Learning Outcomes in Capstone Business Simulation:

Comparing On-ground and Online Instructional Formats

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Abstract

This paper examines the learning assurance results from strategic management capstone courses delivered in distance learning (DL) and traditional classrooms (on-ground, OG) formats. Results from multivariate statistical analyses find that there are significant differences in learning assurance report (LAR) scores by delivery format (on-ground vs. DL), for gender and delivery format, and academic major and delivery format. Simulation performance was higher for DL students though the relationship between simulation performance and final course grade was not significantly different for OG and DL cohorts. Implications of the findings are discussed and suggestions for future work offered. The limitations of LAR scores (e.g., deficiency of measures) are considered.

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 Current generations of college students (Millennials and Gen Z) have a strong interest in and aptitude for using technology in general and in facilitating learning efficiency and effectiveness in particular. Online learning management systems and technological tools seem particularly well-suited to these new generation learners (Aviles & Eastman, 2012; Postolov, Sopova, & Iliev, 2017). These students have strong affiliation needs, low tolerance for ambiguity, expectations for prompt feedback, and demand personalized learning experiences more than previous generations who were largely taught via lectures. Faculty members are increasingly utilizing instructional technologies consistent with new generations of students by providing them with active learning experiences, group engagement, and knowledge of results such as those provided by capstone business simulations.

Business schools aspire to developing future managers and organizational leaders with expertise, understanding, and proficiency to implement strategic initiatives emerging from unpredictable changes in the economy, society, technology, and the cultural environment. The goal of management education research involves constructing an integrated understanding of the pedagogical framework that combines the depth of new instructional technology, using active learning, along with a variety of delivery methods and learning assurance measures that are integral to agile business education. AACSB – International has identified learning agility as the capacity for rapidly acquiring new capabilities for addressing new and unfamiliar situations and problems (LeClair, 2016).  Agility can be enhanced by offering scenarios for discovery in experiential learning activities by embedding opportunities for reflection and coaching. Developing agility could involve the use of competitive business simulations that combine practical strategic decision-making experiences with academic content.

Gupta and Sangeeta Shah (2013) have conceived conceptual models that help in building entrepreneurial agility through business school education containing sub-paradigms derived from theories including “richness (from theory of experiential learning), reach (from social network theory) and business school education agility (from contingency theory)” (Gupta & Sangeeta Shah, 2013, p. 370). Combining these three dimensions enable a new model for business schools, that enable the production of graduates with entrepreneurial agility achieved by mixing traditional-style education with new learning technology that facilitate capabilities to deal with unforeseen events in the future (Gupta & Sangeeta Shah, 2013).

Business simulation games can be an effective learning tools in capstone strategic management courses, aside from, or in addition to, case studies and consultancy projects (Alstete & Beutell, 2016). However, as distance education continues to increase in popularity, there is a need to examine the differences, if any, between simulation effectiveness in on-campus (on-ground classroom) courses and the distance education (DL) delivery formats. Furthermore, educators should judiciously construct their capstone business courses considering instructional techniques and delivery formats. Faculty members and academic department chairs often choose project assignments to foster integrative learning experiences for students consisting of balanced delivery methods such as online, hybrid, and on-campus courses that include case study assignments and business simulation games. These instructional methods and delivery systems have different benefits and learning goals. And, while the use of multiple deliveries and assignments is not mutually exclusive, educators must understand the variables at play to effectively harmonize these methods (Alstete & Beutell, 2016).
 Furthermore, business educators must continuously assess the merits and limitations of their courses to ensure that their programs meet the demands of businesses and organizations (Weber & Englehart, 2011). Many collegiate business programs structure their curricula around functional areas (such as accounting, finance, information systems, management, marketing management and so on), rather than “breaking down” functional silos to foster integration of knowledge from a holistic perspective. It appears, though, that this is changing (Neill & Jiang, 2017). Therefore, the following brief examination of previous writings intends to explore several approaches for delivering the business curriculum via on-campus and distance education with active learning competitive online business simulations that assess learning along with traditional case studies and testing in capstone strategic management courses.

**Review of Related Literature**

A casual-comparative design study was used by Guy & Lownes-Jackson (2015) to determine whether student learning varies as a function of delivery format: a hybrid, computer-based simulation as part of an on-campus classroom versus a fully online approach. This study covered a timeline six-year period from 2008 through 2014 using a population of 281 undergraduate business students enrolled in a 200-level (sophomore) microcomputer application course. The findings support earlier research of simulations that found more effectiveness when these replication systems are used as an additional learning tool in traditional on-campus courses and in hybrid (partial distance education) environments (Guy & Lownes-Jackson, 2015).

Another study was designed to investigate differences in the learning outcomes of graduate students in the MBA degree program at The University of Tennessee at Chattanooga. This study compared traditional instructional settings with students who received their instruction via distance learning. Additionally, the study compared these previously mentioned groups to students who received a mixture of distance learning and traditional classroom instruction.  A somewhat older study that examined differences in cumulative GPA scores of students in a distance learning setting with students in traditional classroom settings as well as students in hybrid courses found no significant differences (Dodd, 2001).

Riley, Ellegood, Solomon, & Baker (2017) examined how course delivery mode, specifically distance education versus traditional in-person, affects understanding in operations management concepts using a simulation. A survey of 514 undergraduate students found that, for the in-person population, student team interaction, previous software experience, instructor's direction, and the simulation game's usability affected student learning. Notably, this differed from the distance education students who were only influenced by the simulation's usability and instructor's direction (Riley, Ellegood, Solomon, & Baker, 2017).
 Previous research examined student performance indicators in online distance education courses offered on the Internet (Alstete & Beutell, 2004). The study analyzed grade performance in a sample of 74 undergraduate and 147 graduate business students and the relationship of grades with various indicators. The research revealed that age and gender are associated differently for undergraduate and graduate students in distance education courses, and that undergraduate grades, age, work experience, and discussion board grades are significantly related to overall course performance. Interestingly and timely with other research (Furuta, 2017; Shen et al., 2012), standardized test scores (SATs, GMATs) and organization position level are not related to the performance in distance learning courses (Alstete & Beutell, 2004).
Other papers have examined distance education with many promoting the benefits e-learning over traditional on-campus instruction. However, it has been noted that despite this effort, implementation of e-learning systems often fails (Ali, Uppal, & Gulliver, 2018). An in-depth review of literature regarding distance education implementation barriers identified 259 studies published between 1990 and 2016. Results revealed that most articles only consider a narrow range of success barriers and that competitive online simulations may be a suitable instructional method in overcoming barriers to distance learning (Ali et al., 2018).
 Teams are also a part of the active learning experiences in many strategic management courses. Learning skills and knowledge from team-based case studies represent a common pedagogic approach in the capstone experiences (Karagozoglu, 2017), although usage varies (Pasricha, 2016). For example, a study (Karagozoglu, 2017) explored why some teams accomplish more in case study work than others. A few variables associated with team characteristics and their impact on team performance were investigated. The results revealed that effects of the independent variables differed in relation to subjective self-assessed team performance and objective expert-assessed performance. Aside from the grade/performance orientation, other independent variables such as team process effectiveness, analytic orientation, learning orientation, and advance preparation revealed a positive relationship, and diversity displayed a negative relationship with subjective self-assessed performance. Only two independent variables, specifically advance preparation and diversity, were found to be related to objective performance expert assessment. Preparation had a positive relationship while diversity revealed a negative correlation to performance (Karagozoglu, 2017).
 Capstone strategic management courses commonly use computer-based simulation games as central pedagogical tools because such simulations are believed to develop strongly-valued skills in crafting business strategy and working effectively in teams (Ritchie, Fornaciari, Drew, & Marlin, 2013; Thompson, Peteraf, Gamble, & Strickland III, 2018). Nevertheless, even with their rich characteristics, there is limited research regarding the relationship between team-level characteristics and simulation performance in DL courses. Research has reported a distinct connection between certain team cultural values, such as a competing values framework, and simulation performance (Ritchie et al., 2013). It is important to understand how these results may influence the pedagogical use of simulations in the strategic management courses regarding culture as a performance tool associated with outcomes.
 Culture in regard to business organizations that are evolving technologically is important to consider, and by extension the antecedences of teaching methods. A study examined distance education that extends the analysis from collegiate management courses to corporate management education (Cater, Michel, & Varela, 2012). The results showed that on-campus students scored significantly higher on the measures of performance utilized. However, for distance education students, the results revealed that student degree major and cumulative grade average were related to better learning outcomes. Furthermore, factors such as the age of the students, students’ experience at college, and students’ familiarity with distance education were not related to learning outcomes (Cater et al., 2012). These results warrant further investigation with respect to precursors and co-influencing variables.
 Distance education can be used successfully in teaching crucially important core business concepts despite the lack of on-campus discussions and face-to-face interactions with faculty members and other students. In fact, students who have completed distance-education courses are able to recall and apply key business concepts as well as students taught in traditional classrooms.  The research may be accounted for by the similarity between the distinct capstone course requirements and distance education options. It is known that capstone strategic management courses are quite inimitable in that, if done properly, demand that students synthesize the learning from various business disciplines in a core curriculum. Therefore a certain level of creativity and independent thinking that may be not be present in many of the on-campus business courses that are taught in the usual manner (Sonner, 1999).
 Overall, the literature review identifies several important topics that warrant further investigation. Notably, antecedents to potential differences in online distance education and on-campus (classroom) learning such as student gender, major field of business study, learning assurance outcomes, simulation performance, course grade, and overall grade point average.
 Figure 1 illustrates the research questions considered in this exploratory study.

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The numbers shown in the figure represent to the following questions:

1. Does delivery method (DL vs. on-ground) predict learning assurance report (LAR) scores from capstone business simulation performance?

2. Are there gender differences in LAR scores in DL vs. on-ground courses?

3. Are there differences in LAR scores based on academic majors (e.g., accounting, management) for DL vs. on-ground delivery?

4. Does business simulation performance course predict capstone course grades differently for DL vs. on-ground courses?

 **Method**

**Sample**

 The study sample comprised 424 senior-level baccalaureate degree business students who enrolled in strategic management and business policy capstone course sections. The students involved were 179 women (42%) and 245 men (58%). The degree majors included accounting (n=96, 25%), business administration (n=15, 4%), finance (n=80, 21%), management (n=62, 16%), marketing (n=86, 22%), international business (n=27, 7%), and information systems (n=20, 5%).

**Measures**

 In addition to gender and major identified above, the following variables were included: on-ground versus DL, external learning assurance report (LAR) scores, internal simulation grade (SimGrade), capstone course final grade (CapGrade), and cumulative grade point average (GPA).

 **On-ground versus distance learning**. This self-selection variable indicated whether students were enrolled an on-ground, in-classroom section (coded as ‘1’) or a distance learning, internet-based course (coded as ‘2’).

**Learning assurance**. The GLO-BUS simulation provides nine empirical measures of student performance derived for making strategic business decisions. Three of these LAR scores are associated with individual performance (i.e., leadership skills, collaboration and teamwork, and analytical skills). The remaining six dimensions are individual scores based on small team participation (i.e., financial management (FinMgt), operations management (OpMgt), marketing management (MrkMgt), human resource management (HRM), strategic analysis and planning (StratAnal), and corporate social responsibility (CSR). This study focuses on the individual level of performance. Observed scores are based on relative external performance of all participants in the simulation within the United States or globally. This study focuses on United States comparisons.

**Capstone course grade**. This was the final grade for the capstone course recorded on a four-point grading scale where A=4.0, B+=3.5, B=3.0, C+=2.5, C=2.0, D+=1.5, D=1, and F=0. Higher scores indicate better course performance. Since GLO-BUS simulation company performance was included as 16% of the final grade, our analyses controlled for the simulation component.

**Cumulative GPA**. This was the overall grade point for all undergraduate courses attempted by the participants. Once again, a four-point grading system was used where an A=4.00. Higher scores indicate better overall academic performance.

**Procedure**

The study involves 424 students who were enrolled in 15 business strategy capstone course sections during a three-year period from 2015 to 2017 in an AACSB-accredited business school at medium-sized U.S. private college in large metropolitan area. The same full-time tenured management professor taught all of the course sections. All students were required to participate in the GLO-BUS simulation game provided by McGraw-Hill publishing. GLO-BUS is packaged with a required course textbook that examines strategic management concepts that are coordinated with applied decision-making in the simulation game and real-world business cases.

The simulation game counts 20 percent of the overall course grade. The remaining assignments include ten required in-class oral case discussions (26%), twelve online chapter quizzes (24%), a team case presentation (10%), and a written final exam (20%). Within the internal GLO-BUS simulation game scoring system, there are individual student and team assignments that include an overall company score (80%) that results in the 16% of the course grade used in this study. The remaining 20% (or 4% of the course grade) of GLO-BUS includes two individual student quizzes and two three-year strategic plans (2.5% each), team presentation (5%) and self/peer evaluations (1% and 4%). Students are assigned to work in teams of two or three that compete against other company teams in each course section that is a simulated competitive industry.

During the first week of each semester the professor lectures on how to play the game and provides detailed information such as a participant’s guide and videos. Each week simulates one year of company operation, and there are two weeks of practice before the graded portion of the simulation begins. The simulation is then conducted for ten consecutive weeks (simulated years) until the conclusion. Students are debriefed after each week (year) performance and after the simulation all students must make a presentation on their company’s performance throughout the semester and explain the most important lessons learned. The winning student team members are awarded certificates and are given the option to be exempted from the final exam in order to instill additional motivation. All enrolled students participated in the GLO-BUS simulation. Student names were removed from the database to preserve privacy and confidentiality. The Institutional Review Board (IRB) indicated that this study was exempt because it was deemed programmatic evaluation.

**Data Analysis** Research questions 1-3 were tested using multivariate analysis of variance (MANOVA) to control for relationships between the dependent variables (LAR scores) and to minimize the probability of Type I errors. Tukey *post hoc* tests were used to assess statistically significant differences between multiple groups for research questions two and three. Research question 4 was tested using Pearson product-moment correlations computed separately for OG and DL groups. The significance of the difference between these correlations was tested using Fischer’s *r* to *z* transformation.

**Results**

Table 1 reports the means, standard deviations, and Pearson product-moment correlations for the major study variables. Three strong and highly significant correlations stand out: leadership and teamwork (*r*=.80); financial management and simulation grade (*r*=.82); and, strategic analysis and simulation grade (*r*=.72).
 Recallthat research question 1asked whether there were differences between delivery methods (on-ground versus DL) predicting learning assurance report (LAR) scores from capstone business simulation performance. MANOVA results (Table 2) indicated significant differences for five of the nine LAR dimensions: analytical skills (*F*(1,409)=12.45, *p*<.001), FinMgt (*F*(1,409)=43.83, *p*<.001), MrkMgt (*F*(1,409)=11.47, *p*<.001), HRM (*F*(1,409)=10.01, *p*<.002), and StratAnal (*F*(1,409)=7.84, *p*<.005). DL students were significantly higher on all of these LAR dimensions with the exception of analytical skills where OG students were significantly higher.
 The second research question looked at gender differences in LAR scores for on-ground vs. DL course delivery. As shown in Table 3, there were five significant differences in LAR scores based on OG-DL and gender: analytical skills (*F*(3,408)=5.15, *p*<.01), FinMgt (*F*(3,408)=15.60, *p*<.001), MrkMgt (*F*(3,408)=4.61, *p*<.01), HRM (*F*(3,408)=3.65, *p*<.05), and StratAnal (*F*(3,408)=3.63, *p*<.05). *Post hoc* analyses revealed that men in DL sections scored significantly higher than men and women in OG sections for all significant LAR scores with the exception of analytical skills. Women in DL sections scored higher on financial management than men and women in OG sections. OG men and women scored significantly higher than DL women on analytical skills while OG women scored higher than DL men on the same dimension.
 Research question 3 tested for differences in academic business major for OG and DL course sections. This analysis was confined to the four largest majors (i.e., accounting, finance, management, marketing) since sample sizes for the other majors were too small for analysis. Thus, eight groups were compared representing combinations of OG vs. DL and the four largest academic majors. Findings indicated three overall differences for these analyses: leadership (*F*(3,313)=2.56, *p*=.05), MrkMgt (*F*(3,313)=3.51, *p*<.01), and StratAnal (*F*(3,313)=5.50, *p*<.001). *Post hoc* analyses indicated that finance majors scored significantly higher (*p*<.05) on leadership and marketing management (*p*<.05) than marketing majors. Finance majors scored significantly higher (*p*<.05) on strategic analysis than accounting and marketing majors.
 Finally, research question 4 tested differences in the relationships between GLO-BUS simulation performance and capstone course grades for on-ground courses vs. distance learning courses. Correlations between simulation grades and capstone course grade were computed separately for OG and DL cohorts. The correlation between simulation performance and capstone grade was, *r*=.44 (p<.01) for OG students and r=.31 (p<.01) for DL students. An *r* to *z* transformation indicated that the two correlations were not significantly different (*z*=1.41, *p*=.08).

**Discussion**

Based on the results of this study, analyzing learning assurance results from business simulations might be useful in contributing to programmatic and curricular changes that have the potential to enhance student learning, competencies, and program effectiveness. There were differences in learning assurance dimensions for OG versus DL, OG versus DL by gender, and, to a lesser extend OG versus DL by academic business major field. Most of the observed differences clustered around five LAR outcomes: analytical skills; financial management; marketing management; human resource management; and strategic analysis. These findings are interesting and suggestive but clearly not definitive since many other factors could be involved.

 One of the truly important and interesting aspects of GLO-BUS for current generations of college students (i.e., Millennials and Gen Z) is feedback about simulation performance levels within the school, within the United States, and on a global basis. The importance of timely, evaluative performance feedback for these students was noted previously. Thus, students get comparative rankings of their performance that is the basis for subsequent competitive decisions. This suggests that the benefits of the game from the students’ perspective transcends what LAR scores are revealing about outcomes (things that are more important for curriculum and outcomes assessment committees); this “meta” benefit of competitive feedback for students might be more difficult to capture with questionnaires since it is temporal (i.e., until the next decision).
 This study was focused on differences in LAR scores for OG and DL students but differences in simulation performance scores were also noted. Although the relationship between these variables was not significantly different for OG and DL students (research question 4), there were observed differences in simulation performance for these groups. DL students scored significantly higher that OG students on simulation performance although overall course grades did not differ significantly. Since students were not randomly assigned to course sections, we are uncertain about the extent that observed differences are the result of the course format, individual difference variables, or a combination of factors.

Since LAR differences largely “clustered” around five LAR factors, a confirmatory factor analysis was conducted on all nine LAR variables. This analysis yielded two dimensions: leadership/collaboration and functional management (i.e., financial management, marketing management, human resource management, and strategic management). Note that four of the five LAR dimensions comprise the functional management latent factor. This is a notable finding in itself. *A priori*, differences in leadership/collaboration might be anticipated between OG and DL cohorts since DL students might have less face-to-face interaction and team contact. While there were significant differences on functional management (as expected and confirmed by previous results of this study), no differences for leadership/collaboration were observed. If the DL cohorts functioned as virtual teams, this would be quite an important finding.
 There are caveats to using GLO-BUS LAR scores “off the shelf” as it were. The LAR scores should not be taken at face value for programmatic validation purposes. LAR data are useful mostly as part of an overall curriculum development, evaluation, and improvement strategy. Some of the scores are clearly deficient (i.e., they do not fully represent the constructs under consideration). A specific example is human resource management. GLO-BUS measures HRM as labor costs. This is one part of HRM, but it is not a central aspect of HRM in most curricula and as practiced by professional societies such as the Society for Human Resource Management. Using GLO-BUS LAR dimensions requires that users move beyond LAR labels to examine the specific items that are being assessed. Other LAR factors may contain elements that schools do not associate with that factor (i.e., contamination). At a more “macro” level, LAR likely do not represent the full range of variables that schools are seeking to achieve as outcomes of their programs.
**Limitations**
 Possible limitations of this study include using a single business school population, the same instructor taught all of the courses, the structural limitations of grading allocations for the assignments studied, the change in the simulation game from previous editions, and the population of distance learning students sampled. The DL students included only Spring semester students that represented a slightly higher percentage of accounting majors that may be a factor in observed differences. This study did not include shorter summer distance courses. There may also be self-selection biases since, until recently, students could select a capstone section based entirely on case studies with no business simulation. Perhaps students with higher levels of technology skills select DL sections based on their perceived proficiency in competing in an online format.
 Two other limitations should be noted: one is focused on GLO-BUS model overall while the other considers the LAR variables and their labels. In an era that is characterized as “services” GLO-BUS (and other simulations) continue to focus on manufacturing companies (Latta, Clark, & Wathen, 2016) for simulation. Perhaps, over time, capstone business simulations can migrate to service companies that are more central to and prevalent in the contemporary economy. Second, the LAR variable names may be unwittingly reinforcing the silo mentality by focusing on functional areas from the business curriculum rather than fostering integration of knowledge from a holistic perspective. The notable exceptions to this are leadership and collaboration skills.
**Future Research** There are many directions for future research, but one seems particularly useful. Identifying the way in which core business courses contribute to capstone simulation and course performance is critical. There is an expectation that the core business courses are foundational for effective capstone performance. This is still a working hypothesis however. The capstone is positioned in most business schools as an integrative experience (i.e., the blending of all core course areas). This is an explicit, or perhaps implicit assumption, of many academic business degree programs. Mapping core course performance to capstone outcomes may provide truly useful information for programmatic modification and enhancement. This could also include an assessment of core courses that increase leadership and collaboration skills and those that increase functional business skills.
 Future research should also include hybrid strategic management courses that are partially on-campus and partially distance learning that have become popular (add citation here) as well as the team teaching and the increasing use of service learning and consultancy projects (Weber & Englehart, 2011).

**Conclusion** This paper reveals several important aspects of learning assurance results in on-campus and distance learning capstone strategic management courses using business simulations. Business policy and strategy courses have traditionally been a synthesis of business core topics. Understanding strategic management principles is required for crafting and implementing an organization’s directional policy effectively. The relatively recent introduction of online, competitive business simulations offers faculty new opportunities to leverage these developments in meeting the needs of new generations of business students who are digital natives. Faculty should seek to ensure that all students maximize their learning potential by enhancing active engagement with challenging, interactive assignments that provide timely feedback. It is tempting to see the delivery method or a new learning tool as an end in itself. However, educators must stay focused on achieving important learning objectives through continuous improvement by examining learning assurance of assignments, courses and curricula that contribute to rigorous program enhancement.

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Table 1

Means, standard deviations, and Pearson correlations for major study variables

 Mean SD 1 2 3 4 5 6 7 8 9 10 11 12 13

 1. Leadership 67.65 29.66

 2. Teamwork 69.11 30.33 .80\*\*

 3. AnalSkills 34.30 30.40 .09 .09

 4. FinMgt 58.51 22.95 -.03 .02 .04

 5. OpMgt 59.20 28.75 -.03 -.03 -.02 -.02

 6. MrkMgt 53.19 21.63 .02 -.00 -.05 .40\*\* -.11\*

 7. HRM 39.29 28.14 .00 .01 .15\*\* .39\*\* .09 .29\*\*

 8. StratAnal 43.90 24.65 .06 .03 .24\*\* .62\* -.16\*\* .38\*\* .45\*\*

 9. CSR 51.17 28.97 .03 .09 -.02 -.16\*\* -.12\* -.22\*\* -.13\*\* -.18\*\*

10. SimGrade 16.31 3.48 .05 .06 .13\*\* .82\*\* -.08 .55\*\* .54\*\* .72\*\* -.22\*\*

11. CapGrade 3.17 0.94 .20\*\* .18\*\* .12\* .28\*\* -.01 .12\* .13\*\* .30\*\* -.16\*\* .38\*\*

12. GPA 3.25 0.42 .23\*\* .22\*\* .22\*\* .21\*\* .05 .04 .09 .18\*\* -.06 .22\*\* .55\*\*

13. Gender 1.42 0.49 .05 .08 -.03 .07 .10\* -.05 -.02 .00 .09 .01 .13\* .26\*\*

14. OG vs DL 1.36 0.48 -.03 -.05 -.18\*\* .32\*\* .01 .15\*\* .16\*\* -.13\*\* -.01 . 23\*\* -.01 .12\* .23\*\*

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\**p<.05;* \*\* *p<.01*

 *Note*. AnalSkills=analytical skills; FinMgt=financial management; OpMgt=operations management; MrkMgt=marketing management;

HRM=human resource management; StratAnal=strategy analysis; CSR=corporate social responsibility; SimGrade=simulation grade; CapGrade=capstone

Course grade; GPA=grade point average (cumulative); Gender: 1=male; 2=female; OG vs DL= on-ground (OG=1) vs distance learning (DL=2).

Table 2

Learning assurance results for on-ground (OG) and distance learning (DL) cohorts

 OG DL
 *Mean SD Mean SD* *F\_\_\_\_\_\_\_\_*

Learning Assurancea

Leadership 67.94 27.93 66.52 31.53 .42*ns*

Teamwork 69.83 28.90 67.20 32.57 1.46*ns*

AnalSkills 38.27 28.29 27.22 32.77 12.45\*\*\*

FinMgt 53.02 23.42 68.29 19.25 43.84\*\*\*

OpMgt 59.09 27.74 59.72 31.10 .08*ns*

Mrk Mgt 50.89 22.99 57.65 19.07 11.47\*\*

HRM 35.74 28.06 44.20 27.05 10.01\*\*

StratAnal 41.44 22.93 48.28 26.99 23.78\*\*\*

CSR 51.34 29.03 50.30 29.35 .55*ns*

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\**p<.05;* \*\* *p<.01*

*a* Controlling for gender. *Note*. AnalSkills=analytical skills; FinMgt=financial management; OpMgt=operations management; MrkMgt=marketing management;

HRM=human resource management; StratAnal=strategy analysis; CSR=corporate social responsibility; OG vs DL= on-ground (OG=1)

vs distance learning (DL=2).

Table 3

Learning assurance results for on-ground (OG) and distance learning (DL) cohorts by gender

 OG DL

 Men (1) Women (2) Men (3) Women (4)
 *Mean SD Mean SD* *Mean SD Mean SD* *F* *Pairwise Comparisons* \_

Learning Assurance

Leadership 67.12 28.06 69.58 27.74 65.16 32.99 67.53 29.24 .29*ns*

Teamwork 68.76 29.33 71.99 28.05 62.54 34.53 70.66 30.78 1.33*ns*

AnalSkills 36.82 28.49 41.17 27.80 30.46 35.36 24.81 30.70 5.15\*\* 1>4; 2>3,4

FinMgt 52.57 23.58 53.91 23.19 70.38 18.18 66.74 19.97 15.60\*\*\* 3>1,2; 4>1,2

OpMgt 58.12 27.13 61.02 29.00 53.21 31.76 64.55 29.88 2.08*ns*

Mrk Mgt 51.60 24.04 49.48 20.83 61.76 19.56 54.60 18.23 4.61\*\* 3>1,2,4

HRM 36.20 28.74 34.83 26.78 47.92 28.26 41.44 25.95 3.65\* 3>1,2

StratAnal 40.84 23.30 42.64 22.26 52.40 26.97 45.24 26.75 3.63\* 3>1,2

CSR 49.68 28.46 54.68 30.02 47.17 29.32 52.62 29.33 1.04*ns*

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\**p<.05;* \*\* *p<.01*

 *Note*. AnalSkills=analytical skills; FinMgt=financial management; OpMgt=operations management; MrkMgt=marketing management;

HRM=human resource management; StratAnal=strategy analysis; CSR=corporate social responsibility; OG vs DL= on-ground (OG=1)

vs distance learning (DL=2).

Figure 1: Antecedents, On-ground vs. Distance Learning Capstone Delivery, and Learning Outcomes Overview

On-ground Capstone

LAR, Capstone Performance, Course Grade

Antecedents: Gender

Major

Distance Learning Capstone