Deliberate Practice Using VoiceThread to Improve Student Economic Analysis

Deliberate practice, in contrast to innate talent, emphasizes the pivotal role of high-quality, focused practice in achieving expertise. This paper presents a method for implementing deliberate practice in economics education using the video hosting platform VoiceThread. The four-step approach involves targeting specific skills, engaging in video-based practice assignments, reviewing the assignments and providing feedback, and repeating the process to build competence. Using the media hosting platform VoiceThread enhances this approach, providing students with a structured environment for deliberate practice.

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1. Introduction

This paper presents a method for implementing deliberate practice in economics education using the media hosting platform VoiceThread (VT). The process has four steps: target, practice, review, and repeat. The instructors generate scaffolded assignments that target specific skills, students engage in video-recorded practice, review their submissions and get corrective feedback, and finally, the process repeats to build competence. Unlike typical homework methodologies with private feedback, the VT system discussed here is designed around student videos that are subject to peer observation.

VoiceThread is a media hosting and discussion platform designed for classroom environments. Instructors can use VT to record lectures or post media for student comments. VT is like a YouTube or TikTok channel, but because VT integrates with your Learning Management System, only enrolled students can access the VT content. VT can also be used to create assignments which require students to post content or comment on other posts. Since instructors can moderate submissions, students have a safe space to express their thoughts and learn from others.

In our approach, the instructor creates assignments that require students to submit an economic model along with a video-based response that includes an articulation of their reasoning. In a significant divergence from standard homework pedagogy where submissions can only be seen by the instructor, in our approach, students can view their peer's submissions. The public nature of the submissions increases the incentive for students to be more focused, more attentive, and more deliberate in the way they practice.

Understanding deliberate practice (DP) is a critical part of this methodology. DP was originally coined as a term by psychology researchers in the early 1990s seeking to quantify the impact of "practice" on the formation of expertise. Because "practice" is a heterogeneous concept, it is necessary to make distinctions between various types of practice routines. DP has been defined as high-quality effective practice that is focused, systematic, and purposeful. DP requires expert guidance and requires significant effort. Notably, DP is often considered unpleasant because it requires significant effort and focus. Nevertheless, DP is a well-recognized pathway to learning difficult tasks (Ericsson, Krampe, & Tesch-Romer, 1993).

Integrating the video hosting platform VoiceThread (VT) is a way to enhance the adoption of a DP approach in a classroom setting, providing students with structured practice opportunities and expert feedback. In this paper, we propose a method using VT to implement a deliberate practice strategy in principles of microeconomics. The authors have also implemented the methodology in analytics courses. Moreover, the methodology suggested here is readily adapted to almost any subject. In the next section, DP is discussed in more detail. Each step in the practice process is explained, followed by a detailed example, results, and conclusion.

2. Literature Review

Sir Francis Galton published an influential book on the "laws" of inherited genius in 1869 (Galton, Sydney, & Dudley, n.d.). The book argued that stellar individual ability was largely inherited. For over a century, it was commonly assumed that people who excelled at anything must have a "natural" talent. In the mid-20th century researchers seeking to quantify the acquisition of skill demonstrated conclusively the other rather obvious point that skill in an activity was highly correlated with the amount of practice. Scientific studies of Morse code translators, typists, and athletes pointed to a strong correlation between practice and performance (Ericsson, Krampe, & Tesch-Romer, 1993). Nevertheless, the nature versus nurture question nagged:

could sufficient repetition alone yield maximum performance? Or does natural ability have a significant role? Does practice make perfect?

Ericsson, Krampe, & Tesch-Romer (1993) reached a surprising and controversial conclusion: "Yes!" Sort of. Practice does not make perfect, but perfect practice does. The research showed that mere repetition would not yield maximal results, however, enduring a sufficient volume of what they called "deliberate practice" would. In effect, their surprising conclusion held that anyone can achieve any result with diligent attention to practice (Ericsson, Krampe, & Tesch-Romer, 1993). The correlation between deliberate practice and performance was so strong, that the authors doubted the role of genetics at all. These ideas made the leap from scholarly research to the popular press with the publication of Malcolm Gladwell's best-selling book "Outliers" (Gladwell, 2008). Gladwell's oft-cited 10,000-hour rule is an extension of Ericsson, Krampe, & Tesch-Romer's (1993) work that suggested that anyone could achieve expertise in anything by applying a certain amount (10,000 hours) of practice.

While the "10,000-hour" rule took on a life of its own after 2008, the notion that practice is the only thing that matters has not stood up to serious scrutiny. Many authors have disputed the finding, but none dispute the idea that serious practice is associated with increased ability. Hambrick et al. (2014) summarize many of the issues with expert research and find that practice is important but may not be the only driver of performance. Hambrick, Macnamara, & Oswald (2020) revisit the argument in more detail. They review the long debate over the definition of deliberate practice and the quantitative evidence about the efficacy of practice and suggest that while practice is important, there are other important factors including experience, ability, and environmental factors (Hambrick, Macnamara, & Oswald , 2020). That said, none of Ericsson, Krampe, & Tesch-Romer's (1993) critics deny that deliberate practice has an important role to play in the individual acquisition of skill.

One major factor emerging from follow-up research is that practice must have certain characteristics to be effective. Repetition is not sufficient;. quality and quantity matter. Becoming a better golfer requires more than hacking at the golf ball for 10,000 hours. To improve, a serious student of the game must practice deliberately; concentrating on proper form with an array of clubs in various situations. This type of practice requires knowledgeable instruction, systematic effort, careful monitoring of progress, and, not surprisingly, it may not be enjoyable!

Recognizing the importance of practice, educators often assign homework to meet that need. Homework, however, is not synonymous with deliberate practice. Recently teacher-scholars have been incorporating DP methodologies in their assignments and reporting on effects. In studying mathematics education, researchers emphasized two features: expert guidance and instructor feedback. The input of an expert is critical in laying out an appropriately scaffolded path toward a goal and in providing timely and effective feedback that corrects errors so learning stays on track (Lehtinen et al., 2017). Researchers on students in academic disciplines have shown significant gains in learning when using DP compared to a control group (see Brezovszky et al., 2019., Smith & Holmes, 2020, Fawcett et al., 2020, Miller et al., 2021).

Obviously, practice is important and while perfectly deliberate practice is often unwarranted or impractical, some tools and strategies that make practice more purposeful and deliberate. VoiceThread is an educational tool employed to create an online environment for purposeful and deliberate practice. VT supports structured guidance and timely feedback in an environment that encourages effortful input from students.

One significant feature of the VT platform is the potential for peer observation and the ability to use peer exemplars in the review process. Instructors use exemplary student work for three main reasons: to help students understand what constitutes quality work, to help

students work to improve their submission and meet reachable goals, and as a way to promote self-reflection on work in progress (Hawe, Dixon, & Hamilton, 2021). While choosing a truly exceptional exemplar may be de-motivating for some students, an authentic example of mid- to upper-level student work provides a good way to impress on many students the sort of work they should be submitting. Research has shown that using student-generated examples in review can have many benefits, including increasing student motivation and raising the bar for learning outcomes. The process can also help instructors identify instructional challenges leading to common errors (Thorne et al., 2024).

3. Deliberate Practice Methodology for Microeconomics

The DP process has four steps: target, practice, review, and repeat. The idea is to target specific skills in each practice opportunity, engage in effortful video-based DP assignments, review and provide feedback, and then repeat the process in a series of scaffolded assignments to gradually build competence.

Target

The first step in a DP methodology is to create a series of practice assignments each targeted at a specific skill or goal that requires focus and effort to ensure proper execution. Each assignment breaks down a larger task into parts with detailed explanations for completing each step. Ideally, successive exercises are scaffolded to include review as well as new material and be designed to be slightly outside of the typical student's current comfort zone. Figure 1. shows a sample individual assignment targeting analysis using a production possibilities model.

Figure 1. Sample Targeted Task

Low-Stakes Deliberate Practice Opportunity (DPO): Dam Salmon Part I Exercise

Background

*Washington State is considering a plan to remove hydroelectric dams from some rivers where native salmon are endangered. If the dams are removed, the salmon will be able to migrate freely and will have better spawning (breeding) success. **Opponents of the plan argue that removing the dams will create massive unemployment in the area.** Particularly hard hit according to their claims will be the aluminum industry which relies heavily on electricity in production. The dams currently provide an inexpensive local source of electricity which is a resource used in the production of aluminum.*

Complete the following steps:

1. Use MS Word drawing tools to construct a production possibilities curve for the two goods mentioned above.

2. List four resources used in the production of the two goods. If you use a category of resources (like capital), give a specific example. Label the economy.

3. Label the current point of production (before the dam removal project) assuming it is productively efficient. (Label this point A)

4. Is point A an example of allocative efficiency? **Explain your answer.**

5. Use the production possibility curve to illustrate the effect of the dam removal on the two goods being considered here.

6. Write a brief explanation of your model and the changes. Be sure to incorporate *the arguments of opponents (that the plan will cause massive unemployment)*.

7. Submit your model and *record your explanation on VoiceThread.*

The assignment in Figure 1 divides the economic analysis task into six chunks each requiring effort and concentration. Step one requires students to use the MS Word drawing tools. This is most likely an unfamiliar activity but one that can be learned and implemented with some brief instruction. Step two requires critical thinking to differentiate the goods from the resources in the background information. Steps three and four require an application of relevant economic theory to the scenario at hand, and the last two steps require the student to craft a coherent explanation. Combined, these chunks amount to a complete economic analysis.

Successive assignments repeat the tasks in the first targeted assignment, steps one through six, and add additional tasks. Ideally, repetition will increase comfort and understanding while each new task adds a stress element that requires concentrated effort. Following the Smith and Holmes (2020) model, once a skill is acquired and integrated into the analysis, the detailed and specific instructions for that skill are faded. For example, after two or three practice rounds, the detailed instructions in Figure 1 can be replaced by a general statement like "include a production possibilities curve model in your analysis."

Video-Based Practice

Homework assignments are often designed to allow students to test their understanding and receive feedback before a major assessment. Electronic homework systems provide similar practice opportunities. For example, students might be able to practice multiple-choice questions and receive corrective feedback on wrong answers. Two other options are document and video submissions. Where a document submission often only shows the solution, a video submission can capture the process and may even include a demonstration. This can confirm the correct execution and help verify understanding. Students must articulate their reasoning not just select the correct answer.

Debourgh & Prion, (2017) discuss the benefits of implementing a video-based approach to deliberate practice of nursing skills. Nursing students worked in teams to video-record their deliberate practice of psychomotor skills. Students reported increased confidence in their skills as they processed more activities in this manner. The nursing videos, however, were submitted directly to the instructor for feedback and were not subject to peer observation. While the video submission approach has value, the advantages are amplified if the submissions are made public.

VT is unique in that it allows video submissions visible to the rest of the class. In a study of the efficacy of video-based practice on VT, Chang & Windeatt (2023) compared students who were given VT practice assignments to a control group without such assignments. Presentations were notably better in the experimental group which reported far more practice than the control group where practice was optional and virtually non-existent. Other researchers have shown that video-based practice using VT has a positive impact on language learning (Sojisirikul & Chanchula, 2023). It has been used by law students to practice interaction with clients (Abrams, 2022). VT has also been shown to have positive effects on connectedness in online settings. Soto and Soto (2023) have a thorough review of the myriad of uses for VT technology across a wide variety of settings and provide an excellent use of VT to make their college-level mathematics courses more student-centered.

Peer observation may also have a positive norming effect, where students who observe others performing in a way that meets expectations will adopt similar practices. Instructors observed this norming effect in a study using videos demonstrating proper form in citations during oral presentations. Students who were shown a video modeling proper technique were more likely to adopt those techniques (Buerkle & Gearhart, 2017).

The VT system is ideally suited to purposeful, deliberate practice. The assignment discussed in Figure 1 is designed so that each student completes the same task and submits a document with a video-based explanation. Submissions remain hidden from the class until the instructor makes the videos visible. After instructor activation, all versions of the same task are visible to all participants. This construct forces students to generate an economic model and articulate their reasoning which is significantly more demanding than a written analysis.

Because all submissions are visible to the entire group there is a significant peer incentive to improve their performance. This incentive can be amplified if the instructor plays one or two of the videos in the classroom. Knowing that their video might be played in front of the class can motivate students to solve the problem correctly, and explain it cogently which has the beneficial effect of deepening their understanding. Another benefit is the norming of student submissions toward more advanced performance. When students can inspect better submissions, the effect elevates expectations and increases the pressure to improve performance.

 Review

The other significant difference between "practice" and "deliberate practice" is the importance of corrective feedback. Ideally, intervention should take place as soon as possible after an error is made. While a music instructor in a one-on-one, face-to-face lesson can intervene immediately to correct a student's mistake, that is not possible in a typical classroom setting. However, VT is well-suited to corrective intervention and offers several avenues for feedback. The authors devoted class time to review selected submissions to point out common mistakes and help students make corrections. Though we did not pursue it, the system has the functionality to leave text or video comments on individual submissions. These assignments were low stakes and some classes were very large, therefore detailed review and commenting took place during class and were limited to a small subset of submissions. Finally, excellent submissions can be downloaded and shared with the class as a model to set expectations.

Repeat

As mentioned in the targeting section, repetition is a key component to success. Scaffolding assignments so that elements of prior assignments are incorporated into successive assignments allows students to correct errors while engaging with new material.

Example

A deliberate practice video-based process was adopted in the author's Principles of Microeconomics sections beginning in the 2022 academic year at a mid-sized public university. The class is a general education class and a core requirement for business majors, and most students are first-year students. The classes were taught in person in two 75-minute or three 50-minute classes per week. The instructor had several sections with approximately 35 students and two large sections with approximately 200 students each. The focus of the course was to prepare students to analyze news articles with the following prompt "Provide a complete economic analysis of the following article. Provide appropriate graphs and a complete explanation" (Andrews, 2021). This is an authentic assessment that requires significant skill and is well-suited to a deliberate practice methodology.

Ten assignments were designed to cover five major topic areas: Production possibilities models, supply and demand, production and cost, perfect completion, monopoly, and oligopoly. Each major topic had two assignments. For most assignments, students were given class time to work collaboratively on the models and answer the associated prompts. After the in-class work, students had at least 24 hours to work individually to produce a video recording of

their models with a brief (typically limited to 90 seconds) explanation of their reasoning. While the submission window was open, all student submissions were hidden.

After the submission window closed, the responses were previewed by the instructor (only to ensure they were suitable for viewing) and made visible to the class. At the next class meeting, the instructor chose one or two submissions for detailed review. The assignments chosen for review always contained errors but were typically well constructed. The idea is to display a well-developed and labeled model with many positive elements that also contains at least one common mistake. The class can then learn from the error at the same time it is being normed toward high-quality submissions. The class was allowed to review all submitted videos and make any necessary corrections to their analysis before moving on to the next practice opportunity or topic. Students did not submit revised versions of their original analysis, but because assignments are scaffolded, students still had a strong incentive to eliminate errors before the next practice opportunity.

The appendix contains a sample set of assignments . The sample has five assignments: an introduction to VT followed by four scaffolded deliberate practice assignments. The introduction to VT requires participants to use VT to record a brief personal introduction and display an image during the video. This topic is designed to ensure students can use the system, so they are prepared for the practice opportunities to follow. The topic contains an embedded video from VT in case students struggle with the technology.

The remaining topics are based on real-world events. Each topic asks the students to present an economic analysis. The instructions divide the analysis into chunks with specific directions for what the student needs to accomplish at each step. The detailed instructions in earlier assignments are faded in later assignments in favor of more general statements. The first economic analysis task requires the students to use a production possibilities curve to analyze the effect of introducing a mechanical nut shelling machine to African villages. The goal of the assignment is for students to practice making a distinction between goods and resources and to consider the effect of new technology on the economy. The topic includes a video that demonstrates the nut sheller and explains its impact. The next assignment (Dam Salmon Part I shown in Figure 1) repeats the production possibilities analysis from the nut-sheller assignment and adds a new task: including a discussion of the efficiency implications. Dam Salmon Part II fades some of the detailed steps in the production possibilities analysis in the prior assignments (Dam Salmon Part I) while adding detailed steps required for a market analysis. The final assignment in the sample has a scenario featuring food shortages following the COVID-19 pandemic. There are no new tasks in this assignment, but much of the detailed instructions from prior assignments have faded to a more general statement of what needs to be accomplished. At this point, the deliberate practice process has prepared students for the mid-term. The process systematically adds challenging material while gradually fading detailed instructions for earlier tasks as students gain competence.

<u>Review and Grading</u>

These practice assignments were considered "low-stakes." Low-stakes opportunities constituted 25% of the overall course grade or about 1% of the course grade for each assignment. There were a few extra assignments built into the course. If a student missed one or two, these extra assignments served as make-up, and if students did them all, the extra assignments served as extra credit. This fits well with the practice analogy. For example, a basketball coach teaching a novice player probably shouldn't punish a player for a missed shot, but also should not reward a player practicing their dribble when they were instructed to practice free throws. Also, a player can miss an occasional practice and achieve an acceptable level of competence.

To earn full credit, students do not have to get the "correct answer." Instead, students need to follow the process indicated in the instructions and have an audible explanation. Because this method was used in classes with hundreds of students, no attempt was made to review each entire submission. Rather, instructors reviewed each assignment to ensure that the students had made a complete attempt. Review in this manner takes a few seconds per submission and because there is no partial credit instructors simply click the appropriate box (complete or incomplete). Grades are automatically recorded in the LMS.

The low-stakes VT assignments were designed to prepare students for and improve the quality of analysis in high-stakes analysis assignments which are the focus of the course. All of the high-stakes assignments were of the nature described previously. Students were asked to analyze articles according to the "Provide a complete economic analysis of the following…" prompt mentioned earlier. At that point, they are expected to provide a complete and accurate analysis without the detailed instructions provided in the low-stakes assignment prompts. It should be noted that students who practice deliberately can meet this relatively significant challenge successfully.

4. Results

The authors adopted the DP model in the Fall semester of 2023. From Fall 2023 to Spring 2024, the process used the Microsoft-owned video hosting platform Flip. That platform was discontinued in the summer of 2024. In Fall 2024, the authors switched to VoiceThread. Over three semesters from Fall 2022 to Fall 2024, 797 students were enrolled in principles of microeconomics sections utilizing the protocol described here. Of those, 747 students responded to an anonymous survey regarding their experiences. The survey was administered after the mid-term. At that point, students had a clear idea of the process and an understanding of the value of the DP opportunities. Figure 2 shows the student-reported participation in the video-based assignments. The values in Figure 2 are based on a Likert scale where 5 is "always" and 1 is "never."

Figure 2. Student Use of Video-Based Assignments

How often did you participate in the low-stakes video-based deliberate practice assignments?
747 responses
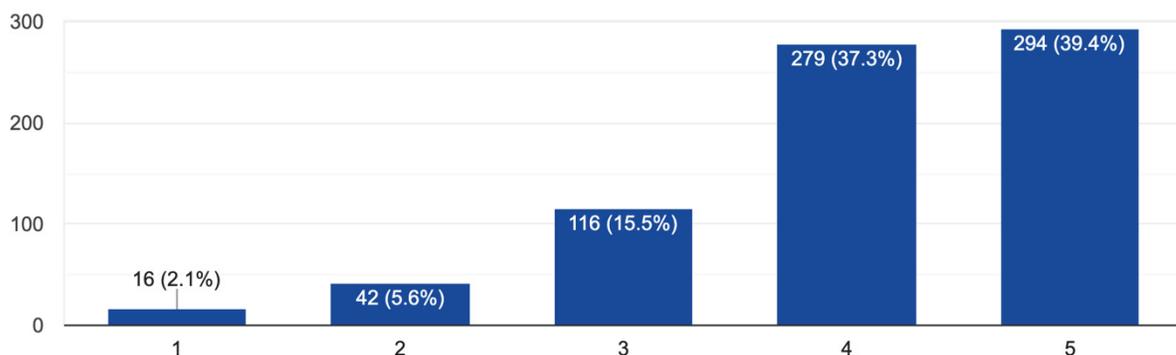
Approximately 75% of students reported completing the assignments "always" or "almost always." There were also a small number of students who never or rarely participated. Figure 3 displays how useful students felt the assignments were for preparing them for future assignments. This uses a Likert scale from 1 = "not helpful" to 5 = "very helpful." More than half of the students scored this as a 4 or a 5 indicating that they understood the usefulness of the practice assignments in helping them complete the high-stakes assignments.

Figure 3. The usefulness of video assignments

How would you rate the usefulness of the low-stakes deliberate practice video posts in terms of preparation for future assignments (high-stakes written homework and exams)?

747 responses
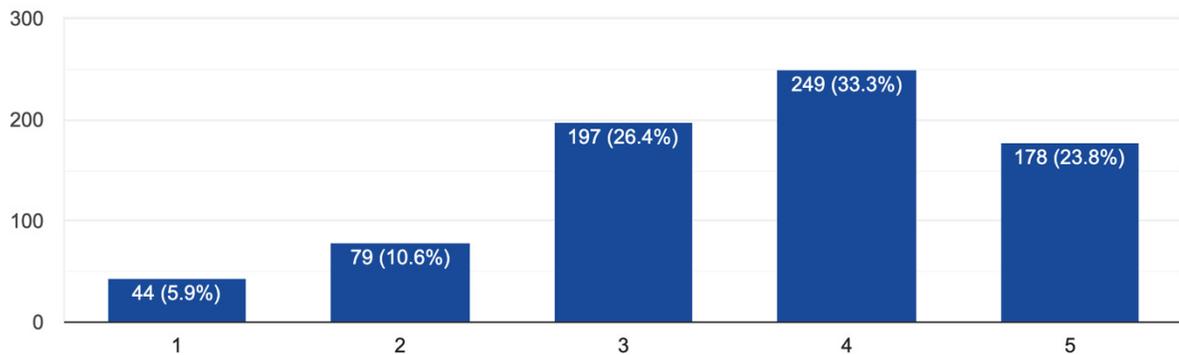
Students were also given an opportunity to leave comments in the survey. Some selected comments are shown below in Figure 4.

Figure 4. Selected Student Comments

- I think it is a great learning opportunity and that you don't have to be right because your still in the learning process for some of these assignments

-I enjoyed the flipgrid annsignments it, helped to understand the material more. I not only had to complete the assignment but I also had to explain the material.

-At the end of the day no ones gonna like doing assignments, but I do think it's super helpful to understand where your thinking is at during class. So the Flipgrid are very helpful when it comes to understanding what do and don't know.

-very helpful way to practice, good grading system, because even if we mess something up its low stakes, so we still get credit and see exactly what we need to fix

-I like the fact that the class after the VT assignments are due that they are discussed on how to complete them the right way and how to do it the right way.

From the instructor's point of view, VT provides a convenient estimate of how well students can perform a given task. Since students appear on video, it helps ensure that each student is doing their own work (which may alleviate potential academic integrity violations). We have also not seen significant evidence of artificial intelligence (AI) being used in completing these assignments. The construction of the model may be more readily accomplished by a person rather than via the detailed prompts that would be necessary if using AI. Also, the AI models we have experience with do not appear to be adept at reading and interpreting the models the students create. Finally, video submissions can also create a faster and stronger student-teacher relationship. For example, learning student's names in a large section (or multiple sections) occurs more quickly when you are meeting with students in class and watching their videos (seeing & hearing them present) outside of class.

5. Conclusion

Deliberate practice has a proven record of improving performance across a variety of disciplines. The method introduced in this paper adopts this process for learning in an academic discipline using VT. The instructor designs a series of tasks/assignments to lead a student from novice to more advanced levels. Each task is accompanied by a detailed set of instructions designed to make even a complex task achievable. The student demonstrates their understanding in a video presentation and is given immediate, corrective feedback from the instructor. As competence is achieved at each level, new tasks are added, and growth ensues.

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Appendix: Sample Assignments

A. Deliberate Practice Opportunity (DPO) Introduction to VoiceThread

This assignment has two purposes. First, it gets you acclimated to using VoiceThread (VT) It's also an opportunity to introduce yourself to me and the rest of the class! So do your best to make a good impression. Turn on your lights, get out of bed, and add some enthusiasm to your delivery! Show your face and if you have to, fake it till you make it! Second, all the VT assignments require you to use the slide feature to show off a model. I want you to test that out. You have 90 seconds to do two things:

- Use "add a slide" to share an interesting photo/image. Paste an image into a document then upload the doc. (That is your slide)

- Use the "comment" feature to tell us your first name and share an *interesting* fact or two about yourself. Also, tell us a little about the image in the slide!

This is a YouTube video link that demonstrates the process

https://www.youtube.com/watch?v=POspzmoFS7o&t=1s

Completing both tasks is worth five practice points!

B. Deliberate Practice Opportunity (DPO): Universal Nut Sheller

After reviewing all the material in the Production Possibilities Module, watch the video on the Universal Nut Sheller in Guinea. Then construct an economic model (a PPC) to illustrate the change implied in the video.

1. Use MS Word Drawing tools to construct a production possibilities curve for two goods. Put the main good on the horizontal axis and choose a second relevant good for the vertical axis.

2. List four resources used in the production of the two goods. If you use a category of resources (like capital), be sure to give a specific example.

3. Label the economy.Label the current point of production without the nut sheller assuming that it is productively efficient. (Label this point A)

4. Use the production possibility curve to illustrate the effect of adding the nut sheller on the two goods being considered here.

To earn credit, the model must be constructed using MS Word drawing tools, with complete labels and all changes clearly shown. To get credit the model must be accompanied by a brief video explanation of what you did and why. Here is the process (in a nutshell!)

Figure 5
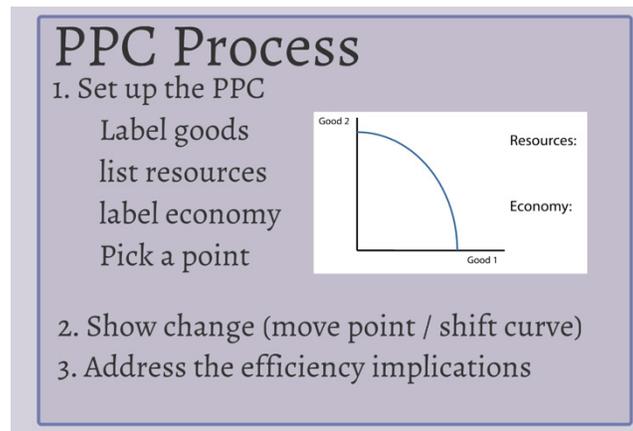
In VoiceThread,

- Add a slide (upload a Word document that shows your model)

- Use the comment button to record a video using the webcam where you explain the setup and the changes to the model.

C. Deliberate Practice Opportunity (DPO) Dam Salmon Exercise

Use the following information along with the videos to answer the questions below

Washington State is currently considering a plan to remove hydroelectric dams from some rivers where native salmon are endangered. If the dams are removed, the salmon will be able to migrate freely and will have better spawning (breeding) success. ***Opponents of the plan argue that removing the dams will create massive unemployment in the area.*** *Particularly hard hit according to their claims will be the aluminum industry which relies heavily on electricity in production. The dams currently provide an inexpensive local source of electricity which is a resource used in the production of aluminum.*

The two videos below show how dams are removed from rivers.

The downstream dam is removed slowly

https://www.youtube.com/watch?v=VipVo8zPH0U&t=5s

The upstream dam is removed explosively to flush the sediment downstream

https://www.youtube.com/watch?v=4LxMHmw3Z-U

To earn credit you must complete the following:

1. Use MS Word Drawing tools to construct a production possibilities curve for the two goods mentioned above.

2. List four resources used in the production of the two goods. If you use a category of resources (like capital), be sure to give a specific example. Label the economy.

3. Label the current point of production (with the dams) assuming that it is productively efficient. (Label this point A)

4. Use the production possibility curve to illustrate the effect of the dam removal on the two goods being considered here.

5. Is point A an example of allocative efficiency? Will removing the dam lead to productive inefficiency? **Explain your answer.**

Figure 6
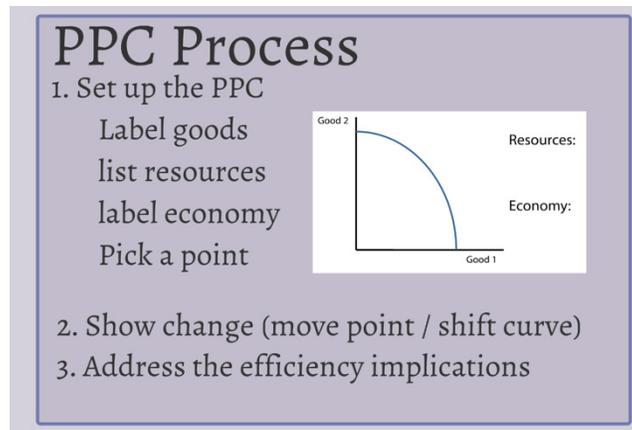
In VoiceThread

- Add a slide (upload a Word document that shows your model)

- Record a video comment that explains your model.

D. DPO Dam Salmon Part II (PPC & MKT)

Before you do this assignment, review the PPC portion of the analysis from Dam Salmon Part I

Background Information

Washington State is considering a plan to remove hydroelectric dams from some rivers where native salmon are endangered. If the dams are removed, the salmon will be able to migrate freely and will have better spawning (breeding) success. Opponents of the plan argue that removing the dams will create massive unemployment in the area. Particularly hard hit according to their claims will be the aluminum industry which relies heavily on electricity in production. The dams currently provide an inexpensive local source of electricity which is a resource used in the production of aluminum.

Here's a link to a video that shows the first dam being removed. Here's another that shows the upstream dam being removed

To earn credit you must complete the following:

1. Use MS Word to construct a market diagram directly above a PPC (completely labeled) to illustrate the effect that removing the dam has on the market for salmon.

2. Use artificial intelligence to specify reasonable values/labels for each axis.

3. Indicate the change in supply **or** demand, the shortage or surplus, and the changes in quantity demanded and quantity supplied.

4. Construct a production possibilities curve for the two goods mentioned above. List four resources used in producing the two goods and label the current point of production (with the dams) assuming that it is productively efficient (label this point A). Use the production possibility curve to illustrate the effect of the dam removal on the two goods being considered here. In your answer be sure to incorporate the opponents' arguments to the plan. Explain your answer.
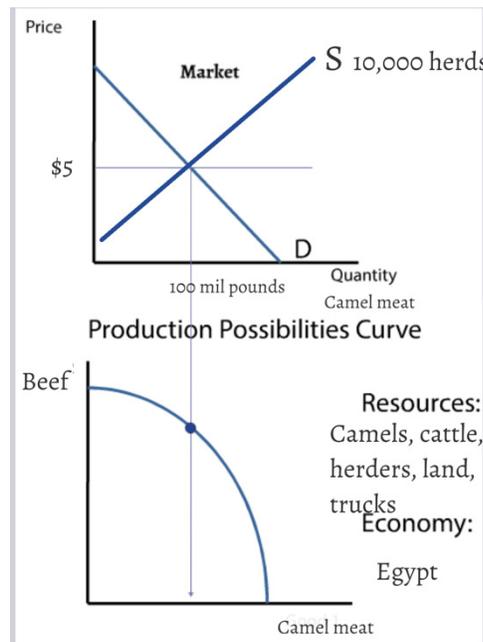
In VoiceThread

- Add a slide (upload a Word document that shows your model)

- Record a video comment that explains your model.

Five-Step Process for Analyzing Market Changes

1. Set up the market and PPC (aligned vertically with the same good on each horizontal axis.) Both graphs should be completely labeled and specified with appropriate values.

Figure 7

2. Change either demand or supply (left is a decrease, right is an increase)

3. Identify the resulting shortage or surplus

4. Change price, quantity demanded and quantity supplied

5. Implement the PPC process and analyze efficiency effects

E. DPO Food Shortage

Provide a complete economic analysis of the food shortage

video: https://www.youtube.com/watch?v=0TlumJlsB3Q

In VT add a slide (upload a document (slide) that includes both a market diagram and a PPC.) Make sure they are completely labeled and the market diagram is specified with reasonable values. Use the comment feature to record a brief video explanation of the change. To earn credit, you must complete the five-step process listed below.
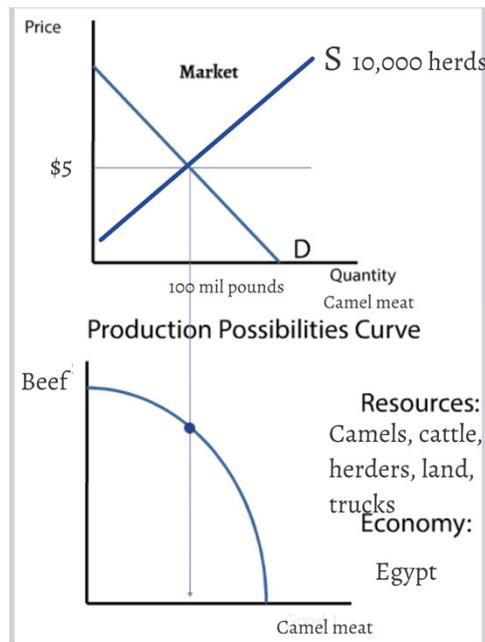
Two-graph Complete Economic Analysis

At this point, you should include a PPC and a market diagram in every complete analysis question. The graphs should be aligned vertically with matching horizontal axes. That way both models will move in the same direction. The market diagram should be completely labeled and specified to establish a firm connection with the material being analyzed. The PPC can be used to analyze efficiency and the market can be used to show how prices and quantities will adjust to changes in economic conditions.

Five-Step Process for Analyzing Market Changes

1. Set up the market and PPC (aligned vertically with the same good on each horizontal axis.) Both graphs should be completely labeled and specified with appropriate values.

Figure 8

2. Change either demand or supply (left is a decrease, right is an increase)

3. Identify the resulting shortage or surplus

4. Change price, quantity demanded, and quantity supplied

5. Implement the PPC process and analyze efficiency effects