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How to “Align” an Online Finance Course Using Capital Budgeting Analysis

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Abstract

The assessment of business courses and their learning goals and objectives is important for accredited business schools. However, not all business educators are necessarily knowledgeable and trained in designing appropriate learning objectives and aligning all aspects of a course around these learning objectives. This paper tries to fill this gap for business instructors by describing the concept of alignment. This paper also applies the concept of alignment to the specific learning module of capital budgeting analysis in an online MBA level corporate finance class. Important observations are given that help an instructor align a class with the course objectives, materials and assessments. The paper shows how the specific learning objective for risk assessment in capital budgeting analysis can be achieved with the use of a screen capture recording, a spreadsheet tutorial, a case study assignment and a specific grading rubric.

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Introduction

Learning and teaching processes are in and of themselves very complex. Generally, teachers in the field of business in higher education are well educated in their respective field of expertise but may have a limited amount of formal training in how to teach effectively and how to promote student learning. After acquiring a Ph.D. in their respective field, instructors can acquire teaching knowledge from experimentation with courses and course materials over time, by networking with other teachers, by using publisher teaching resources, or by taking teaching-specific workshops. One of the important tools for effective teaching that are covered in teaching workshops is the concept of *alignment*.¹ Alignment involves the matching of course objectives with the rest of the course materials and assessments. Research has found that revising a course around stated objectives resulted in better student outcomes (Swan, Matthews, Bogle, Bowels, & Scott, 2012). Assessment of the business curriculum and its learning goals and objectives is an important concept for business schools as accreditation organizations require such assessment. The assessment of analytical thinking skills in business courses, for example, is important for an accredited business program. A study by Barboza and Pesek (2012) supports the hypothesis that high marks in course-embedded assessment on business-specific analytical skills positively affect performance on overall business disciplinary competence proxy by results in the Major Field Test in Business. However, not all business educators have developed learning goals and/or are not assessing them. For example, Christensen, Judd, and Nichols (2011) surveyed faculty at AACSB-accredited schools regarding the learning goals and measures for their accounting programs as well as course objectives for the introductory tax course. The authors found over 50% of respondents were still developing their learning goals and measures and only 18% of respondents had completed 2 or more rounds of assessment.

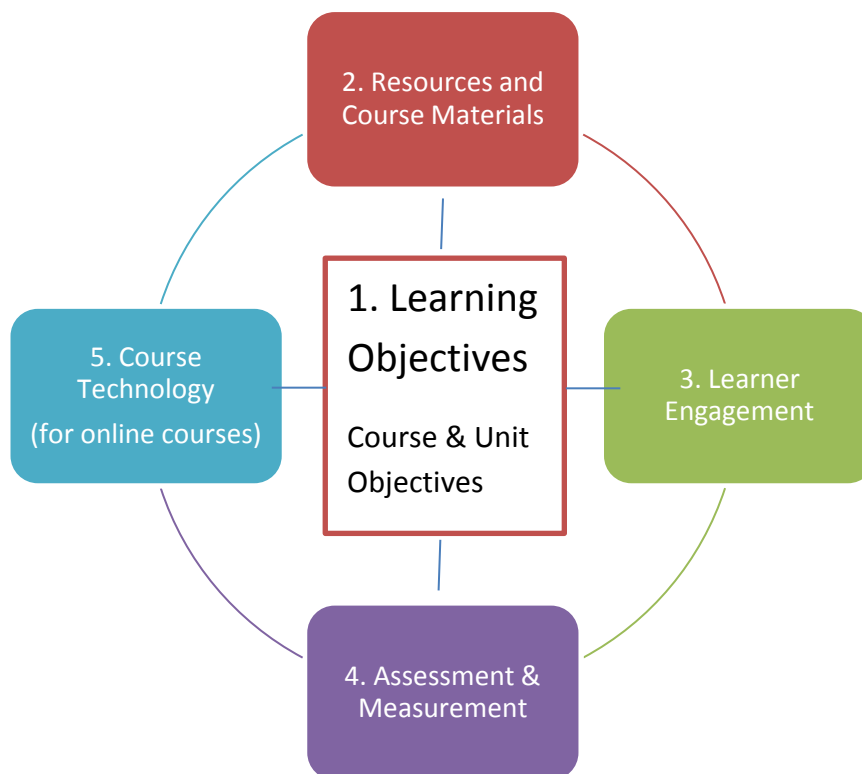
This paper serves two purposes, first it clarifies what the concept of alignment in teaching courses means and second it shows how the concept of alignment can be applied to the specific topic of capital budgeting analysis in an MBA online corporate finance class. The insights from this paper should be helpful for business educators who want to successfully design and align learning objectives in their courses with the course materials, assessments, and course technology. Aligned courses are more likely to meet the guidelines of accreditation organizations and help business schools achieve accreditation. Most importantly, aligned classes will aid student learning and teaching effectiveness. The rest of the paper is organized as follows: Section 1 explains what the concept of alignment means. Section 2 describes how alignment can be applied to the specific topic of capital budgeting analysis in an online MBA Advanced Financial Management class. The third and final section of the paper concludes with a summary and conclusions.

1. What Does Alignment Mean?

The concept of alignment is an important tool in an effective learning process. For example, alignment can be applied in the field of education to create a standards-based assessment and evaluation process within a country (Looney, 2011). As Looney explains in the 2011 study, a standards-based system rests upon the alignment of three key elements: 1. standards defining the knowledge and skills, 2. curricula, which cover the objectives identified in the standards, and 3. student assessments which measure the attainment of standards. However, the concept of alignment can also be applied to individual courses. In that context, alignment refers to the matching or linking of the learning objectives that are set by either the instructor and/or the learning institution with the instructional materials, the learner engagement or communication, the course technology (in case the course is at least partly online based, which many courses are nowadays), and the assessments used to evaluate if the learning objectives are met. One can think of the *learning objectives* in a course as the *destination* or where the instructor wants the students to go, the *learning materials and activities* as the *elements that are needed for the students to get to the destination*, and the *assessment strategies* as the *tools to find out how effectively and efficiently the students arrived at the destination*. The use of the concept of alignment creates a holistic view of a course and commands an integrated approach to teaching which consequently creates a more effective, efficient, and therefore positive learning experience for the student.

Figure 1 is a visual demonstration of the concept of alignment. It shows that all the different aspects of a course, the course resources and materials, the student engagement, the performance assessment, and the course technology are directly linked with and match the course and unit objectives. The figure demonstrates that the relationship between the different aspects of a course and the course and unit objectives as well as the relationship between the different aspects of a course is a multi-dimensional and not a one-dimensional one. Not only do the course and unit objectives have to match the course materials, the student engagement, the performance assessment, and the course technology, but all the different aspects of the course also have to be aligned among themselves and are therefore interconnected. Therefore, the materials have to also match the learner engagement, the assessments, and technology. The learner engagement also has to match the assessments and technology, and the assessments also have to match the technology.

Figure 1: Visualization of the Concept of Alignment of a Course



This graph demonstrates that in a well aligned course, the different aspects of a course are directly linked to and match the course and unit objectives. Also, the relationship between the different aspects of a course is a multi-dimensional one.

The following paragraphs explain in more detail what the different parts or aspects of a course entail that are listed in figure 1 and what steps are necessary for the alignment of each course aspect.

1.1. Learning Objectives

Learning objectives are extremely important as they set the tone or direction of where the instructor wants the students to go. The objectives are the destination of a course. In order for an effective learning experience to occur, the instructor needs to list the learning objectives or learning outcomes, which need to be clear and measurable so that at a later point in time, they can be easily assessed. This applies to both the learning objectives at the overall course level as well as the specific unit learning objectives, where units in a course could be defined as individual weeks, chapters, or modules.

Examples of verbs that should be avoided in creating objectives because they would make the objective difficult to measure in an assessment are “to know”, “to learn”, and “to understand”.

Examples of verbs that make are preferable in the statement of an objective are “to apply”, “to calculate”, “to solve for”, “to differentiate”, “to list”, and “to define”. Using these verbs in the phrasing of an objective makes the objective much more easily assessable.

Course and unit objectives in a corporate finance class could be as follows:

a) Course level objective examples:

Upon successful completion of this course, students should be able to

- use quantitative applications and financial theory on issues pertinent to financial management.
- apply the analytical processes utilized in financial decision making and use the results to solve business finance problems.

b) Unit level objective examples:

Upon the completion of this unit’s activities, students will be able to:

- define the principle of “time value of money”
- solve calculation problems involving time value of money with the use of the financial calculator and Excel functions.

The instructor needs to realize that the student will be reading the objectives before learning the material. Difficult and complex language with a lot of specialized terminology specific to the field of study should therefore be avoided. All students, even foreign students whose first language is one other than English, should be able to grasp the meaning of the objectives.

In some learning institutions, the learning objectives, especially the course level objectives, are set by the institution. They are not created by the instructor and therefore the instructor may not have the flexibility or authority of creating his or her own. However, if the learning objectives are not well designed, the instructor may be able to add some additional objectives that follow the above guidelines or may be able to go through the necessary steps to have the institution-wide course objectives changed (for example if they are not measurable or they are not easily understood).

1.2. Resources and Course Materials

While the objectives of the course give the student a destination or direction, the course materials help the students to get to the destination. They are like a vehicle of transportation. The course materials are essentially the core of a course. Resources and course materials can include anything from a chapter in a book, to an introductory chapter video recorded by the instructor, to a narrated PowerPoint presentation, to a screen capture video that demonstrates a tutorial, to an instructional YouTube video, to a link of a webpage or news article.

The course materials and resources should enable students to achieve the stated learning objectives. Therefore, course materials need to be chosen that are effective in achieving the stated course and unit learning objectives. For example, if a student is supposed to learn how to use the time value of money function keys on the financial calculator then having the students read the chapter in the book on how to apply time value of money function formulas would be inappropriate. Instead, a tutorial that is recorded with a screen capturing software and a

calculator emulator that shows how to use the financial functions to solve a time value of money problem would be more appropriate. The course materials should also have an explanation that helps the student understand how these materials help the student achieve the stated course or unit objectives. This type of statement points out to the student how the learning objectives are aligned with the course materials.

1.3. Learner Engagement

Learner engagement entails any activity that requires the student to do something, for example, write an essay or watch a video or post to a forum or complete an assignment. Learner engagement includes any kind of interaction of communication between students and the instructor (such as e-mail, the feedback for a paper, or a virtual office hour), between the student and the content (for example the student engaging in a simulation game), and between the students themselves (for example a forum discussion).

Engaging students in a course and making students become active learners improves the learning process. Engaging students in the learning process and making courses student as opposed to instructor focused is a particularly important part of an effective online course (Orlando, 2010). The instructor, however, needs to make sure that the learning activities align with or match the course and unit objectives. In other words, the learning activities should help students to learn the stated learning objectives. A classic example of a mismatch between learning activities and learning objectives is when a dance instructor tries to teach a dance step and uses a written description rather than a visual demonstration. An example of a mismatch between a unit objective and learner engagement in a corporate finance course would be if the objective requires students to be able to complete a financial analysis and to calculate the net present value (NPV), but the activities in the course do not include that skill and rather require the student to write an essay about their opinion on the effectiveness of the NPV. In order to align the activities with the course objective, the course could require for example the student to complete an Excel template and calculate the NPV in an investment analysis using the financial functions in Excel.

As the concept of alignment is multi-dimensional, the course materials and student engagement also need to match. An example of a mismatch would be to have the students watch a news video on the Federal Reserve and their actions regarding inflation as part of a unit and then ask the students to make calculations that convert real and nominal rates with the use of inflation. While the Federal Reserve can influence interest rates and inflation, a video on the actions of the Federal Reserve will not help a student to apply the formula that converts rates using inflation. Instead, a narrated PowerPoint video that presents the Fisher Effect formula and how to solve a sample problem with the formula would be a more appropriate match between the course material and the learning engagement.

1.4. Assessment and Measurement

Assessment and measurement of student performance are the tools used to find out how effectively and efficiently a student has arrived at the destination or has accomplished the learning objectives. Assessments therefore measure the effectiveness of student learning and are important to the learning process. An instructor needs to create assessments that evaluate student

progress throughout the semester which are aligned with the stated learning objectives but are also consistent with the course materials and appropriate for the type or level of course.

Many different formats exist for assessment methods. Examples are multiple-choice, computer-adaptive multiple-choice, and performance-based assessments, such as oral presentations, essays and collaborative problem solving. Each one has certain advantages but also certain challenges. Multiple-choice assessments are machine scored and therefore create reliable data on student performance and are convenient to grade as they need less resources to be administered. Multiple choice questions are an excellent way to test lower-order knowledge and skills but can also be used to assess higher-order knowledge, as long as the multiple choice questions are well designed. Multiple-choice questions, however, cannot measure certain higher-order skills such as the capacity to develop an argument. If multiple-choice questions are poorly designed, they can also be prone to measurement error. For example, students might misinterpret questions or may make random guesses. Computer adaptive tests (CAT) are tests that adapt questions based on the feedback from and performance of the test-taker. Students who have answered questions correctly are directed to a more difficult set of questions, and those answering incorrectly are directed to an easier set of questions. Since the test is adapted according to each student's responses, no two students take the same test, and it is impossible to compare student performances. On the positive side, CATs are generally considered as providing more precise scores of student performance than typical standardized assessments. However, CATs have the disadvantage of demanding a very high number of test questions, which increases development costs, and of heavily relying on multiple-choice formats. Performance-based assessments, such as oral presentations, essays and collaborative problem solving, are more effective at capturing more complex performance and processes and higher-level learning skills. However, these assessments may not be as reliably as human subjectivity plays a role during the assignment of scores. Performance-based assessments are also more expensive to administer and more complicated and time consuming to score. A well thought-out grading rubric, which is a predetermined set of evaluation criteria and the associated possible points that can be obtained for a certain criteria, is a useful tool to improve the scoring process for this type of assessment.

Another solution could be computer-based performance assessments. “Computer-based performance assessments may potentially assess more complex performances through simulation, interactivity, collaboration and constructed response formats. Increasingly sophisticated ICT programs that score open-ended performances may address concerns regarding reliability of human-scored assessments and validity of multiple-choice assessments that do not effectively measure higher-order skills (Looney, 2011).

The type of assessment has to be appropriate for the type of course that is being taught. Multiple-choice questions for example are more appropriate for an undergraduate Principles of Finance class while a combination of well-designed multiple choice questions, CATs, and performance based assessments is more appropriate for a master level Financial Management class.

In order to align the course in terms of its assessments, the type of assessment has to match the learning objective. For example, in a corporate finance course, the assessment of the learning objective to apply evaluation criteria in capital budgeting analysis with the use of an essay would

be inappropriate. More appropriate would be the assessment of this type of mathematical skill with the use of multiple-choice questions.

The appropriate type of course material for this objective and multiple-choice assessment could be a tutorial on how to use the financial functions in Excel. An appropriate type of learner engagement for this type of assessment would be a set of practice multiple-choice calculation problems and explanations on how to get to the answer.

In an MBA level class, a learning objective may be to apply critical thinking skills and evaluate the effectiveness of the monetary policy by the government. An aligned course material might be a news video about recent Federal Reserve actions and an appropriate type of learner engagement would be an essay about the student's opinion of the Federal Reserve's actions. A very effective and appropriate way to assess this learner activity would be through the use a rubric that explains how the grades are derived. A rubric is an excellent way to grade or assess a performance based activity such as an essay. An example of a grading rubric is presented in section 2 of this paper.

A particularly important aspect of assessment is the clear statement at the beginning of the course or the beginning of an assignment of how the student will be graded and what percentage of the total grade is made up of each activity.

1. 5. Course technology

Since the advent of the internet and particularly its Web 2.0 functionality that allows for the creation and exchange of user generated content, technology has become an important part of education with many higher level education courses now being offered in either online or hybrid format in the United States.

The Babson Survey Research Group, for example, found in their 2011 report that in the fall term of 2010, 6.1 million college students were taking at least one online course in the US, which was about 500,000 students more than in the prior year. This was a 9% increase. The report also shows that for the past eight years, online enrollments have been growing substantially faster than overall higher education enrollments in the United States. Between 2009-2010, online enrollments grew 10%, whereas overall enrollments only grew less than 1%. While the course technology is at the heart of an online course and is also important in many regular face to face classes as many instructors make use of today's advanced technologies.

Course technology is meant to include any tools and media that are used in the course. Examples are the learning management system (LMS), such as Blackboard, Moodle or Canvas, which is the main software through which a course is delivered to the student online and any functionality within these, such as the grade center, discussion forums, video conferencing software, and any other tools outside the LMS, such a social media websites, video websites like Youtube, screen capturing software such as Camtasia, simulation games, voice narration in PowerPoint, voice recording in Acrobat reader, etc. that are used to present course materials and enable student engagement. The challenge that instructors face is to keep up with and be educated about the different technologies that are available.

The technological tools have to be appropriate for the stated learning objectives. For example, a Facebook discussion would be an inappropriate use of technology when the student is supposed to solve time value of money problems. Instead, a better technology would be the use of automated self-check exercises requiring student responses with automated feedback and solutions. ⁱⁱ

The technology used should enable the various course components to be easily accessed by the students and facilitate the student's learning experience. Also, clear information and instructions have to be provided regarding how the tools and media support the learning objectives. This will communicate to the student how the course is aligned in terms of its use of technology.

The technology not only has to be aligned with the course objectives, but with the course materials, the learner engagement and the assessments as well. For example, if the learning objective in an online course is to evaluate the effectiveness of the monetary policy by the government, the appropriate technology to use for the presentation of the learning material is for the instructor to post a Youtube video in the LMS. The appropriate technology to use for student engagement would be a forum discussion, and the appropriate technology for the assessment of the forum discussion would be the use of a rubric in Excel that explains how the student's postings will be graded.

So far, the paper has introduced and explained the different integral parts of an aligned course. Next, the paper continues with an exploration of the concept of alignment through the application of this concept to the topic of capital budgeting analysis in an online corporate finance MBA level course. ⁱⁱⁱ

2: Alignment of a Capital Budgeting Analysis

A typical corporate finance class covers several main topics, including financial statement analysis, time value of money calculations, asset valuation, investment or capital budgeting analysis, the risk and return relation, and financing or capital structure decisions. This part of the paper focuses on the topic of investment or capital budgeting analysis and more specifically, the risk assessment within capital budgeting analysis. In order to show how this topic can be aligned in an online MBA Advanced Financial Management course, the different aspects of a course are discussed next and how they can be structured so that they are aligned within the framework of capital budgeting analysis. The course is assumed to be structured into modules, which correspond to weeks. Each module covers multiple chapters. The topic of capital budgeting analysis is covered in multiple chapters within one module. The demonstration here of the concept of alignment is specific to the topic of capital budgeting analysis and the assessment of risk within the topic of capital budgeting analysis. The assessment of risk goes beyond basic investment analysis and can be performed with sensitivity, scenario, and break-even analysis.

2.1. Learning Objectives in Capital Budgeting Analysis

As mentioned before, the course has two types of learning objectives: the overall course objectives, which are stated in the syllabus or course overview and the unit specific objectives, which are posted in the beginning of each chapter within a module.

Two of the *course objectives*, which are related to capital budgeting analysis, are as follows:
Upon the successful completion of this course, students will be able to:

- a) apply quantitative applications to issues pertinent to financial management.
- b) go through the analytical processes utilized in financial decision making and apply them to business finance problems in order to find a solution to the problem.

The *unit specific* objectives for the chapter are as follows:

Upon the successful completion of this chapter's activities, students will be able to:

- a) perform a financial investment analysis in Excel and determine if an investment is feasible.
- b) create a financial model in Excel that is "dynamic" and describe the benefits of such a model.
- c) differentiate between a sensitivity, scenario, and break-even analysis and calculate and interpret the results of such an analysis.
- d) list some of the conclusions of a sensitivity analysis and analyze how the conclusions can help with solving a business problem.

First, the learning objectives describe outcomes that are measurable. In other words, it is possible to determine or assess if the student has achieved a particular objective and to which degree. For example, it is easy to find out if a student created an Excel financial model that is dynamic. If none of the formulae the student creates in the Excel model includes number values but only cell references and if an input variable is changed in the assumption section and the final result for the NPV changes accordingly, then the learning objective is obtained.

Second, the unit objectives and the objectives match or are aligned. They are not completely different objectives but rather complementary. Specifically, the unit objectives are a subset of the course objectives. In other words, the course objectives take on a more macro view ("to apply quantitative applications"), whereas the unit objectives take on a more specific micro view ("to perform an investment analysis in Excel"). If the course and unit learning objectives are aligned properly, then a student who achieves the unit objectives will simultaneously also achieve at least one of the course objectives.

For example the unit learning objective b) "to be able to create a financial model in Excel that is "dynamic" and describe the benefits of such a model" is a subset of the course objective a) "to apply quantitative applications to issues pertinent to financial management". In other words if a student creates a dynamic financial model, he or she will also be applying quantitative applications that are important to financial management.

The next few paragraphs explain in detail how the course materials, the learner activities, the assessment tools and the technology used to teach capital budgeting analysis can be designed and structured to align with the above-stated leaning objectives as well as with each other.

2.2. Resources and Course Materials

The core course materials for each chapter in the course can be the reading assignments in the textbook that is used in the course as well as a screen capture video by the instructor, which can be a narrated PowerPoint slide show that explains and clarifies the important aspects of the subject and introduces any information that is important but may not be covered in the text, such

as a screen capture Excel tutorial and any real-world business experience the instructor has with regards to the subject. Students would be asked to read through the chapter in the book on capital budgeting analysis and watch a narrated PowerPoint slide on the topic which has some additional pointers and examples. Again, it is important that the course materials are effective in achieving the stated course and unit learning objectives. Most finance textbooks are doing an excellent job at matching the unit objectives with the materials that are covered in the book. In the case of the capital budgeting chapter, for example, the text would explain the differences between a sensitivity, scenario, and break-even analysis and what the meaning is of the results of such an analysis. The screen capture presentation by the instructor then could show how to perform a dynamic financial analysis in Excel that includes sensitivity, scenario, and break-even analysis. This can basically be an Excel tutorial that is closely aligned with unit objective b), which states that students will be able to create a financial model in Excel that is “dynamic”. The tutorial explains each formula used in Excel step by step and how the use of a particular formula makes the spreadsheet dynamic. Please note that the unit learning objective also states that students will describe the benefits of such a dynamic model. This learning objective will be aligned with the student activity described in the next paragraph.

2.3. Learner engagement

The main learner engagement or activity for the capital budgeting chapter can be a multi-part Excel case study assignment. For this case study, students create an Excel-based financial model. This learning activity helps the students to achieve the stated unit learning objectives.

The first part of the assignment asks the students to read through the case study at the end of the chapter in the textbook. The instructor has two choices in terms of the required work for students in the creation of the Excel model. First, the students could be asked to create the financial model from scratch based on the case study or second, the instructor could create an Excel template, which summarizes the model’s assumptions in an “assumption section” where it lists all the names of the computational variables in the first column and asks the students to fill in the blanks, i.e. the formulas. The author prefers the use of a template as the students who do not have an extensive knowledge of financial modeling could otherwise be overwhelmed by the assignment. In addition, creating a template will make the assessment of the students’ work much easier later on, as all the students’ work will have a very similar look and can be compared easily across students. The students are asked to calculate the different evaluation criteria in capital budgeting analysis, such as the NPV, payback period, discounted payback period, internal rate of return (IRR), and profitability index (PI). The students have to decide if the company in the case study should accept the project, i.e. if the project is feasible. For ease of grading, the students are asked to write all answers into the Excel spreadsheet.

This first part of the assignment is aligned with unit learning objective a) “to perform a financial investment analysis in Excel and determine if an investment is feasible”, and partially with objective b) “to be able to create a “dynamic” financial model in Excel”. At this point, based on the author’s past experience, many students believe that their model is dynamic. They do not realize that their model is not dynamic until they are asked to perform the second part of the assignment.

In the second part of the assignment, the students are asked to perform a sensitivity, scenario and break-even analysis of the base case. For each of these, the students copy the initial Excel worksheet and then have to change some of the input variables in the assumption section. At this point, the students will most likely recognize if their model is dynamic. If it is dynamic, the final output, for example the NPV, will instantaneously change as well. This activity is clearly aligned with unit learning objective b) where the student is able to “create a dynamic financial model in Excel and describe the benefits of such a model”. If the students’ model is not dynamic, the NPV will not adjust correctly as the input variables are changed and the students will have to change the formulas within the model. This can be a very time consuming task. As a dynamic model saves a lot of time, the students will experience the benefits of creating a dynamic model.

It is possible that a student does not realize that his or her model is not dynamic until the assignment is submitted to the instructor, and the instructor sends a corrected version back to the student with corrections. A suggested way to correct a spreadsheet is to insert “notes” into the spreadsheet which point out the mistakes and how to correct them. If a student has more than three or four errors or if the model is not dynamic, the instructor may require the student to re-submit the assignment after the corrections. Again, it is imperative that the students understand what makes a model dynamic.

This second part of the assignment is also closely aligned with unit objective c) “to differentiate between a sensitivity, scenario, and break-even analysis and be able to calculate and interpret the results of such analysis” as the students have to perform all three types of analysis and describe the results of these analysis.

For the sensitivity analysis part of the question, the students are asked to create two separate sensitivity analysis, in each one, the sales volume of a different product line is changed. The instructions are very clear in terms of which variable is changed and by how much. The students are then asked to calculate by how much the NPV changes as the input variable changes and calculate the resulting sensitivity. Finally, the students are asked to interpret the results. The results show that the NPV is more sensitive to the sales volume of one product line versus the other. The interpretation of the findings is closely aligned with unit objective d) “to list some of the conclusions of a sensitivity analysis and analyze how the conclusions can help with solving a business problem.” The students will be able to identify for example that the firm should put more marketing emphasis on the more “sensitive” product line, thereby helping to solve a business problem.

In the scenario analysis, specific instruction are given on how several variables change at the same time in three different equally weighted scenarios, which reflect a weak, normal and strong economic environment. The students are then asked to calculate the expected NPV (a weighted average NPV) and interpret the results and decide if the firm should still accept the project. Again, this part of the assignment is aligned with learning objective d) “to list some of the conclusions of a sensitivity analysis and analyze how the conclusions can help with solving a business problem.” This assignment points out to students that the assumptions are just estimates and that assumptions need to be carefully chosen when dealing in an uncertain business environment, which is one of the major business problems that firms face.

In the break-even analysis, the students are asked to use the “goal seek” function in Excel with the original assumptions to find out what the minimum unit price for one of the products has to be in order for the firm to “break even”. This activity aligns with learning unit objective c) “to calculate and interpret the results of such an analysis”. Note how the course material (i.e. the Excel tutorial) is also closely aligned with the assignment as the tutorial shows in detail how a financial analysis is performed.

Another learner activity for this chapter could be the communication between the student and the instructor, where the instructor sets up a life virtual office hour. This way the students can ask any questions they have on how to set up the assignment. Also, a forum discussion can be set up so that students can communicate with each other about the assignments and possibly help each other in solving the problem at hand.

2.4. Assessment and Measurement

The assessments used for this chapter include a mixture of assessments. First, automatically graded multiple choice self-test questions offer explanations once completed and test the students’ understanding of the definitions and concepts as well as some of the basic calculations. Second, a grading rubric is used to measure the level of success the students have when completing the Excel model. For each of the assessments, it is clearly stated how many points the students achieve for a certain quality of work. For example, for the self-test questions, the instructor may choose a grading scale of 0-100% or not grade the assignment at all, as it only serves the purpose for the students to find out if they have mastered the concepts and calculations. The multiple-choice self-test questions are an excellent way for students to test if they understand when an investment is acceptable or feasible (which is aligned with unit objective a) “to determine if an investment is feasible”), if they understand the differences between sensitivity, scenario, and break-even analysis and do some basic calculations (this is aligned with learning objective c) “to differentiate between a sensitivity, scenario, and break-even analysis and calculate and interpret the results of such an analysis”). The course materials also need to be aligned with the assessment. For example, the definitions for the sensitivity, scenario, and break-even analysis need to be given in the reading assignments and/or the narrated PowerPoint presentation.

The critical thinking skills, such as the understanding of how to build a dynamic financial model and the conclusions that can be drawn from the results of a scenario analysis are better assessed with a grading rubric. The rubric should be provided or posted for the students before the start the assignment. This way the students have a clear idea of what is expected and what type of grade is given for what level of performance. Again, the rubric itself needs to be aligned with the learning objectives and the course materials. A rubric that can be used for the assignment in the capital budgeting chapter is displayed in figure 2.

Figure 2: MBA Advanced Financial Management - Assignment Rubric

Criteria	Weight	Points and Levels of Performance				Score
		25 Excellent	20 Good	15 Marginal	0 Poor	
PART I: Calculations and Interpretations, basic capital budgeting analysis Unit Objective a)	0.4	The student is able to perform all the necessary calculations in the basic capital budgeting analysis and correctly determines if the investment is feasible.	While the student is able to perform all the necessary calculations in the basic capital budgeting analysis, a few calculation errors occur in the model (for example a wrong cash flow sign is applied, a function is applied incorrectly, etc.).	The student makes some attempt to complete the basic capital budgeting analysis, but makes many errors and/or seems to be confused about the signs and timing of the cash flows.	The student does not perform any of the basic capital budgeting analysis.	
PART II: Calculations and Interpretations, sensitivity, scenario and break-even analysis Unit Objective c) and d)	0.4	The student is able to perform all the necessary calculations in the scenario, sensitivity, and break-even analysis and correctly determines the sensitivities, expected NPV and the break-even level. In addition, the student is also able to interpret all the results correctly and can identify how the results can be used to make important business decisions.	While the student is able to perform all the necessary calculations in the scenario, sensitivity and break-even analysis, a few calculation errors occur in the calculations (for example, the sensitivity is calculated incorrectly) and/or makes a mistake in the interpretation of the results.	The student makes some attempt to complete the sensitivity, scenario and break-even analysis, but makes many errors and/or seems to be confused about the calculations and the interpretations.	The student does not perform any of the sensitivity, scenario, or break-even analysis.	
Is the Spreadsheet Dynamic? Unit Objective b)	0.2	The student demonstrates excellent knowledge of what a dynamic spreadsheet is.	The student has a good knowledge of what a dynamic spreadsheet is, but makes a few errors that prevent the spreadsheet from being 100% dynamic.	The student seems unclear about what a dynamic spreadsheet is and makes many errors that prevent the spreadsheet from being dynamic.	The student has no knowledge about the functioning of a dynamic spreadsheet	
Weighted Average:						#####

This table shows a grading rubric that can be used in the assessment of a capital budgeting case study in an MBA level corporate finance class. The specific unit learning objectives are given for the grading criteria.

In this rubric, three grading criteria are used. Each of them has a total maximum point value of 25 points and each criterion has a grading weight. The total score will therefore be a weighted average score between 0 and 25. The first grading criterion is clearly aligned with unit objective a) “to perform a financial investment analysis in Excel and determine if an investment is feasible”. To get the full points the student needs to be able to perform all the necessary calculations in the basic capital budgeting analysis and correctly determines if the investment is feasible. The second grading criterion is aligned with unit objectives c) “to differentiate between a sensitivity, scenario, and break-even analysis and calculate and interpret the results of such an

analysis” and d) “to list some of the conclusions of a sensitivity analysis and analyze how the conclusions can help with solving a business problem”. To get full points on the second criteria, “the student has to perform all the necessary calculations in the scenario, sensitivity, and break-even analysis and correctly determines the sensitivities, expected NPV and the break-even level. In addition, the student is also able to interpret all the results correctly and can identify how the results can be used to make important business decisions.” Grading criterion 3, “is the spreadsheet dynamic?” is aligned with unit objective b) “to be able to make the financial model in Excel “dynamic” and understand the benefits of such a model”. To get the full points for this criterion, all formulas need to be dynamic and point to the assumption section. It is possible for a student to have all calculations correct but not receive full points for the assignment if the spreadsheet is not dynamic.

Both students and the instructor can benefit if the learning objectives are added to the grading criteria, as is shown in the first column of the rubric under “criteria”. The benefit to the students is that they will clearly know what they are supposed to accomplish with the assignment and how they are graded on it. Instructors benefit, because adding the objectives to the grading criteria helps to point out any misalignment between learning objectives and assessments.

This rubric is not only aligned with the course objective but also with the course materials. In the chapter reading assignment and the recorded lecture, the definitions of different terms are given, for example the NPV and the formulas are presented for the calculations of the different analysis. In addition, the Excel screen capture tutorial shows a step by step the process how this type of analysis is performed. The student can always refer back to the tutorial or communicate with other students or the instructor if any questions occur (which falls under learner engagement).

After the assignment is graded, the instructor needs to provide the graded rubric back to the student, so the student can understand how she or he was graded. Also, the instructor can insert comments into the spreadsheet to show the student exactly where the mistakes are and provide the student with the corrected spreadsheet for feedback, as is shown in the following screenshot of the student’s Excel model.

Figure 2: Example of Feedback Provided for a Case Study Assignment in an Excel Spreadhseet

The screenshot shows an Excel spreadsheet with the following data:

Year	0	1	2	3	4
Sales					
OEM Market:					
Units (grow at 2.5%)		2,464,000	2,525,600	2,588,740	2,653,459
Price (grows at 4.25%)		\$38.00	\$39.62	\$41.30	\$43.05
Total Sales OEM Market		\$93,632,000	\$100,051,644	\$106,911,435	\$114,241,550
Replacement Market:					
Units (grow at 2%)		1,120,000	1,142,400	1,165,248	1,188,553
Price (grows at 4.25%)		\$59.00	\$61.51	\$64.12	\$66.85
Total Sales Replacement Market		\$66,080,000	\$70,266,168	\$74,717,530	\$79,450,885
Total Sales		\$159,712,000	\$170,317,812	\$181,628,965	\$193,692,435
- Variable costs					
Units (OEM + Replacement)		3,584,000	3,668,000	3,753,988	3,842,011
Costs (grow at 4.25%)		\$22.00	\$22.94	\$23.91	\$24.93
Total variable cost		\$78,848,000	\$84,125,580	\$89,756,868	\$95,765,599
- Fixed costs (SG&A) (grow at 3.25%)		\$26,000,000	\$26,845,000	\$27,717,463	\$28,618,280
- Depreciation		\$20,020,000	\$34,300,000	\$24,500,000	\$17,500,000
EBIT		\$34,844,000	\$25,047,232	\$39,654,634	\$51,808,557
- Taxes		\$13,937,600	\$10,018,893	\$15,861,854	\$20,723,423
Net Income		\$20,906,400	\$15,028,339	\$23,792,781	\$31,085,134

A comment box is overlaid on cell C41 (Units for OEM Market in Year 1) with the text: "Nina Schmidt: Do not use numbers, use cell references in your calculations to make your model DYNAMIC! Points: -2".

This screenshot shows a comment added to a cell, in which the student has made an error. The comment provides feedback on exactly what error the student made how that error affected the student's grade.

Finally, feedback can also be provided to the students with the help of a voice recording into an Acrobat Reader file with the instructor's comments, although this type of feedback is more suitable for essay assignments.

Examples of different types of course materials, learner engagement activities and assessment tools for different types of learning objectives and desired skill sets are given in table 1. In this table, different suggested percentages of grade weights are indicated for undergraduate versus MBA level classes of the different skill sets.

Table 1: Possible Grading Weights for Different Types of Learning Skills in Undergraduate vs. Graduate Classes

Desired Skills/Objective	Example % of Grade		Material	Learner Engagement	Assessment
	Undergraduate Class	Graduate Class			
Definitions/Concept Understanding	45	20	Textbook chapter Narrated PPs	Self-test multiple-choice questions	Multiple-choice questions Short-answer questions Computer adaptive tests
Basic Calculations	45	20	Textbook chapter Narrated PPs Tutorials	Self-test multiple-choice questions	Multiple-choice questions Short-answer questions Computer adaptive tests
Critical Thinking/Problem Solving/Development of an Argument	10	60	Website links Journal or news article News video Youtube video	Well-designed multiple-choice questions Forum discussion Oral Presentation (individual or group) Essay (individual or group) Case study (individual or group) Simulation game (individual or group)	Well-designed multiple choice questions Computer adaptive tests Forum discussion rubric Oral presentation rubric Essay rubric Case study rubric Simulation game rubric

This table lists which types of class materials, learner engagement, and assessments can be used for different learning skills and demonstrates example grading weights that can be applied for undergraduate vs. graduate classes.

2.5. Course technology

The course technology is at the heart of an online course and is also important in many regular face to face classes as many instructors make use of today’s advanced technologies. Today’s learning management systems (LMSs), like Blackboard and Moodle, offer many features that help in the learning process. The challenge that instructors face is to keep up with and be educated about the different technologies that are available within the LMS (such as grade center, discussion forums, video conferencing software) and outside the LMS, such a social media websites, video websites like YouTube, screen capturing software such as Camtasia, voice narration in PowerPoint, voice recording in Acrobat reader, etc.

As the Advanced Financial Management class that is used as an example in this paper is taught 100% online the use of technology is particularly important for this class. For the chapter on capital budgeting, the author uses of the following technology:

Camtasia is used together with PowerPoint for the recording of narrated lectures. In these lectures, very clear narrated and visual instructions are given on how to calculate the cash flows necessary for a capital budgeting analysis. The lecture also incorporates the basics of sensitivity, scenario and break even analysis. The technology is therefore aligned with the case study assignment as well as the unit objectives a) “to perform a financial investment analysis in Excel and determine if an investment is feasible” and c) “to differentiate between a sensitivity, scenario, and break-even analysis and to calculate and interpret the results of such an analysis”.

Camtasia is also used in conjunction with Excel to record a tutorial on how to perform the different types of analysis and create dynamic financial models. This tutorial is aligned with unit objective b) “to be able to make the financial model in Excel “dynamic” and describe the benefits of such a model.”

The unit learning objective d) “to list some of the conclusions of a sensitivity analysis and how the conclusions can help with solving a business problem” is supported by the Excel spreadsheet calculations and comments that students have to complete in the capital budgeting assignment. The alignment of the technology with the student engagement is also supported by the communication opportunities in the course. While on the path to achieve the learning objectives, students may have questions. There are different ways student questions are addressed in the course. Student – instructor communication is obtained via e-mail and live virtual office hours in Elluminate Life. Also, the author provides feedback to students within their Excel spreadsheet through inserted comments. In addition, students can participate in an online forum discussion with other students. The author also collects student questions in a “frequently asked questions” list which is posted for all students to see.

Finally, the course technology also supports the creation and transmission of the assessments. All grades are listed in the LMS’s grade center and are easily accessible by the students. The grading rubric is an Excel template where the author enters the point values under scores for each criterion and Excel automatically calculates the weighted average score. This score is then entered into the grade center in the LMS and a copy of the completed rubric sent to the student for feedback, creating communication between the student and the instructor.

Many other technologies can be incorporated into the virtual classroom, that are not mentioned here. These include social media, simulation software, and virtual social world software, such as SecondLife. Social media websites like Facebook can be an effective way to communicate between students, but have certain drawbacks. Simulation and virtual world software can be useful for experiential learning and for having students apply knowledge in a more real-world like environment. No doubt, the future will hold some interesting developments in the field of online learning technology. The biggest challenge for instructors is to be able to keep up with technology and commit the time needed to master the new advancements.

3. Summary and Conclusions

Instructors can never be prepared enough through their formal education to teach effectively and efficiently. One concept which contributes greatly to the learning process is the concept of alignment. This paper describes the concept of alignment and demonstrates that the connection between learning objectives, course materials, learner engagement, assessment and technology is a multi-dimensional one. Not only do the different aspects of a course, such as learning materials, learner engagement, assessment, and technology, have to be directly aligned and match the learning objectives, but the aspects themselves have to be aligned with each other as well. This paper applied the basics of the concept of alignment to one learning unit for an online MBA corporate finance class and gave suggestions on how to align this topic. The purpose of the paper is to give instructors suggestions and pointers on how to improve their courses through the use of the alignment concepts. For a course to be aligned, an instructor has to go through a well-designed process of creating objectives that are measurable and easily understandable and then of designing the corresponding course materials (such as narrated PowerPoints, and Youtube videos, tutorials, etc.), the appropriate learner engagement activities (such as self-test multiple choice questions, Excel case studies, forum discussions, or essays and oral presentations), and an effective assessment tool (such as multiple-choice questions or clear rubrics), all with the appropriate course technology. No doubt, this process is very time consuming and requires a commitment of effort from the instructor. However, the outcome for this effort, an effective and interesting learning experience by the students, is very rewarding.

As advancements in technology are continuous, many changes and innovations in the types of course materials, learner activities, and assessment tools will occur in the future. Some of these recent innovations include virtual worlds, social media and complex computer-based performance assessments. While technological innovations in pedagogy present new learning opportunities, learning institutions and educators face many challenges. While learning institutions need to spend the resources to provide and support the new technology, instructors face the challenge to keep up with the new technologies. These technologies should be incorporated in a way that makes courses interesting and stimulates student learning through the alignment of course objectives.

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ⁱ The non-profit organization Quality Matters (QM) for example uses this concept of alignment as part of its certification process of effective online class creation. According to QM, a course meets its certification guidelines as long as it follows its 8 general standards. Out of the 8 standards, 5 standards relate to the concept of alignment.

ⁱⁱ Examples of automated online assignment, quiz and self-test software is the “Connect” product by McGraw Hill and “Aplia” by Cengage.

ⁱⁱⁱ The author has been teaching the Advanced Corporate Finance course at the MBA level since 2002 and started teaching this class as a 100% online class in 2012.