

the Years 2017 and 2018

Raj K. Kohli, Anurag Pant

(Judd Leighton School of Business and Economics, Indiana University South Bend, USA)

Abstract: Assurance of Learning (AOL) has become an increasingly important dimension in Association to Advance Collegiate Schools of Business (AACSB) evaluation standards. In this case study, the authors developed and used a distinct AOL model to measure the impact on students learning in a capstone finance course at a state university in Indiana. Direct assessment of students learning is tested in closely controlled classroom environment through exam. A comparative analysis is completed using AOL developed model for the years 2017 and 2018. The findings suggest the mean non-AOL grade (85.67%) is significantly higher than the mean AOL grade (58.60%) in the year 2017. The same was observed in 2018, the mean non-AOL (85.53%) was significantly greater than the mean AOL grade (70.96). A poor performance in AOL model category indicates that the AOL model developed for this study successfully measures Assessment Process.

Key words: assurance of learning (AOL); case study; capstone finance course

JEL codes: G

1. Background

Assessment is an important factor of improved education on the part of faculty, students and programs. It provides feedback from which those involved can learn and make necessary changes to enhance the learning environment Educational assessment is the amount of knowledge, skills, or benefits in terms that can be accounted for or measured (Ben-Jacob, 2017). Business schools are tending toward a managerial training and skills development model of education. In doing so, the mission of preparing students for jobs and careers in the business world with a demonstrable, ready-made skill set tends to take precedence over the more broad aims of liberal education (Kilpatrick & Kilpatrick, 2008). Kohli (2018) reports academically poor performance by students in tested AOL model versus non-AOL model.

Assurance of Learning (AOL) has become one of the important dimensions in AACSB evaluation standards of business schools. In this article, the author has developed and used a distinct AOL model, to measure the impact

Raj K. Kohli, Professor of Finance, Chair of Department of Finance and Economics; Director of Center of Economic Education; Judd Leighton School of Business and Economics, Indiana University South Bend; research area/interest: finance. E-mail: rkohil@iusb.edu.

Anurag Pant, Associate Professor of Marketing, Chair of Department of Management and Marketing; Judd Leighton School of Business and Economics, Indiana University South Bend; research area/interest: marketing. E-mail: anurag@iusb.edu.

on students learning in a capstone finance course at a state university in Indiana.

Assurance of Learning continues to play an important role in continuous improvement and is positioned within the broader context of curriculum management (2013 Revised AOL Standards – AACSB). With the adoption of the 2003 standards, there was a shift from schools primarily using indirect measures such as student and employer surveys to direct measures. The need for direct measures continues to be present in the 2013 standards. AACSB Assurance of Learning Standards: 20 November 2007 – Revised 3 May 2013

Accountability and Continuous improvement are two basic AOL standards on which AACSB accreditation mainly depends. While learning measures may be assessed through external constituents in accountability, continuous improvement may be measured internally by evaluating student's success.

Palomba and Banta (1999) state that the outcomes assessment process should include:

- a) What will our students learn in our program? What are our expectations?
- b) How will they learn it?
- c) How will we know they have learned it or not?
- d) What will we do if they have not learned it?

This article, examines and compares the above-mentioned four outcomes assessment processes in a course at Indiana University South Bend across years 2017 and 2018. A systematic model developed to test the above four assessment processes is explained in the section.

2. Four Assessment Processes

2.1 Assessment Process #1: What Will Our Students Learn in Our Program? What Are Our Expectations?

Assessment process #1 is tested in a non-structured capstone finance course entitled, "Applications in Financial Management" of the finance program at a State University in Indiana. Students learn to apply knowledge acquired from the previous finance courses by analyzing and solving comprehensive finance cases with extensive spreadsheet applications. In addition, students learn the importance of collegiality by effectively working with their colleagues in groups.

The finance program expects them to understand importance of collaborative learning, collegiality, understanding and applications of financial management concepts. The purpose of this capstone finance course is to let students apply financial concepts and techniques to real life situations, develop skills in the analysis of financial problems and apply the knowledge gathered from previous finance courses. A general format for the course is to place students in a consulting like business situation in which he/she must make a decision regarding a complex financial problem.

2.2 Assessment Process # 2: How Will They Learn It?

This capstone course of the finance program is a self-learning, non-structured class designed for finance majors only. Students spend significant time completing this course, perhaps more than the time spent on any other two senior level business courses at the business school. To compensate students for the extra time and efforts needed to complete this course, the class does not take any regular exam. However, students are required to solve one in-class individual case as final exam in order to demonstrate the individual learning outcome. The model in question is specifically applied for testing the final exam in a closely controlled classroom environment. Assessment process #3 explains the details of the AOL model.

This course is a combination of case analysis, presentation, spreadsheet application, and discussions with minimal essential review lectures. Case solutions require the application of various theories and concepts covered in prerequisite finance classes. Two to three cases on each topic of capital budgeting, cost of capital, discounted cash flows, leasing, risk and return, valuation, mergers, and long term financing are covered during the semester.

The class begins with the professor solving a comprehensive case on any one of the finance topics mentioned in the preceding paragraph. Altogether, the professor spends about three to four class meetings of 75 minutes each in solving one comprehensive course from scratch. After that, professor assigns students to various groups depending on their academic capacity, demographic and background diversity. Students are assigned to different groups for each case presentation round.

Altogether, five groups of about four students present approximately 20 finance cases during the semester. Each group is held responsible for analyzing, organizing, solving and presenting the case to the class on a specified date. At the end of each case presentation, the professor provides feedback, comments, corrections and suggestions to the group. Students are encouraged to challenge the professor's feedback with substantiated justifications without fear of backlash. The grade for the case presentation depends on two dimensions; (a) thoroughness, completeness, accuracy, and applications of financial management concepts; and (b) completeness, accuracy, unrepeated data entry, and properly interlinking worksheets in the spreadsheet model.

2.3 Assessment Process #3: How Will We Know They Have Learned It or Not?

As stated earlier, each group analyzes, solves and presents about five finance cases during the semester. Students solve cases by applying knowledge of finance topics learned from previous courses. In addition, they are required to enter the case solution in a thoroughly prepared spreadsheet. The grades depend on two dimensions; (a) thoroughness, completeness, accuracy, and applications of financial concepts and (b) completeness, accuracy, unrepeated entry of data, and interlinking of multiple worksheets.

In addition to grading students' work through case presentations during the semester, a customized AOL assessment process model is specifically developed and tested for this class. Presumably, a comprehensive and cheating proof final exam was proctored in spring semester 2017.

2.4 Assessment Process #4. What Will We Do If They Have Not Learned It?

Development, application of a newly suggested and tested AOL model for a capstone finance course at a state university in Indiana indicates successful results of the Assessment Process #3. These findings indicate that the finance program may comfortably state that students learned and applied the required concepts in this specific course. The faculty member would have to redesign the proposed AOL model if the students did not successfully learn it. Still, the model can be further modified and probably applied in other finance courses.

3. Customized AOL Evaluation Method for Assessment Process #3 and Results

The exam proctoring method is explained in this section. To ensure a comprehensive cheating proof process of students' understanding of concepts and application, a four steps evaluation process is used.

3.1 Step I: A Completely Customized Exam Administered in a Computer Lab

Students were informed in advance that the final exam would be a customized finance case either on capital budgeting or cost of capital topics. Students were actually tested on a customized case (Table A1 — shown in Appendix) on capital budgeting in April 2017. In order to test the validity of tested concepts, the exam was shown and Okayed by two other finance professors for accuracy, clarity and completion time.

3.2 Step II: Spreadsheet Model

Overall, 20 students enrolled in the class. Each student was given an Excel template with a locked cell (Student #1 to #20). A random student # for each student was used because the excel file with student names cannot be posted on website due to Family Educational Rights and Privacy Act (FERPA) regulations. The process of locking student #s in the provided Excel template guarantees that students cannot share their Excel work with peers. Hence, the results of the exam directly measure if students learned and applied the topics correctly.

Students were given the following formatted Excel template (Table A2 — shown in Appendix) to save typing time and to increase time available for analyzing applying the finance concepts into Excel.

3.3 Step III: LanSchool Classroom Management Software

LanSchool software was used in the computer lab to monitor students' activities while taking the exam with computers. Cell phones (and hence cameras) were not allowed during the exam. This process of no cell phones or cameras guarantees that students cannot share the Excel work with peers via texting or other external means.

A completely customized exam, non-duplicable formatted spreadsheet for each student, not allowing cell phones (hence cameras) during exam along with monitoring the computer with LanSchool software almost guarantees cheating proof examination. The results of the application of this model directly measure if students learned and applied topics properly.

Altogether, 20 students took the exam using this model. The findings of the AOL application model in classroom with negligible chance of cheating are reported below.

4. Results

Table 1 shows the grade distribution (also in Figures 1 and 2) and descriptive statistics for comparative analysis across years 2017 and 2018. The results of an effective AOL would show lower grades for AOL model and higher grades for non-AOL model.

In Figures 1 and 2, we sorted the data on the Semester Grade of students which is hence continuously increasing. It is clear that the difference between AOL and non-AOL grades has a downward slope. This indicates that as the semester grade increases, the difference between AOL and non-AOL assessments declines. Second, the non-AOL performance closely mirrors the pattern of the semester grades of students but not the AOL data. Third, looking at the data distributions above, it is clear that AOL data rarely outperforms non-AOL tests in either 2017 or 2018. It does outperform very occasionally for some of the higher overall performing students.

Non-AOL grades are shown as mean₂₀₁₇ = 85.67%, σ_{2017} = 3.65%, and median₂₀₁₇ = 85.85% while the corresponding AOL model grades are mean₂₀₁₇ = 58.60%, σ_{2017} = 16.62%, and median₂₀₁₇ = 59.00%. Similarly for the year 2018 the non-AOL grades are shown as mean₂₀₁₈ = 8262%, σ_{2018} = 3.71%, and median₂₀₁₈ = 84.05% while the corresponding AOL model grades are mean₂₀₁₈ = 70.960%, σ_{2018} = 13.88%, and median₂₀₁₈ = 75.88%. Thus, the results show that mean and median test grades for AOL model are lower than their respective non-AOL test grades in both years 2017 and 2018. Interestingly, standard deviation (σ) of mean AOL grade is larger than standard deviation (σ) of mean non-AOL grade in both years 2017 and 2018.

Paired sample tests are conducted to test the significance of the difference between the non-AOL and AOL performances of the students and results are shown in Table 2. The findings in Table 2 suggest the mean non-AOL grade (85.67%) is significantly higher than the mean AOL grade (58.60%) with (t = 7.430, p = .000) in 2017. The same was observed in 2018, the mean non-AOL (85.53%) was significantly greater than the mean AOL grade

(70.96%) with (t = 5.255, p = .000).

| | G | rade Distrib | ution and Descript | tive Statistics f | or Compara | tive Analysis | s for two yea | ars | | |
|----------------------------------------|-------------------------------------------------------------|-----------------------------------------|---------------------------|------------------------------------------------------|-------------------|-----------------------------------------|------------------------------------------|-----------------------------------|------------------------------------------------------|--|
| Spring 2017 Grades in Percent (N = 20) | | | | | | Spring 2018 Grades in Percent (N = 25) | | | | |
| Student number | Semester Grade (Weight = 100%) | Non AOL Model (Weight =85%) | AOL Model (Weight=15%) | Difference between Non-AOL and AOL model | Student Number | Semester Grade (Weight = 100%) | Non AOL Model (Weight = 80%) | AOL Model (Weight = 20%) | Difference between Non-AOL and AOL model | |
| #1 | 71.00 | 74.18 | 53 | 21.18 | #1 | 82.55 | 87.60 | 62.35 | 25.25 | |
| #2 | 81.35 | 86.00 | 55 | 31.00 | #2 | 86.75 | 88.73 | 78.82 | 9.91 | |
| #3 | 80.63 | 83.57 | 64 | 19.57 | #3 | 84.42 | 85.82 | 78.82 | 7.00 | |
| #4 | 85.01 | 87.66 | 70 | 17.66 | #4 | 87.32 | 88.86 | 81.18 | 7.68 | |
| #5 | 80.35 | 85.70 | 50 | 35.70 | #5 | 85.28 | 86.30 | 81.18 | 5.13 | |
| #6 | 84.85 | 88.52 | 64 | 24.52 | #6 | 81.52 | 86.31 | 62.35 | 23.96 | |
| #7 | 83.07 | 87.14 | 60 | 27.14 | #7 | 86.60 | 88.25 | 80.00 | 8.25 | |
| #8 | 73.68 | 82.62 | 23 | 59.62 | #8 | 84.84 | 88.11 | 71.76 | 16.35 | |
| #9 | 83.04 | 87.46 | 58 | 29.46 | #9 | 84.05 | 84.77 | 81.18 | 3.59 | |
| #10 | 83.34 | 87.46 | 60 | 27.46 | #10 | 74.03 | 79.60 | 51.76 | 27.83 | |
| #11 | 87.43 | 91.04 | 67 | 24.04 | #11 | 84.73 | 86.80 | 76.47 | 10.33 | |
| #12 | 80.34 | 85.70 | 50 | 35.70 | #12 | 81.20 | 85.47 | 64.12 | 21.35 | |
| #13 | 83.20 | 85.35 | 71 | 14.35 | #13 | 79.61 | 84.80 | 58.82 | 25.98 | |
| #14 | 80.23 | 83.80 | 60 | 23.80 | #14 | 84.21 | 86.29 | 75.88 | 10.41 | |
| #15 | 76.16 | 81.66 | 45 | 36.66 | #15 | 85.81 | 83.14 | 96.47 | -13.33 | |
| # 16 | 82.98 | 88.45 | 52 | 36.45 | # 16 | 84.37 | 85.46 | 80.00 | 5.46 | |
| #17 | 88.77 | 88.55 | 90 | -1.45 | #17 | 75.16 | 81.75 | 48.82 | 32.93 | |
| #18 | 79.26 | 83.54 | 55 | 28.54 | #18 | 77.18 | 85.60 | 43.53 | 42.07 | |
| #19 | 80.90 | 89.89 | 30 | 59.89 | #19 | 85.39 | 82.62 | 96.47 | -13.85 | |
| #20 | 86.53 | 85.03 | 95 | -9.97 | #20 | 81.80 | 88.42 | 55.29 | 33.13 | |
| | | | | | #21 | 81.24 | 85.66 | 63.53 | 22.13 | |
| | | | | | #22 | 82.57 | 87.03 | 64.71 | 22.33 | |
| | | | | | #23 | 77.75 | 82.63 | 58.24 | 24.40 | |
| | | | | | #24 | 87.49 | 89.07 | 81.18 | 7.90 | |
| | | | | | #25 | 79.57 | 79.17 | 81.18 | -2.01 | |
| | 1 | • | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| Mean | 81.61 | 85.67 | 58.60 | 27.07 | | 82.62 | 85.53 | 70.96 | 14.57 | |
| S.D. | 4.35 | 3.65 | 16.62 | 16.29 | | 3.71 | 2.74 | 13.88 | 13.86 | |
| Maximum | 88.77 | 91.04 | 95.00 | 59.89 | | 87.49 | 89.07 | 96.47 | 42.07 | |
| Minimum | 71.00 | 74.18 | 23.00 | -9.97 | | 74.03 | 79.17 | 43.53 | -13.85 | |
| Median | 82.17 | 85.85 | 59.00 | 27.30 | | 84.05 | 85.82 | 75.88 | 10.41 | |
| Mode | #N/A | 87.46 | 60 | #N/A | | #N/A | #N/A | 81.176 | #N/A | |
| | These students outperformed in AOL Model than non-AOL Model | | | | | | | | | |

| Table 1 | F444: Applications in Financial Management |
|---------|--------------------------------------------|
|---------|--------------------------------------------|

Assurance of Learning (AOL): Case Study in a Capstone Finance Course at Indiana University South Bend Comparative Analysis of Classes Over the Years 2017 and 2018







Figure 2 2017 F444 Data (N = 25)

| | Spring 2017 Grades of F444 (N = 20) | | | | | | Spring 2018 Grades of F444 (N = 25) | | | |
|--------------|-------------------------------------|-----------|--------------|-------------|-------------|---------|-------------------------------------|--------------|-------------|-------------|
| Pairwise | t valua | Degree of | Significance | Correlation | Correlation | t valua | Degree of | Significance | Correlation | Correlation |
| Comparison | t-value | freedom | level | (r) | sig | t-value | freedom | level | (r) | sig |
| Semester | | | | | | | | | | |
| Grade versus | -7 427 | 10 | 000 | 828 | 000 | -5 254 | 24 | 000 | 660 | 000 |
| Non-AOL | -/.+2/ | 17 | .000 | .020 | .000 | -3.234 | 24 | .000 | .007 | .000 |
| Grade | | | | | | | | | | |
| Non-AOL | | | | | | | | | | |
| Grade versus | 7.430 | 19 | .000 | .200 | .399 | 5.255 | 24 | .000 | .105 | .617 |
| AOL Grade | | | | | | | | | | |
| Semester | | | | | | | | | | |
| Grade versus | 7.431 | 19 | .000 | .715 | .000 | 5.256 | 24 | .000 | .810 | .000 |
| AOL Grade | | | | | | | | | | |

| Table 2 | Paired Samples t-test Results | Comparing Each Pair | of Grades in A Given Year |
|---------|-------------------------------|---------------------|---------------------------|
|---------|-------------------------------|---------------------|---------------------------|

(F444: Applications in Financial Management)

 Table 3
 Independent Samples t-test Results Comparing Grades Across Two Years

| | Comparison of Spring 2017 (N = 20) and Spring 2018 (N = 25) Grades | | | | |
|-------------------------------------------------|--------------------------------------------------------------------|-------------------|--------------------|--|--|
| | t-value | Degree of freedom | Significance Level | | |
| Semester Grade | 841 | 43 | .405 | | |
| Non-AOL Grade | .142 | 43 | .887 | | |
| AOL Grade | -2.720 | 43 | .009 | | |
| Difference between Non-AOL and AOL model grades | 2.781 | 43 | .008 | | |

Hence, we can conclude that the model developed for AOL testing results in significantly smaller grades among students than the non-AOL test grades in both years. Thus, it may be safer to infer that the non-AOL tests may not be as demanding as the AOL ones.

We also plotted the results for number of students versus grade percent scores in Figures 1 and 2. Figure 1 shows that line graph for semester grade as well as non-AOL model grades lies above the line for AOL tested model grades consistently except for two students during year 2017. It is further evident from the graph line for difference in between non-AOL and AOL model grades that the academic performance of eighteen from twenty students is weaker in AOL model in the year 2017. Similarly, Figure 2 shows weaker academic performance in AOL testing model than non-AOL model by twenty two of twenty five students.

We also looked into the difference in standard deviations of non-AOL and AOL grades. Looking at the standard deviations of the grade scores, it is evident that AOL scores in 2017 and 2018 (SD = 16.6 and 13.9) are more widely distributed than non-AOL scores (SD = 3.7 and 2.7). We tested these for significance using the F-test for difference of standard deviations using MedCalc software. These standard deviations are significantly different in 2017 (F = 20.1286; p < .001) and in 2018 (F = 26.5034, p < .001). It seems as if students may be collaborating somewhat in non-AOL tests while collaboration is unlikely in the AOL testing.

The results in Table 2 seem to also support that students' collaboration rarely exists in the AOL tests. We tested the correlation between semester grade versus non-AOL grade, non-AOL grade versus AOL grade, and semester grade versus AOL grade. Semester grades were significantly and positively correlated with Non-AOL grades (r = .828, p = .000) in 2017 and correlated with AOL grades (r = .715, p = .000) in 2017. The corresponding correlation between semester grade and non AOL grade in 2018 (r = .669, p = .000) and semester grade versus AOL grade in 2018 (r = .810, p = .000). However, non-AOL grades were uncorrelated with AOL grades both in 2017 (p = .399) and 2018 (p = .617). This seems to indicate that non-AOL tests produced grades are not in line

with AOL tests. Stating it differently, AOL developed model is working.

We also compared the performance of students in 2017 with those in 2018. As a result of the gap observed in the AOL performance in the 2017 data, a number of corrective steps were undertaken to close the loop. The results in Table 3 shows the consequent improvements in the 2018 students AOL performance over those of 2017 was tested using the independent samples t-test. Results show that mean AOL performance in 2017 (58.60%) was significantly poorer than mean performance in 2018 (mean 71.00%) with (t = 2.72, p = .009).

The results in table also show that the difference in performance between AOL and non-AOL grades in 2018 was narrower than in 2017. The mean difference in 2017 (mean 27.06) is significantly more than the difference in grades in 2018 (mean 14.60%) with (t = 2.781, p = .008).

This leads us to believe that our monitoring activities in 2018 led to significant improvements in our teaching of F444.

4.1 Closing the Loop of Learning Process

Table 4 shows that in both years, students agreed strongly that the AOL exam was fair, its difficulty levels were OK, the time allotted was sufficient, and the topics in the AOL exam were covered during the semester. They also strongly denied that there was any probability of cheating in the AOL exam (see the means and distributions in Table 4). In fact, none of the five independent t-tests conducted between the mean student ratings of AOL in 2017 and 2018 were significant (all ps > 0.05 as seen in Table 4). This indicates that the AOL tests of 2017 and 2018 were seen to be equivalent. Hence, any improvement in AOL test performance cannot be attributed to any change in the AOL test itself. This offers additional support for the fact that our closing the loop activities were instrumental in increasing student performance on the AOL.

| | Spring 2017 AOL Feedback (N = 18) ¹ | | Spring 2018 AOL Feedback $(N = 23)^1$ | | Independent Samples t-test results | | |
|-----------------------------------------------------------------|------------------------------------------------------|------|---------------------------------------------|------|------------------------------------|--------|-------|
| | Mean | SD | Mean | SD | t | df | sig |
| 1. Exam was fair ² | 4.44 | 0.51 | 4.43 | 0.66 | 0.051 | 39 | 0.96 |
| 2. Difficulty level of the exam was ok^2 | 4.00 | 0.69 | 4.39 | 0.58 | -1.974 | 39 | 0.056 |
| 3. Time allotted was enough to complete the $exam^2$ | 4.72 | 0.46 | 4.87 | 0.34 | -1.132 | 30.587 | 0.267 |
| 4. Topics in exam were covered during the semester ² | 4.33 | 0.69 | 4.57 | 0.59 | -1.163 | 39 | 0.252 |
| 5. Probable chances of cheating during exam were ³ | 4.33 | 1.03 | 4.26 | 0.86 | 0.245 | 39 | 0.808 |

 Table 4
 Feedback on the AOL test in 2017 and 2018 (Closing the Loop Learning Process)

¹N in table 4 is different than N in tables 1 through 3, because two student in spring 2017 and three students in spring 2018 did not reply to "Closing the Loop Survey Questions"

² Questions 1 through 4 were measured as - Strongly Agree (5); Agree (4); neither agree nor disagree (3); disagree (2); strongly disagree (1) to Strongly Disagree (1)

³ Question 5 was measured as-Extremely 0% (5); < 2% (4); 2-5% ((3); 5-10% (2); Extremely High (1)

5. Conclusion

Direct assessment of students learning is tested in closely controlled classroom environment through exam. A comparative analysis is completed using AOL developed model for the years 2017 and 2018. The findings suggest the mean non-AOL grade (85.67%) is significantly higher than the mean AOL grade (58.60%) in the year 2017. The same was observed in 2018, the mean non-AOL (85.53%) was significantly greater than the mean AOL grade

(70.96). A poor performance in AOL model category indicates that the AOL model developed for this study successfully measures Assessment Process.

Students in AOL model generally showed poor academic performance versus non AOL performance. Only two of twenty students in 2017 and three of twenty five students in 2018 outperformed academically in the AOL model versus non AOL tested model. Also, standard deviation of mean AOL grade was larger than standard deviation of mean non-AOL grade in both years 2017 and 2018. It seems as if students may be collaborating somewhat in non-AOL tests while collaboration is unlikely in the AOL testing. Non-significant correlation between non-AOL and AOL also indicates that non-AOL tests produced grades are not in line with AOL tests.

Results show that mean AOL performance in 2017 was significantly poorer than mean performance in 2018. This leads us to believe that our monitoring activities in 2018 led to significant improvements in our teaching of F444. Student feedback indicates that the AOL tests of 2017 and 2018 were seen to be equivalent. Thus, any improvement in AOL test performance cannot be attributed to any change in the AOL test itself. This offers additional support for the fact that our closing the loop activities were instrumental in increasing student performance on the AOL. Stating it differently, AOL developed model has functioned well.

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Appendix

Table A1 Exam Type A

Your professor flew from Chicago to Houston last week on United Airlines equipment type A320 and wrote final exam on capital budgeting case on the airline equipment. All numbers are hypothetical but assumed to be within close proximity of the actual figure for A320 equipment. In order to save typing time during the exam, the required excel format is provided for your reference. You may modify this worksheet as per your needs.

Revenue from this equipment

The equipment has a capacity of <u>12</u> business class seats, <u>12</u> economy plus seats, and <u>156</u> economy seats. Assume an average ticket price of <u>\$500</u> for a business passenger, <u>\$200</u> for an economy plus passenger, and <u>\$180</u> for an economy passenger. Further, assume that the plane makes <u>900</u> trips of four hours each in a year, always runs on <u>80%</u> capacity, and flying fuel cost per trip is <u>\$5,000</u>. To minimize our computation, assume UA will sell the plane at a salvage value of <u>\$60,000,000</u> at the end of five years.

Costs associated with the equipment

The initial cost of the plane is <u>\$98,000,000</u>, will need shipping cost of <u>\$1,500,000</u> and installations cost <u>of \$500,000</u>. It falls into 15 years MACRS category but annual deprecation rates for the first 5 years (needed) are <u>5.00%</u>, <u>9.50%</u>, <u>8.55%</u>, <u>7.70%</u>, <u>and 6.93%</u> respectively. The annual maintenance cost is <u>\$800,000</u> with annual payment for top management is <u>\$1,000,000</u>. For successful operations, the equipment annually needs <u>2 Captains</u>, <u>2 first engineers</u>, <u>2 chief stewards</u>, <u>and 6 stewards</u>.

Annual salary for each employees is \$250,000 for captain, \$200,000 for first engineer, \$100,000 for chief-steward, and \$75,000 for stewards. UA also pays its employees 50% of the additional annual salary for hotels and retirement benefits.

Other Information

UA's federal plus state tax rate is 35% and its after-tax cost of capital is 7%

Questions

1) Find NPV, and IRR of this equipment. 90 points

- 2) Would you accept the project using NPV method? 2 points
- *3)* Would you accept the project using IRR method? *2 points*
- 4) Do NPV and IRR lead to the same or controversial decision? *1 point*

Why or Why Not? 5 points

| - | | - | | | 1 |
|----|-------------------------------------------------------|--------------|-------------|--------------|---------|
| | Α | В | C | D | E |
| 1 | F444 Final Exam (Case on Capital Budgeting): 4/27/201 | 7 (United Ai | lines Equip | oment Type A | 320) |
| 2 | | | | | |
| 3 | Initial Cost of the Plane | | | | |
| 4 | Shipping Cost | | | | |
| 5 | Installations Cost | | | | |
| 6 | MACRS Rates (See depreciation area) | | | | |
| | | | First | Stewar- | Stewar- |
| 7 | Number of Employees | Captain | Engineer | dess | dess |
| 8 | Employees Salary | | | | |
| 9 | Employees' additional benefits | | | | |
| | | | Econom- | | |
| 10 | Seating Capacity | Business | my Plus | Economy | |
| 11 | Number of Seats | | | | |
| 12 | Price per seat | | | | |
| 13 | Capacity of occupancy | | | | |
| 14 | Salvage Value | | | | |
| 15 | The annual maintenance cost is | | | | |
| 16 | Annual navment for ten management | | | | |
| 10 | Annual payment for top management | | | | |
| 17 | Number of trips per year | | | | |
| 18 | Flying fuel cost per trip | | | | |
| 19 | UA's federal plus state tax rate | | | | |
| 20 | After-tax cost of capital | | | | |
| 21 | | | | | * |
| 22 | Annual Ticket Sales Revenue per Trip | | | | |
| | · · | Number of | Ticket | | |
| 23 | Type of Seats | Seats | Sales | Revenue | |
| 24 | Business Class | | | | |
| 25 | Economy Plus | | | | |
| 26 | Economy | | | | |
| 20 | Total passible Povenue per Trip | | | | |
| 27 | | | | | * |
| 20 | | | | | |
| 29 | Total annual Ticket Sales revenue | | | | |
| 30 | | | | | |
| 31 | Employees annual compensation | | | | |
| 32 | Employee Type | Number | Salary | Total Salary | |
| 33 | Captain | | , | , | |
| 34 | First Engineer | | | | |
| 35 | Chief Stewardess | | | | |
| 35 | Stowardoss | | | | |
| 30 | Stewartess | | | | |
| 37 | | | | | * |
| 38 | Total Employees annual compensation | | | | |

Table A2Panel A

Final Exam F444 (Applications in Financial Management) Spring 2017

| Table A2 | Panel B |
|----------|-----------|
| TADIC AL | I AIICI D |

| | А | В | С | D | E | F | G | Н |
|----|------------------------------------------------------|--------------|---------------|--------|--------|------------|--------|----|
| 43 | Computation for Depreciation and Book Value | | Depreciati | ion | | | | |
| 44 | Purchase price of the plane | | Year | Rate | Amount | Book Value | | |
| 45 | Shipping cost | | Year 1 | 5.000% | | | | |
| 46 | Installation cost | | Year 2 | 9.500% | | | | |
| 47 | Depreciable Base | | Year 3 | 8.550% | | | | |
| 48 | | | Year 4 | 7.700% | | | | |
| 49 | | | Year 5 | 6.930% | | | | |
| 50 | | | | | | | | |
| 51 | Computation for Cash Flows | Year 0 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | |
| 52 | Annual Ticket Sales Revenue | | | | | | | |
| 53 | Employees Salaries and benefits | | | | | | | |
| 54 | Annual Fixed Fuel Cost | | | | | | | |
| 55 | Annual fixed maintenance cost | | | | | | | |
| 56 | Annual payment to top management | | | | | | | |
| 57 | Depreciation | | | | | | | |
| 58 | EBIT | | | | | | | |
| 59 | Taxes | | | | | | | |
| 60 | After tax income | | | | | | | |
| 61 | Add back depreciation | | | | | | | |
| 62 | Net operating cash flows | | | | | | | |
| 63 | | | | | | | | ** |
| 64 | Salvage Value | | | | | | | |
| 65 | Salvage Value Tax | | | | | | | |
| 66 | Net Salvage Value | | | | | | | |
| 67 | | | | | | | | ** |
| 68 | Net Cash Flows | | | | | | | |
| 69 | | | | | | | | |
| 70 | NPV and IRR Calculations | | | | | | | |
| 71 | NPV | | | | | | | |
| 72 | IRR | | | | | | | |
| 73 | | | | | | | | |
| 74 | *These rows are kept purposefully empty for students | to think and | fill if neede | d. | | | | t |
| 75 | **These rows are kept blank for good visibility | | | | | | | |

| Final Exam | F444 (Ap | plications i | n Financial | Management |) Spring | 2017 |
|------------|----------|--------------|-------------|------------|----------|------|

| | Final Exam F44 | 4 (Applications in | Financial Manage | ement) Spring 20 | 17 | |
|----------------------|----------------------------|----------------------|-------------------------------|------------------|---------------------|---|
| Excel File - Survey | | | | | | |
| (F444) | | | | | | |
| Capital Budgeting | | | | | | |
| Case 4/27/2107 | Panel | 4 | | | | |
| | Please put an x in row of | only once as applica | able | | | |
| | Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree | |
| Exam was fair | | | | | | * |
| Difficulty level of | | | | | | |
| the exam was ok | | | | | | * |
| Time allotted was | | | | | | |
| enough to complete | | | | | | |
| the exam | | | | | | * |
| Topics in exam | | | | | | |
| during the semester | | | | | | * |
| during the semester | 00/ | Less then 20/ | L and them 50/ | Less then 100/ | Entrancels, III als | |
| | 0% | Less than 2% | Less than 5% | Less than 10% | Extremely High | |
| Probable chances of | | | | | | |
| cheating during | | | | | | |
| exam were | | | | | | Â |
| | | | | | | |
| *Please put x only | | | | | | |
| in one cell of this | | | | | | |
| row | | | | | | |
| Make sure you enter | only 5 "X" in five differe | nt shaded rows abo | ve | | | |
| Survey is invalid if | more than 5 "X" or les | s than 5 "X" are | | | | |
| entered | | | | | | |

Table A3"Closing the Loop Survey Questionnaire"

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