next section). In the five proposed hypotheses, "*following the instructional guide*" is employed as the independent variable, and each of the five learning outcomes corresponding to the five categories under the Bloom's Taxonomy are treated as the dependent variables. Both the descriptive statistics results and the correlation analysis (including ANOVA) for the above hypotheses are presented in the next section.

Finally, while in rating the assigned student case reports, all three raters were asked to record those meaningful, indicative, suggestive, and implicative statements and citations from the student reports for a

qualitative analysis using the constant comparative method recommended by Miles and Huberman (1994). The results of such a qualitative analysis are then used to develop a coding scheme for emerging themes and patterns for two major purposes: (1) these identified themes and patterns can provide additional insights and understanding to the statistical results by generating richer and deeper information; and (2) these identified themes and patterns can further explain and clarify the statistical findings through triangulation (Caracelli and Greene, 1993; Johnson and Onwueguize, 2004).

RESULTS

General Information Summary Results

A summary of the general information about the companies selected by the 105 student case project reports is displayed in Table 1. As shown in Table 1, among all business selected by students for their live case study, over two third (67%) are in service sector, another one third (33%) are manufacturing firms.

It is not surprised to see such a representation, as this ratio is relatively close to the real life business world today (by the most recent available statistics, over 80% of people work in a service business – comparing to only 11% in manufacturing industry, and remaining are in government related organizations – 2005).

In terms of company size (here a company with over 100 employees is viewed as a “large” company, from 20 -100 employees as “medium”, and less than 20 employees as “small”), among all companies selected by the students, there are about 46% of large companies, comparing to 39% for medium-sized firms, but only 15% for small businesses. While this ratio is of course not representative to the business size in real life, but it is an indicative that a majority of business students may have a misconception that a large company might provide them more room and space (i.e., more materials) in writing their live case study (This point is revealed from reading students’ statements in explaining – why this company was selected for this project). A possible implication to the instructor here is that a more clear instruction guideline about the company size may be necessary to guide students in selecting a company for their case study.

Since all 105 student case reports were selected from the same undergraduate OM course of a campus in Georgia, it is of interest for this study to see – the locations of the companies selected by students for this case study (The students were instructed that there was no restriction on their selection of the companies for their case study). Not surprisingly, as shown in Table 1, an overwhelming large majority (66%) of the companies selected for this case study are located somewhere in the state of Georgia – very close to the percentage of students (about 64%) who are enrolled from Georgia on this campus. All students of this class were encouraged by the instructor to select a business that they were familiar with by either had worked there before, or any of their family member/relatives/personal friends have been working there, so that it would be relatively easier for them to collect the required business information for their case study. As such, it can be seen that most students (who were from Georgia originally) had selected a company located in Georgia. This may also explain that 21% of the companies discussed in students’ case study reports are from “other states” and about 6% from “other countries”, as campus statistics show that a 26% of students from other states and about 10% of international students. An overall impression of all three raters throughout the evaluation process is that by selecting a company being familiar with in a certain way, students in general were able to get all basic required business information for their case study and to put the related operations management issues in perspective. An instructional implication which can be learned here is that when a live case method is used in an instructional class project at the undergraduate level, it is constructive to provide more clear and direct instruction by the instructor in terms of how to select a company for their case study and how to obtain the required real life business information for their case study. The result of this research shows that such an instructional guide can certainly improve students’ performance and learning

outcome from their case study experience.

The last two items in Table 1 are relatively subjective in nature, and suggested in the instructional guide to help students better understand and apply the covered course material and better analyze, synthesize, and evaluate the case situations. The first one is about firms’ current financial performance (or positions) given the company’s operations management decisions described by the students. It is somewhat surprising to see that nearly half (49%) of sampled student reports claiming the company selected for their case study as in “Good” financial position, with another 15% claiming in “Fair” condition, a total of 64%. In contrast, less than 4% of the companies reported by the sampled student project papers have a financial position being “bad” or “poor”. It is hard to believe in real life business world that about two-third of all businesses will have a positive financial position in their competitive market. There are two possible explanations. First, since there was no clear or consistent criterion provided about the firms’ financial position, thus judgment of the students (or the person he/she contacted in the business) was quite subjective. Secondly, in general, students tend to “believe” that the company (they wrote their case study) must be in a “good” financial position (unless otherwise told by the information they obtained), to “believe” that the instructor would more likely to give a favorable grading consideration for a “happy-ending” story (Most students used the wording of - “I believe that the financial position of this company is” in their reports about this item). Additionally, as many businesses in real world would keep their financial related information confidential, it is not surprised at all to see that about one-third (33%) of the student reports claiming – no information available in regard to this item. We believe that the results about this item from this research are “biased” and too “subjective” to reflect real business world. If such a performance measure were included in a live case method undergraduate level class project, then the instructor must provide more consistent and practical instruction to guide students for more real and objective outcome. (For example, the instructor should make it clear to all students in advance that their final grade of the case study will have nothing to do with the current financial position of the firm being discussed.) The final item in Table 1 is about the industry position of the company selected for student case reports – a “leader” in its industry or just a “follower”. The intent for this information is that a leader in its industry should have earned a better evaluation in all key operational performance measures in the reports, reflecting the consistency between the “leader” position and its supposed operational performance. Among all sampled student case reports, over half (53%) claimed that the company described are in a leading position, while a third (33%) described as a “follower”. It also has been observed during the case report evaluation process that overall those companies

Table 2. Cases Review Statistic

	Mean	Std. Dev	Sample Size
Format	3.057	0.991	105
Understanding	3.086	0.991	105
Application	3.029	0.955	105
Analysis	2.267	0.933	105
Synthesis	2.181	0.782	105
Evaluation/Reflection	1.743	0.899	105
References	1.848	0.969	105
Appendix	2.629	0.775	105
Use of Comics	2.648	0.693	105
Use of Graphic Display	2.143	0.935	105

being claimed as a “leader” in its industry did receive more positive comments about their related operational performance than their counterparts in the “follower” category.

Student Report Performance Rating Results

With a 4-point scale (Very Satisfactory – 4, Satisfactory – 3, Somewhat Satisfactory – 2, and Not Satisfactory – 1), the results of student report performance and learning outcome rating are summarized in Table 2. It can be seen that a majority of sampled student case reports followed the given guideline well with a mean of 3.057 (greater than 2.50), as a result, two important learning outcome measures earned a very positive rating: “Understanding the course materials well” with a mean of 3.086, and “Applying the course concepts better” with a mean of 3.029. In comparison, another three learning outcome measures are rated relatively lower, with “Analysis of company data/information” earned a mean of 2.27, “Synthesis of case situation” of 2.18, and “Case evaluation and reflection through suggestions and recommendations” of only 1.743. It is not a total surprise to see those ratings, as the last three are the three highest levels on the learning capacity of the current available learning theories. For undergraduate business students in general, it has been well recognized that applying (what have learned into real world situations), analyzing (the much more complex real life situation), synthesizing (all related factors in a logic way), and evaluating (a given situation with appropriate and constructive suggestions and recommendations) are the most difficult skills to master during their college career. The result of this research has reconfirmed this point, especially the last one – making the right and appropriate

suggestions and recommendations to a real business organization based on their own brief evaluation. It may be unrealistic to expect undergraduate business students to master those higher level learning capacities at a great level, but how to design a better instructional guideline with specific instruments to help students improving those higher level learning skills through such a live case method certainly merits future research.

To help students improving their professional writing skill, the students in this class were instructed to have necessary references and appendix in their final case reports and using better graphic displays (even adding humor with related comics) to enhance the readability of their case reports. The last four items in Table 2 are the ratings on those usage – all are showing an average mean score around 2.5, while “having references” received the lowest mean of 1.85. This may partially be explained by the fact that many students wrote their reports on a family related business and obtained the required information from personal interviews (thus no references to be cited), and partially be attributed to the weakness of general undergraduate students in searching and using outside related research information. An instructional implication is that those professional writing elements and skills should be emphasized more directly by the instructor with an announced higher weight in final grading (Table 2).

Hypothesis Testing Results

Using “Format” (i.e., following the instructor’s guideline) as the independent control variable, a correlation analysis and one-way ANOVA are conducted to test the five hypotheses regarding the primary research questions of this research, and the results are presented in Tables 3 and 4 respectively.

In Table 3, Column 1 (under Format) represents the correlation coefficients between the independent variable - Following the Instructor’s guideline, and the four major learning outcome measures. The remaining columns show the degree of potential relationships among the four learning outcome measures. It can be seen clearly that all of the learning outcome measures have a positive relationship with the degree of following the instructional guideline, i.e., all correlation coefficients are positive with a value larger than 0.27. For example, with a high correlation coefficient of 0.736 (p-value at 0.000), it is evident that if students followed the instructor-provided instructional guidelines well, their understanding about the required course materials is better (comparing to those who didn’t follow the instructional guidelines well), that is, the proposed H_1 is strongly supported.

Table 3. Correlation Analysis

	Format	Understanding	Application	Analysis	Synthesis
Understanding	0.736				
	0.000				
Application	0.697	0.901			
	0.000	0.000			
Analysis	0.515	0.661	0.649		
	0.000	0.000	0.000		
Synthesis	0.389	0.538	0.572	0.698	
	0.000	0.000	0.000	0.000	
Evaluation/R	0.271	0.381	0.400	0.553	0.518
	0.005	0.000	0.000	0.000	0.000

Table 4. The Results of One-Way ANOVA

Factor	F-Value	P-Value	Individual 95% Confidence Intervals			
Understanding	48.58*	0.000	Level	N	Mean	StDev
			1	10	1.3000	0.4830
			2	20	2.3000	0.8013
			3	29	3.3793	0.6769
			4	46	3.6304	0.5719
Application	44.83*	0.000	Level	N	Mean	StDev
			1	10	1.2000	0.4216
			2	20	2.4000	0.7539
			3	29	3.3793	0.6769
			4	46	3.4783	0.5865
Analysis	13.56*	0.000	Level	N	Mean	StDev
			1	10	1.1000	0.3162
			2	20	1.7500	0.7164
			3	29	2.4483	0.8275
			4	46	2.6304	0.8783
Evaluation/Reflection	7.46*	0.000	Level	N	Mean	StDev
			1	10	1.5000	0.7071
			2	20	1.7500	0.6387
			3	29	2.3793	0.6769
			4	46	2.3913	0.7740

(* indicates a statistic significance at 95% confidence interval, in which DF=104)

This conclusion is reconfirmed by the results of One-Way ANOVA testing shown in Table 4 (Row 1), not only from the given *F-value* (48.58), but also from the confidence interval charts on the right. It is evident that while the difference between the top two levels (Levels 3 and 4) may be insignificant, but the differences between the top two levels and the bottom two levels (Levels 1 and 2) are clearly statistically significant. Similarly, having a

correlation coefficient of 0.697 (p-value at 0.000), the proposed H_2 is also strongly supported, that is, if students followed the professor-provided instructional guidelines well, their application of the course materials to the situations described in the case study will be improved in a significant measure. It is interesting to note that from the observed confidence interval charts, not only the

Table 5. Summary of the Results of Hypothesis Testing

Hypotheses	Degree of Support	Result	
		Correlation Coefficient	ANOVA (F)
Hypothesis-1	Very Strongly Supported	0.736	48.58
Hypothesis-2	Very Strongly Supported	0.697	44.83
Hypothesis-3	Strongly Supported	0.515	13.56
Hypothesis-4	Strongly Supported	0.389	
Hypothesis-5	Supported	0.271	7.46

differences between the top two levels and the bottom two levels are statistically significant, even the difference between the bottom two levels (i.e., Level-1 and Level-2) is also meaningfully significant. In comparison, the *Hypotheses 3 – 5* are supported but in a less significant manner. For instance, the proposed H_3 is also supported by the data from this research, but with a smaller correlation coefficient of 0.515 (Table 3), and a much less significant ANOVA result of an *F-value* of only 13.56 (Table 4). Finally, as indicated earlier, while both H_4 and H_5 are supported by the data of this research, but with a much less significant degree and with relatively smaller correlation coefficients of 0.389 (p-value at 0.000) and 0.271 (p-value at 0.005). The results of all hypothesis testing are summarized in Table 5. As discussed earlier, the above results should be expected, as the last three learning outcome measures represent three highest level of learning skills, as a result, the most sampled student case study reports received lower scores on these measures – even for those who followed the professor-provided instructional guidelines relatively well.

Qualitative Analysis Results

Finally, along with the statistical analysis described above, the selected student case reports are also qualitatively examined through the approach of content analysis, as discussed earlier in the research methodology section. Three major learning themes are identified - which can provide additional insights to confirming and supplementing the findings obtained in earlier sections of quantitative analysis. In particular, the qualitative analysis results can further enhance our understanding about the facilitating roles of the instructor and the instructional guidelines. A summary of the qualitative findings along with student examples is presented in Table 5. Three major learning themes are described below.

Learning Theme 1: Most students are successful in identifying a company's unique competitive edges by applying OM principles such as those in production cost control, demand management, planning, quality control, and inventory control.

Throughout the reading process of those selected student reports, it is observed that most students followed

the instructional guide and studied businesses of small or medium sizes. These students often are able to obtain enriched first-hand information, through either direct observations or interviews of an insider. Many students gained insights about how successful businesses often had to build unique and creative strength in order to hold a position in a market place which is often filled with relentless competitions (see Table 6 - Examples 1 and 2). We believe that such insights are valuable and important for undergraduate students who have limited real-world business experiences. These insights may guide them in choosing future employers who share their personal values and philosophies, facilitate them in the process of fitting into a business organization, or maybe one day help them establish successful businesses of their own.

Another finding supportive to the Learning Theme 1 above is the fact that a majority of the students, under the advice of the instructor, had selected businesses that they were familiar with for their undergraduate-level experiential learning assignments. For example, some students chose to analyze operations at a local restaurant because they dine at the restaurant often or were once hired by the restaurant. Other students chose to study a company owned by one of their friends or relatives. Many students also selected to study companies with which they had positive experiences as a customer. However, the above selection approaches may introduce personal biases in presenting and analyzing the cases. It is also possible for some students to choose a family-owned business to which many key OM concepts and principles are not directly applicable. Despite these concerns, it is one of our instructive conclusions from this research that the selection of small to medium-sized businesses will be the most appropriate for an undergraduate-level experiential learning assignment. While students should be cautioned about the potential biases, another consideration is that the instructor may require students to submit their cases for approval before their projects start.

Learning Theme 2: Students who produced high-quality case reports are those writing beyond just presenting information by adding their own in-depth analysis, especially paying attention to using analytical approaches such as comparison and contrast.

Table 6. Summary of Qualitative Findings and Student Examples

Themes	Student Examples
<p>Theme 1: Most students are successful in identifying a company's unique competitive edges by applying OM principles such as those in production cost control, demand management, planning, quality control, and inventory control.</p>	<p>Ex. 1: "Maxine Clark has founded a company that even adults can go back in time to their childhood through memories of that favorite-stuffed animal or to enjoy watching their own children," "employees have a very relaxed and fun atmosphere at Build-A-Bear Workshop headquarters. Employees can bring children to work or if they would like to bring their dogs from home...the dress code is very informal, such as a top executive coming to work in jeans and a t-shirt." Ex. 2: "Pricing may be one of its strongest points in creating a competitive edge. Sports Emporium will sell any product in the store at a price lower than any of its competitors. As explained by one of the store managers at Sports Emporium, low price along with quality customer service puts them head and shoulders above their bigger and stronger competitors."</p>
<p>Theme 2: Students who produced high-quality case reports are those writing beyond just presenting information by adding their own in-depth analysis, especially paying attention to using analytical approaches such as comparison and contrast.</p>	<p><u>Strong analysis:</u> Ex. 3: "the HVAC industry has become increasingly competitive because companies based in the United States are migrating to foreign companies because of cheaper labor costs. This, in turn, causes companies to be more aware of wasteful and unnecessary production activities, and constantly search for methods to reduce overall production cost. In an effort to address these issues, Rheem Manufacturing Company is using lean manufacturing methods." Ex. 4: "The demand for Filson clothing is very seasonal. The majority of the outdoor clothing is only suitable use in cold and wet conditions. This drawback has caused the company to diversify its product line slightly to include more 'unseasonal' products...this effort to alter demand for its products has allowed them to have a more steady income and production volume".</p>
<p>Theme 3: Due to the lack of confidence in their own ability to provide meaningful suggestions or recommendations, most students failed to provide good recommendations or suggestions for the company's future direction as required by the instructional guide.</p>	<p><u>Weak analysis:</u> Ex. 5: "Exchange Bank is definitely in their growth stage and shows strong signs that they will continue to remain a leader amongst their competitors". Ex. 6: "if demand changes, Dicks will simply contact suppliers and distributors to deliver new <u>Did not provide specific recommendations:</u> Ex. 7: "the suggestion that I would make to Chick-fil-A would be to develop an effective operations strategy that includes the five competitive priorities: cost, quality, delivery, flexibility, and service". <u>Did not discuss potential benefits and barriers:</u> Ex. 8: "The recommendation that I would suggest is it should go international...I believe it should do more TV advertising in order to really show off its style that it has to offer".products for them to sell".</p>

In general, it has been observed that almost all of those good student reports which earned high grade points are those writing beyond just presenting the collected information. More specifically, those reports have their own in-depth analysis with specific comments about a market segment, a particular industry, or a competitive business environment with appropriate comparisons and contrasts (see Table 6 - Examples 3 and 4). In comparison, it is not unusual to read some student reports in which strong comments or statements are made without a sound analysis and supportive examples or evidence (see Table 6 - Examples 5 and 6). From this learning theme, an instructive recommendation is that before making such experimental learning assignment through a live case study approach, the instructors should demonstrate case presentation skills and analytical approaches more explicitly and directly. For instance, examples, elaborated discussions, and analysis through comparisons and contrasts typically are

necessary components of a high-quality case report. Students should be encouraged to incorporate these components more consciously, consistently, and systematically. Sample student case reports with good grades can certainly be shared with students. Additionally, student progress report can also be used as another instructional tool to monitor students' performance in this effort.

Learning Theme 3: Due to the lack of confidence in their own ability to provide meaningful suggestions or recommendations, most students failed to provide good recommendations or suggestions for the company's future direction as required by the instructional guide.

This learning theme is consistent with the results highlighted in the earlier quantitative analysis (Tables 3 and 4). Several explanations are available. The lack of confidence in their own ability to provide meaningful suggestions or recommendations is believed as the key reason, as many students indicated when being asked by

the instructor. Students basically were afraid of losing grade points by giving inappropriate suggestions because of lack of first-hand business experiences. Another known reason is a misconception by many students that they could earn a better grade by portraying the company in a more positive light so that any recommendation or suggestion may imply a criticism for the company's current management. A third explanation is the fact that knowing their reports will not be seen by the companies, students believed that it was meaningless to give an advice or a suggestion that would never be considered. In addition, with a few exceptions, most students provided either too broad or too ambiguous recommendations (Table 6 - student Examples 7 and 8).

The abilities to think independently and critically and to translate thinking into sound business decisions or solutions are qualities highly valued by potential employers. Generating meaningful and relevant recommendations provides such an excellent opportunity for business students to build critical thinking and decision making skills. In order to encourage students to take this extra step in a learning experimentation with a live case method, the following instructive approaches are thus recommended: (1) The instructor should share "sample" reports with students; both positive and negative examples. (2) The instructor should assure students with explicit instruction that providing recommendations for a company does not necessarily mean to criticize the company's current policies or practices. (3) The instructor may consider assigning higher percentage of credit to the quality of students' final recommendations in the grading process. (4) The instructor should emphasize the open-ended nature of an experiential learning assignment, and encourage students to provide several alternatives when a clear-cut direction seems to be unavailable. (5) The instructor should caution students against the tendency to provide a right-or-wrong answer or a one-size-fits-all decision. (6) Finally, the instructor may consider using "*student progress report*" as a means to monitoring and directing students' effort in achieving the objective of having high quality students' recommendations for their case study reports.

Conclusion and Recommendations

This paper describes an empirical study investigating the effect of an innovative instructional guideline provided by the instructor for a required OM (Operations Management) class term project on the pre-established course learning objectives at undergraduate level. While the research on such experiential learning with graduate students has been widely reported, similar research at the

undergraduate level has been quite limited in the literature. As such, the results of this research will certainly add new contributions to the research field of experiential learning at undergraduate level in terms of benchmarks and references for future research.

Both quantitative and qualitative tools are used in examining the results of this research, and many meaningful and important instructive implications have been derived from this research. For example, this research concludes that when a live case method is used in an instructional class project at the undergraduate level, it is important to provide a clear and direct instruction about - how to select a company and how to obtain the required real life business information for their case study. Five hypotheses were constructed to examine the issues addressed in this research, and are tested with related statistical procedures. The results showed that all five hypotheses are strongly supported by the data from this research but at different degrees. A clear instructive suggestion is that an instructional guide for such a live case study, as a scaffolding tool, can significantly improve students' performance and learning outcome for their case study experience. When some key business financial performance measures are included in a live case method at undergraduate level, the result of this research suggests that the instructor must provide a consistent and practical instruction to guide students for more real and objective discussion. More importantly, perhaps, regarding the primary research question of this study - constructed through *Hypotheses 1 and 2*, which are strongly supported by the data from this research, this research conclude that by following closely the instructor-provided instructional guidelines, students will have a better understanding about the required course materials and more likely being able to better apply the learned course theories and concepts into their real life case reports.

Finally, through a qualitative approach of content analysis, three major learning themes are identified, providing meaningful insights for the facilitating roles of the OM instructors, such as: sharing "sample" reports with students; assuring students that their suggestions (positive or negative) have no relation to their final grades; assigning higher grade percentage to the quality of students' final recommendations; warning students against the tendency to provide a right-or-wrong answer or a one-size-fits-all decision; and using "*student progress report*" as a means to monitoring and directing students' effort. However, one possible limitation is that the findings of this research are based on students from one institute and one instructor only. It is believed that the above instructive implications and insights will be contributive to the literature and may be used as benchmarks and references for future research.

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Appendix-A: The Sample Student Class Project Paper Guideline

A CASE STUDY: OPERATIONS STRATEGY ANALYSIS

Prepare an "Operations Strategy" analysis for a small or medium sized business organization (preferably a company with a limited or single product/service line produced at a single or limited number of sites).

The overall purpose of the analysis is to determine, with some specificity, how the company competes in the marketplace through its operations. It is not particularly important for this project whether the company is doing a good job or poor job in operations.

The outline below should be followed in developing and writing the report. Other formats may be used but check with the instructor before deviating significantly from the outline. For the grading criteria, emphasis will be placed on the supporting logic and evidence presented in the report. An innovative, professional presentation style will also be considered positively in grading. As a general guideline, the report should not be significantly longer than 15 pages (double-spaced) or shorter than 10 pages (double-spaced). Appendices may be used to support your analysis.

The outline below tends to "cover the waterfront". For a particular firm, several of the topics may be irrelevant or of very minor importance. It is also normal to expect that information may be unattainable in a few of the areas. Simply make a statement to this effect. In the outline below, the use of the term "product" does not imply that a manufacturing company should be selected. Substitute "service" for "product" if a service organization is selected.

I. GENERAL INTRODUCTION (2 or 3 pages).

- A. Name of the firm, location, major product(s), market segment served.
- B. Apparent product strategy of the company (60 or less words).
- C. General financial posture (financial report not necessary).
- D. Major competitors. Position of company in the industry (estimated market share, etc.).
- E. Substitutes for company's products.
- F. Nature of entry/exit constraints (barriers!) to the industry.
- G. Importance of industry suppliers/power of customers.
- H. Intensity of rivalry in the industry.

II. OPERATIONS (6 to 10 pages).

A. Product(s): Where is the firm' product(s) on the product life cycle? What is the breath of product line relative to competitors? Is product change/development a factor in the industry?

B. Process: General classification. Identify significant inputs/outputs. Level of automation? Estimate of position on the product/process matrix. Industry leader or follower in process technology? Is process technology important in the industry?

C. Level of Vertical Integration: Does the company practice vertical integration to the industry? What is the apparent motivation - cost? control? quality? risk?

D. Demand Management: Does demand for the firm's products vary significantly? Does this present significant problems? How is the varying demand met - varying employee work hours, subcontracting, inventory, backorders, hiring/firing? Does the firm attempt to control/alter demand patterns? If so, how?

Appendix A cont.

E. Capacity: Does the company have a small/large range of volume output capability? Do unit costs vary significantly with volume? If so, how? Has the firm periodically in the past increased capacity? If so, do capacity increases lead/lag demand?

F. Facility Location: What motivated the company to locate where it did? Is location of firms in the industry dictated more by customer location, raw material/labor? politics? other factors? Does the firm' location provide any advantages/disadvantages over competitors in the marketplace? Are firms in this industry sensitive to location?

G. Use of Inventories: Does this company produce "to-stock" or "to-order"? What relative advantages are offered by this choice? What general level of inventories are maintained in finished goods, raw materials, work-in-process?

H. Organization/Work Force/Management: Is job specialization prevalent? Job enlargement? Job enrichment? Is worker motivation a problem with this type of production process?

I. Quality: Define briefly the important "dimensions of product quality". Is there significant staff involvement in quality management? Is there a quality differential among the products sold by industry members?

J. Productivity/Efficiency: Are any formal measures of productivity used in the firm? Are they computed for each organization unit? For the firm as a whole? For each product? Is a formal productivity improvement program in place?

K. Cost Measurement: What cost/profit measures are routinely available and used by operations management? Is a formal cost accounting system used?

L. Overall Operations Posture in the Firm: Choose one of the following "stages" as the most representative of the operations function and justify/explain. (1 page maximum).

1. Internally Neutral: Operations is primarily reactive to internal pressures placed upon it - does not have its own planning mechanism.
2. Externally Neutral: Operations works hard to keep up with the industry practice and maintain "neutrality" or parity with competitors.
3. Internally Supportive: Operations does work consciously to be compatible with and supportive of the firm's business unit strategy.
4. Externally Supportive: Operations actively seeks ways to develop competitive advantages for the firm - operations is a leading factor in the firm's attempt to develop a competitive advantage.

M. Other Factors: Are there other specialized factors that are not covered elsewhere in this outline that significantly impact the operations posture of this firm, e.g., government regulations, worker safety, international issues, social responsibility, etc.

III. CONCLUSIONS (Two pages maximum)

Do the firm's operations activities appear to be compatible with the firm's product strategy for competing in the marketplace? Are significant incompatibilities noted (i.e., incompatibilities between the operations strategy and the business strategy, between the operations strategy and the other functional strategies, or between the decision categories within operations)? Does operations make a significant contribution to this firm's competitive advantage or success in the marketplace - or is the firm more driven by marketing, etc.? Are there significant environmental changes that could arise in the future that will impact operations?

Recommendations?

Suggestions?

Appendix B

Assessment Rubric

Part I: Content and Structure

	Very Satisfactory (4)	Satisfactory (3)	Somewhat Satisfactory (2)	Not Satisfactory (1)
<p>The following 11 components on the instructional guide must be included: Introduction, Product, Process, Demand Management, Capacity, Facility Location, Quality Management, Productivity or Efficiency, Cost Measurement, Overall Operations Posture, and Conclusion</p>	10-11 required components are present in the case report.	8-9 required components are present in the case report.	6-7 required components are present in the case report.	Less than 6 of the required components are present in the case report.

Part II: Quality and Skills

	Excellent (4)	Good (3)	Fair (2)	Poor (1)
<p>Comprehension (the student demonstrates comprehension by one or more of the following: interpreting, clarifying, giving examples, comparing, explaining, summarizing, elaborating, or a comparable activity)</p>	The desired skill is present systematically and consistently throughout the case report.	The desired skill is present in a few elaborated sections of the case report.	The desired skill is present in fragmented or isolated sections in the case report.	The desired skill is not present or found only in one or two places in the case report.
<p>Application (the student demonstrates application skills by one or more of the following: solving problems, locating proper resources and information, or a comparable activity)</p>				

Appendix B cont.

Analysis (the student demonstrates analytical skills by one or more of the following: differentiating, organizing, making connections, establishing relationships, exploring underlying structures, or a comparable activity)				
Synthesis (the student demonstrates synthesis skills by one or more of the following: creating new knowledge, reflecting, recommending, designing, planning, or a comparable activity)	New knowledge is evident; recommendation provided is relevant and meaningful to the company's operations.	New knowledge is somewhat evident; recommendation given is relevant to the company's operations, but is cursory or incomplete.	New knowledge is somewhat evident; recommendation is given, but not relevant or only marginally relevant to the company's operations.	New knowledge is not evident; no recommendation is given or the recommendation given is irrelevant to the company's operations.
Evaluation (the student demonstrates evaluation skills by one or more of the following: judging, commenting, critiquing, assessing, or a comparable activity)	Personal evaluation or critique is present, relevant to the company's operations, meaningful, and complete.	Some personal evaluation or critique is present and is relevant to the company's operations, but is cursory or incomplete.	Some personal evaluation or critique is present, but is not relevant or only marginally relevant to the company's operations.	No personal evaluation or critique is present.

Part III: Format and Appearance

	Supportive	Not Supportive	None
References			
Appendices			
Comics			
Graphic Displays			