

Curriculum Element: Economic Analysis Group Project Using VoiceThread

Kellie Grasman, Missouri University of Science and Technology

Kellie Grasman serves as an instructor in Engineering Management and Systems Engineering at Missouri University of Science and Technology. She holds graduate degrees in engineering and business administration from the University of Michigan, and began teaching in 2001 after spending several years in industry positions. She was named the 2011-2012 Robert B. Koplak Professor of Engineering Management for her achievements in online learning. She serves as an eMentor for the University of Missouri System and earned a Faculty Achievement Award for teaching.

Curriculum Element: Economic Analysis Group Project

Utilizing VoiceThread

Objectives:

The curriculum element discussed may be implemented in an undergraduate or graduate level engineering economics course. With sufficient instructor and/or TA support, the project may be implemented with any class size. The primary objective of this project is to provide students the opportunity to 1) evaluate project(s) using a systematic economic analysis technique, 2) support their recommended alternative with data, and 3) convey their recommendation in a professional manner. This project allows students to practice these skills in a real life situation.

Content:

Within the project, student teams analyze real life investment alternatives using a structured Systematic Economic Analysis Technique (7 steps) as a framework. The full project description is included at the end of the curriculum element summary. The seven step analysis framework is outlined here:

1. Identify the investment alternatives: Students consider at least two alternative options, possibly including the do-nothing alternative as well. Each alternative should be presented in detail so the audience understands each choice.
2. Define the planning horizon: The period of time over which to analyze the alternatives should be stated, with justification for this choice.
3. Specify the discount rate: MARR should be clearly stated with justification for this choice.
4. Estimate the cash flows: Estimates of cash flows should be detailed for each alternative. Cash flows should be presented in both table and graph form. All assumptions should be clearly stated and sources of data should be noted for each value. This is a SIGNIFICANT portion of the analysis.
5. Compare the alternatives: At least two methods should be used to compare the alternatives, with results presented for each.
6. Perform supplementary analyses: Analyze each alternative to determine which variable/cash flow category is most sensitive. Clearly state conditions under which your project decision would change.
7. Select the preferred alternative: The preferred alternative should be chosen based on the economic criteria from the course. However, often many other considerations may be important.

Does this project have strategic impact that outweighs the economic considerations? Students must defend their alternative and support their recommended choice.

Delivery:

The project may be implemented in a traditional classroom setting with in-person meetings and in-class presentations. However, this instructor has had great success implementing in online courses using a web-based collaboration tool called VoiceThread. VoiceThread is uniquely suited for remote group presentations, and also allows for detailed instructor feedback, in written, audio or video form within the deliverable. Instructions for use of VoiceThread are included at the end of the project description below. Neither the instructor nor student team members need to be in the same physical location for the project to be executed and presented successfully.

The project is submitted in phases to allow for detailed instructor feedback and refinement. Students practice the application of fundamental concepts introduced in traditional classroom and homework problem-solving to a real engineering economic analysis scenario.

Assessment:

The complete curriculum element, in the form of a detailed project description divided into phased deliverables, is provided below. Additionally, detailed grading rubrics are provided for reference.

Appendix A - Economic Analysis Project Description

Overview

The main goal of this project is to provide you with the skills necessary to 1) evaluate project(s) using a systematic economic analysis technique, 2) support your recommended alternative with data, and 3) convey your recommendation in a professional manner. This project will allow you to practice these skills in a real life situation.

The Project

You may complete this project as a team of up to three persons, or as an individual. Each team or individual should choose an engineering project to analyze. Ideally you will choose a real project from your work and use the tools of the class to analyze the project. If you do not have a real-world situation to analyze, you may choose a hypothetical situation. The project must involve at least two alternatives and have a minimum investment cost of \$10,000.

The Analysis

You (or your team) will analyze your project using the Systematic Economic Analysis Technique (7 steps) as a framework. The steps are outlined below, though you may reference the class notes for more detail.

1. Identify the investment alternatives: You should consider at least two alternative options, possibly including the do-nothing alternative as well. Each alternative should be presented in detail so the audience understands each choice.
2. Define the planning horizon: The period of time over which to analyze the alternatives should be stated, with justification for this choice.
3. Specify the discount rate: MARR should be clearly stated with justification for this choice.
4. Estimate the cash flows: Estimates of cash flows should be detailed for each alternative. Cash flows should be presented in both table and graph form. All assumptions should be clearly stated and sources of data should be noted for each value. This is a SIGNIFICANT portion of your presentation.
5. Compare the alternatives: At least two methods should be used to compare the alternatives, with results presented for each.
6. Perform supplementary analyses: Analyze each alternative to determine which variable/cash flow category is most sensitive. Clearly state conditions under which your project decision would change. For instance, if a level of one variable changed to x , the project would no longer be acceptable.
7. Select the preferred alternative: The preferred alternative should be chosen based on the economic criteria from the course. However, often many other considerations may be important. Does this project have strategic impact that outweighs the economic considerations? You should be prepared to defend your alternative and support your recommended choice.

The Presentation

You will present your project in a professional manner using software such as PowerPoint. Your presentation will be graded on professionalism, as well proper project analysis using the Systematic Economic Analysis Technique.

When you present your project, you may assume that your instructor is a possible investor! Your data and analysis should convince her that your project is a sound investment! Be prepared to be convincing and ready to defend your data and assumptions.

You will present your project to your instructor using a collaborative web presentation tool called VoiceThread. You will NOT need to be present on campus for a live presentation. Details on how you will present in VoiceThread are summarized below.

Due dates

October 23: Project proposal to instructor – an email detailing the project you intend to analyze and your team members if applicable.

November 14: Project Draft presentations submitted for review – this is required- submit via VoiceThread. Instructor will provide comments directly within VoiceThread.

December 4: Final Project Presentation submitted

December 11: Project Edits due (if required)

Presenting with VoiceThread

Getting Started with VoiceThread

Follow these steps to get started with VoiceThread. This is the tool we will use to record and share your project presentations. For now, we just want you to login and get comfortable with the tool.

1. I have created a VoiceThread account for each student in the class. We will use the VoiceThread tool to record and share your project presentations. For now, access your VoiceThread account:

- a. Go to <http://voicethread.com/>
- b. Click “Sign in or Register” in the top-right corner.
- c. Enter your SCHOOL email address and the password 123456.
- d. Click the “Sign-in” button.

2. Once you have successfully signed in, click on your email address on the top right. Choose My Account and change your password if you wish.
3. Next, choose My Identities and add a photo to your identity.
4. Click to expand the menu (click the three horizontal lines forming a rectangle) and view the Tutorials. You will want to be comfortable with "Create", "Comment" and "Share".
5. Feel free to click around in the Browse area to see how others are using VoiceThread, watch more Tutorials, and Create one of your own. (Your VoiceThreads remain private to you unless you share with our class group.)
6. Get comfortable with VoiceThread and stay tuned for specifics of how we will use for your project presentations (or continue below now)!

Creating and Sharing Your Presentation in VoiceThread

Once you've completed the steps above, you're ready to use VoiceThread for your project presentation. The tool is quite user friendly, and the Tutorials do a nice job of explaining how things work. Here are just a few pointers to help you as you create and share.

- You can create your presentation in PowerPoint (or other program) and save as a pdf, then upload to VoiceThread. Details of what to include can be found above. You may also wish to include other content like images, video, etc. Be creative!
- When commenting in the VoiceThread, be sure to make audio and/or video comments. I don't want to read text! The VoiceThread will view much like a video of your presentation.
- If you are working with a group, one member should create your VoiceThread and then share with the other group members. Use Secure share and choose the individuals in your group. Be sure to allow them "view", "comment" and "edit" privileges. You can collaborate online so all group members can edit and comment on the presentation.
- When you are satisfied with your VoiceThread, share with me so I can give you feedback. Click Share, and choose Secure. Then share with me as a Contact, allowing me to "view" and "comment".
- Share a **draft** of your presentation by **November 14**, and I will review and make comments right in the VoiceThread. Then you can make changes based on those comments before the **project due date on December 4**. If any remaining edits are required after this submission, you can submit by December 11.

Appendix B - Rubric: Economic Analysis Project

Teacher Name: **Instructor Name**

Student Name: _____

CATEGORY	4	3	2	1
Content	All relevant cash flows are included and presented in both tabular and graphical form.	All relevant cash flow categories included but some items missing or presentation in only one form.	Most cash flow categories included but presented in only one form.	Significant cash flow categories are missing and presentation is unclear.
Sources	All sources used for quotes, data, graphics and facts are credible and cited correctly.	All sources used for quotes, data, graphics and facts are credible and most are cited correctly.	Most sources used for quotes, data, graphics and facts are credible and cited correctly.	Many sources are suspect (not credible) AND/OR are not cited correctly.
Assumptions	All assumptions are clearly identified and supported with reasonable justification.	All assumptions are clearly identified but lack logical justification.	Not all assumptions are identified and/or supported.	No assumptions are identified or supported.
Diagrams & Tables	Diagrams and tables are neat, accurate and support the reader's understanding of the topic.	Diagrams and tables are accurate and support the reader's understanding of the topic.	Diagrams and tables are neat and accurate and sometimes add to the reader's understanding of the topic.	Diagrams and tables are not accurate OR do not add to the reader's understanding of the topic.
Organization	Content is clearly organized and presented in a logical, easy-to-follow manner.	Content is logically organized, for the most part.	Uses some structure to organize, but the overall organization of topics appears flawed.	There was no clear or logical organizational structure.
Mechanics	No misspellings or grammatical errors.	Three or fewer misspellings and/or mechanical errors.	Four misspellings and/or grammatical errors.	More than 4 errors in spelling or grammar.
Professional Appearance	Overall appearance is of highest quality and professionalism.	Overall appearance is generally professional.	Appears unpolished but complete.	Generally incomplete or amateur appearance.
Workload	The workload is divided and shared equally by all team members.	The workload is divided and shared fairly by all team members, though workloads may vary from person to person.	The workload was divided, but one person in the group is viewed as not doing his/her fair share of the work.	The workload was not divided OR several people in the group are viewed as not doing their fair share of the work.

CATEGORY	4	3	2	1
SEAT - Process	SEAT clearly guides analysis, process is clear, and all steps are identified.	SEAT clearly guides analysis and all steps included but not in detail.	SEAT guides analysis but not all steps addressed.	SEAT does not guide analysis.
SEAT - Investment Alternatives	Investment alternatives are clearly identified and thoroughly described.	Investment alternatives are identified in limited detail.	Investment alternatives identified with no detail.	Investment alternatives unclear.
SEAT - Planning Horizon	Planning horizon is clearly identified, appropriate, and justified.	Planning horizon clearly identified with little to no justification.	Planning horizon identified but inappropriate.	Planning horizon not clear.
SEAT - Discount Rate	Discount rate is reasonable and supported with data/justification.	Discount rate is reasonable but not well supported.	Discount rate is unreasonable or unsupported.	Discount rate is unreasonable with little to no justification.
SEAT - Compare Alternatives	Alternatives are compared more than two methods	Alternatives are compared using two methods	Alternatives are compared using one method	Alternatives not compared with an acceptable method.
SEAT - Supplementary Analyses	Analyses consider multiple "what if" scenarios and identify sensitive cash flow categories.	Analyses consider single "what if" scenario and sensitive cash flows.	Analyses consider "what if" or sensitive cash flows.	No supplementary analyses performed.
SEAT - Preferred Investment	Preferred investment supported by data and multiple criteria are considered.	Preferred investment supported by data but limited criteria.	Preferred investment identified but limited supporting data.	Preferred investment not clear.
Convincing Recommendation	Analysis is convincing, sound, and managers would follow recommendation without doubt.	Analysis is convincing and generally sound but some would question.	Analysis is not convincing or data is questionable.	Analysis is not convincing, supporting data is questionable, and managers will doubt credibility.