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Teaching and Educational Methods

Structure, Flexibility, and Consistency: A Dynamic Learning Approach for an Online Asynchronous Course

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Abstract

COVID-19 forced many instructors to migrate their practice online and created a need to develop a new online teaching model. This article proposes an online asynchronous model specifically designed for an economics course. This teaching model was designed with three objectives: consistency, structure, and flexibility. It builds on the capability of learning management systems (LMSs) to create a straightforward learning path for students. The model delivers theoretical and practical knowledge and, although asynchronous, describes the instructor's key role. It embraces strategies to reduce social isolation arising from online, asynchronous teaching models.

1 Introduction

The COVID-19 crisis has forced a majority of instructors to move their teaching online. This move was abrupt and unexpected. Although the profession has shown remarkable adaptation to the new circumstances, there is a growing need to document online teaching practice and to disseminate online teaching methods.

Before the COVID-19 crisis, students could select their preferred content delivery method (online or in person) by enrolling in courses or universities offering online content. At many colleges and universities around the world, students did not choose the online model; it was imposed on them. The online model has created motivation and engagement challenges for the students who did not choose it (Wooten, Geerling, and Thomas 2020), and it has reinforced in-person modalities' existing challenges, such as attendance, participation, and resource availability (Alawamleh 2020). Moreover, it has increased students' anxiety about their educational, personal, and financial situations (Aucejo et al. 2020; Aristovnik et al. 2020; Aguilera-Hermida 2020; Brown et al. 2021; Roux et al. 2021).

Kofoed et al. (2021) and Orlov et al. (2021) show evidence of average learning losses in their surveyed economics courses during the COVID-19 pandemic. However, Orlov et al. (2021) show that strategies similar to those discussed in this article can mitigate negative effects. For instructors, online teaching imposes new constraints, but it also relaxes some in-person teaching constraints. One of the latter is the administratively defined length of a lecture, typically 75 to 80 minutes for twice-weekly classes and 50 minutes for thrice-weekly classes. Online teaching provides greater flexibility in the allocation of teaching time, especially in asynchronous or self-paced teaching modalities. For instance, the teaching model discussed in this article proposes learning blocks of 30 or fewer minutes, giving students a high degree of flexibility when organizing their learning schedules.

Distance education and asynchronous online courses existed before the COVID-19 pandemic. Significant literature supports the design of such courses. Swan (2001) shows that students' learning and satisfaction with a course are improved by a straightforward course design, regular communications with instructors, and ability to interact with other students. Connections between instructors and students are

a key educational need in asynchronous online approaches. In their extensive review of the relevant education literature, Conley, Lutz, and Padgitt (2017), Niess and Gillow-Wiles (2013), and Yuan and Kim (2014) report that students typically feel less supported by both instructors and other students in asynchronous online modalities. They also report the literature's concerns about social isolation when students learn online, especially asynchronously. Yuan and Kim (2014) provide four sets of guidelines to create learning communities in online courses. These guidelines help instructors answer four significant questions about building learning communities: when, who, where, and how. For instance, Yuan and Kim (2014) suggest that community building be a continuous term-long objective pursued by both students and instructors and that course design allow for task-oriented collaborative interactions. The teaching model presented in this article includes a group project designed according to Yuan and Kim's (2014) guidelines. Through randomized control trials conducted in Germany, Hardt, Nagler, and Rincke (2020) show that community-building strategies effectively increase students' morale and motivation. Specifically, they showed that regular mentoring sessions benefit students' learning in an online learning environment.

This article presents an online, asynchronous teaching model for economics courses. This Dynamic Learning model allows students to access course material and all the necessary guidance for accommodating different learning styles. Evidence that such a model is valuable for students' engagement and learning is provided by Conley, Lutz, and Padgitt (2017); Hardt, Nagler, and Rincke (2020); and Orlov et al. (2021). The model was created with the CANVAS Learning Management System (LMS). CANVAS's capabilities should be replicable in most other LMSs because it uses only basic features of those systems. In addition to presenting the Dynamic Learning model, this article explains how to adapt it.

2 The Course: Theory and Practice

The Dynamic Learning model was created to facilitate delivery of content for a cost-benefit analysis course. This course is offered at the third-year level and has first-year prerequisites. Thirty-four students were enrolled in fall 2020, when the course was offered.

Course components and their grade distributions are as follows:

- | | |
|----------------------------------|------------|
| • Dynamic Learning Quizzes | 5 percent |
| • Team Project | 40 percent |
| • Midterm Exam (chapters 1 to 4) | 20 percent |
| • Final Exam | 35 percent |

The course helps students understand the theoretical origins of cost-benefit analysis and the way to perform it. The theory is supported by the midterm and final exams, and the practical application is supported by the term project. In turn, the project provides real-life examples to support the theory.

3 Theoretical Path and Dynamic Learning

Students study the theory using an online, asynchronous model in the course LMS. This Dynamic Learning model gives students access to all the information required to complete the course and the opportunity to revisit already learned material at their convenience. It emphasizes high-frequency, low-stakes assessment. The graded basic quizzes aim to verify basic knowledge rather than deep understanding. That understanding is tested during the midterm and final exams with questions and exercises relating to the course's most challenging content. A group project allows students to develop practical knowledge. The following subsections describe in detail what Dynamic Learning is and how to create it.

Error! Reference source not found. provides a schematic of the teaching model, in which the instructor is the center. In an in-person course with a group project, the instructor potentially interacts at the class, group, and individual levels. The model was created with these three levels in mind. Similar levels of interaction are discussed in Picault (2021a). Dynamic Learning provides for intervention at the class level and gives the instructor flexibility to interact at the group and the individual level.

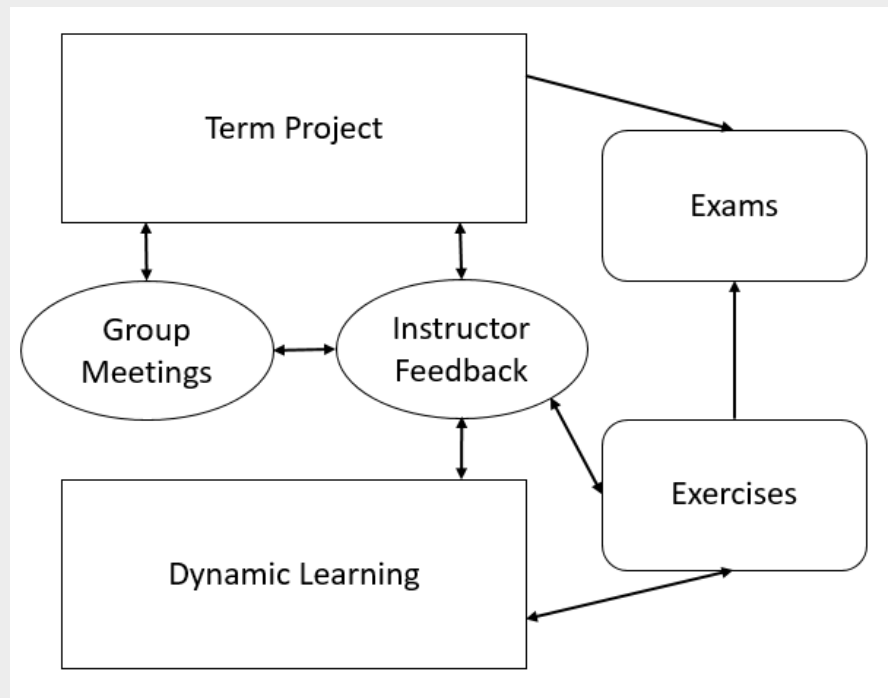


Figure 1. The Teaching Model

3.1 Primary Objectives: Structure and Flexibility

Students that had transitioned online in the previous term were asked about their expectations of an online course. They indicated the need for both structure and flexibility. Although structure and flexibility appear antithetical, an asynchronous, scaffolded model for content delivery can provide both. Scaffolded delivery facilitates structure, whereas asynchronous delivery increases flexibility, a requirement given that students in the course would be located in different time zones. The asynchronous, scaffolded model for content delivery would require a redesign of course content around concepts.

3.2 Course Content Redesign

Directly transferring face-to-face practices to an online learning environment and focusing on disciplinary-appropriate content are insufficient to generate cognitive engagement and a positive learning experience (Aguilera-Hermida 2020; Lemay, Doleck, and Bazalais 2021). Therefore, the content of the cost-benefit analysis course needed to be adapted to the online environment. It required a significant restructuring for scaffolded delivery and logical content progression.

Economics content related to COVID-19 was contemplated. Such content is available in Mateer and Coppock (2020) and Zhang and Ramse (2020). However, Wooten and Al-Bahrani (2020) recommend care when referring to the pandemic, which has had mental, physical, and economic consequences for some students.

Discussions with students highlighted the need to keep divisions of course material consistent with chapters in the course textbook. This feedback led to an LMS module for each chapter in the textbook. But for structure and flexibility, the model's primary organizing factor was course concepts.

Structure is accommodated because the scaffolding process moves from concept to concept following a logical order. Flexibility is accommodated because students learn each concept in a short amount of time (the course was designed so that each concept would be studied for 30 or fewer minutes). In other words, students gained flexibility when organizing their time. Instead of fitting hour or longer lectures into their schedule, they only had to fit 30-minute course concepts.

For each chapter in the course, the concept-oriented content redesign followed the four-step process presented in **Error! Reference source not found.**

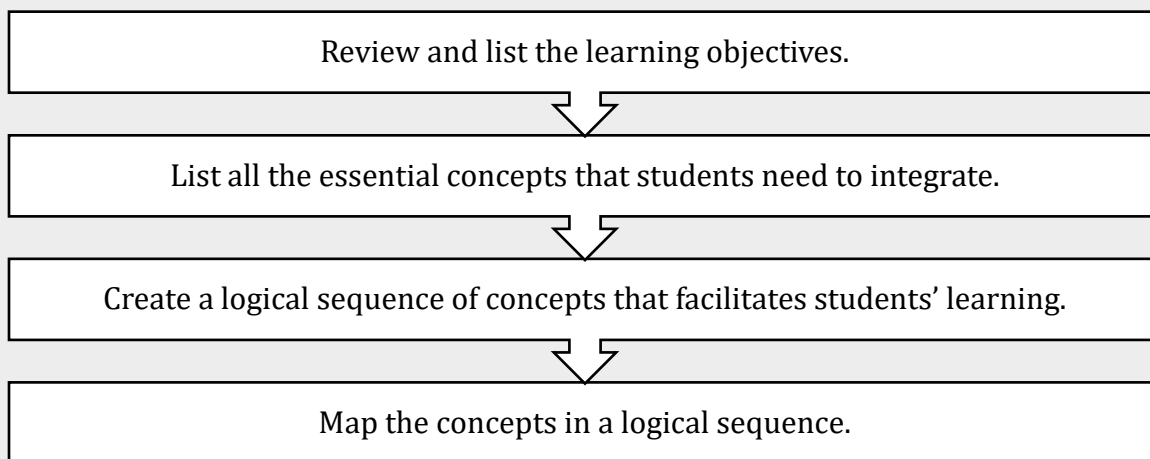


Figure 2. Redesign process

The content map was then used to create chapter modules in Canvas. **Error! Reference source not found.** shows how a typical chapter appears in Canvas.

3.3 Dynamic Learning in Practice

The goal of the Dynamic Learning model is to guide students along a path from which they will not stray. For consistency, each book chapter has its own module, within which, for structure, students progress through a logical sequence of concepts (**Error! Reference source not found.**). Each concept is explored in a brief description, a lecture video, and a quiz.¹ Integrating all the material about a concept gives students the flexibility to use the material in a way that makes sense to them.

The lecture videos were specifically designed and recorded to present the course concepts. They last between 5 and 15 minutes, in line with the typical student's attention span for such videos (Geri, Winer, and Zaks 2017; Guo, Kim, and Rubin 2014). Hew (2016) recommends providing lecture slides with videos. Students can use the slides to take notes or review material.

Depending on video length and content difficulty, quizzes could consist of 3, 5, or 8 questions.² **Error! Reference source not found.** shows the instruction part of a quiz with a lecture video and a link to the slides. The quizzes were not designed to test deep learning or skills utilization.³ Their objective is to give students the opportunity to immediately reflect on the concept at hand. Because access to course content relating to the subsequent concept is unavailable until a quiz score of 6/8, 4/5, or 3/3 is attained, students are forced to progress through the logical sequence of concepts.

¹ When possible, other relevant resources were embedded in the course material. Briguglio et al. (2020), Picault (2019), Picault (2021b), and Wooten (2018) list videos and other resources suitable for online economics instructions.

² The majority of quizzes had eight questions.

³ Midterm and final exams are used to test deep learning and skills utilization.









▼ Chapter 3: Conceptual Foundations of Cost-Benefit Analysis Prerequisites: Chapter 2: Predicting and Monetizing Impacts	
Complete All Items	
 Conceptual and Practical Bases for CBA Mark done	⋮
 Pareto Efficiency Mark done	⋮
 Pareto Efficiency 8 pts Score at least 6.0	⋮
 Potential Pareto Efficiency Mark done	⋮
 Potential Pareto Efficiency 8 pts Score at least 6.0	⋮
 Fundamental Issues with WTP Mark done	⋮
 Fundamental Issues with WTP 8 pts Score at least 6.0	⋮
 Concluding Remarks - 3 Mark done	⋮

Figure 3. Example of A Chapter Module

Instructions

The goal of this part of the module is to define and explain the Pareto efficiency concept, its appeal for decision-making, and its practical limitations.

First, watch the following course video (corresponding slides are available [here](#)).

Then, answer the following questions. You need to score 6 out of 8 to access the next part of the module.



Figure 4. Instructions and Introduction for A Typical Quiz

Appreciation for the Dynamic Learning model was expressed in students’ evaluations, from which the following anonymous comments were drawn:

“The lecture video, followed by a brief quiz afterwards kept me on top of the course material. I also liked the feature that prevented you from entering a module if you had not completed the previous module as it allowed me to stay organized when learning the course material.”

“I loved the shorter videos with the quiz. I found it so much easier to engage with and get done.”

“(T)he content was structured in such a way that makes sense for this format (short, concise videos for the lecture material with frequent small quizzes to test knowledge and encourage active recall).”

3.4 Weekly Progression

Although the Dynamic Learning model creates a straightforward learning path, it does not help students know when to work on what. One solution is to provide a course schedule that identifies the progression of course objectives. A weekly schedule keeps attainment of the objectives manageable. For the cost-benefit analysis course, the weekly objective was simply learning a core concept, which means working through a module’s components, including taking quizzes and completing exercises. **Error! Reference source not found.** shows the course schedule provided to students on CANVAS. The course schedule allowed students to plan study time for the course. It was accessible from day one on the first page of the LMS, where it could not be missed.

Week 1: Course Presentation	
Week 2: Chapter 1 and Chapter 2	
Week 3: Chapter 2 and Chapter 3	
Week 4: Chapter 4	Topic Announcement and Team Contract (due September 28th)
Week 5: Chapter 5	
Week 6: Midterm - Oct 16th - 10:30	
Week 7: Chapter 6	
Week 8: Chapter 7	Progress Report (due Oct 30th)
Week 9: Chapter 8	
Week 10: Chapter 9	
Week 11: Group Work	
Week 12: Group Work	Video Presentation (due November 23rd)
Week 13: Final report	Final Report (due November 30th)

Figure 5. Course Schedule

3.5 Exercises

The Dynamic Learning model is useful for delivering content and testing basic understanding. However, students must be prepared for the midterm and final exams that test higher levels of understanding, including mathematical, statistical, and graphical aptitudes. Such preparation requires students to complete problem-solving exercises directly targeting these higher levels of understanding. Therefore, a list of exercises from the textbook and from past exams for each course chapter was provided with the chapter's content. The week after students were instructed to solve a problem, they could access a video demonstrating the problem's solution, as shown in **Error! Reference source not found.**

Ex 2

A town's recreation department is trying to decide how to use a piece of land. One option is to put up basketball courts with an expected life of eight years. Another is to install a swimming pool with an expected life of 24 years. The basketball courts would cost \$180,000 to construct and yield net benefits of \$40,000 at the end of each of the eight years. The swimming pool would cost \$2.25 million to construct and yield net benefits of \$170,000 at the end of each of the 24 years. Each project is assumed to have zero salvage value at the end of its life. Using a real discount rate of 5 percent, which project offers larger net benefits?



Figure 6. A Typical Exercise with a Video Demonstrating the Solution to a Problem

4 Building the Community Feeling

The Dynamic Learning model might appear to allow the instructor to be absent. It actually relies strongly on instructor-student interaction in accordance with the literature emphasizing how essential this interaction is for student engagement (Swan 2001) and in response to the literature raising concerns about students' social isolation in online asynchronous course settings (Niess and Gillow-Wiles 2013; Yuan and Kim 2014). The Dynamic Learning model reflects five community-building guidelines:

Guideline 1 (when): The effort to build a learning community should be made from the beginning of a course and continued throughout the term.

Guideline 2 (who): Both students and instructors should be involved in building the learning community.

Guideline 3 (where): Use both synchronous and asynchronous technologies to create a shared space in which students and instructors interact.

Guideline 4 (how): Encourage both task-oriented discussions and social interactions.

Guideline 5 (how): Assign students tasks that require collaboration.

Instructor-student meetings were facilitated by calendly.com, which allows students to directly book Zoom meetings during the instructor's windows of availability.⁴ One-on-one meetings were very popular with students, who used them to discuss course material and any concerns. They allowed multiple such meetings for every student registered in the course.

Meetings of groups with the instructor were necessitated by group projects. The minimum time requirement for these meetings was 15 minutes every second week, but the teams of four to five students were informed that it was possible and preferable to interact more often. Most teams met once or twice a week with and without the instructor. These small-group meetings led to productive instructor-guided and peer-guided discussions. Hogan, Nastasi, and Pressley (1999) note the importance of both types of discussions, finding teacher-guided discussions to be an "efficient means of attaining higher levels of reasoning and higher-quality explanations" and peer discussions to be "generative and exploratory" (Hogan, Nastasi, and Pressley 1999, 379).

Although the meeting strategy required a substantial time commitment, students recognized it as an advantageous, as suggested by these anonymous comments in instructor evaluations:

"[The instructor] worked hard to develop a strong line of communication between himself and his students given the online situation."

"He made himself approachable and made students feel connected to the course in a similar way to in-class lectures."

"He made me feel more connected through bi-weekly mandatory meeting with our group project and helped in any way he could with the content."

5 The Group Project

For the cost-benefit analysis course, students must perform a cost-benefit analysis of a project or a policy of their choice. Students are instructed to follow the 10 steps of a cost-benefit analysis presented in Boardman, Greenberg, Vining, and Weimer (2017). In other economics courses, the group project could focus on any relevant and real-life-related project, such as an industry analysis or a policy proposal.

The group project requires students to apply the theory they learn in the Dynamic Learning model, and it is critical for community building because it facilitates interactions among students and between students and the instructor. Working as a small group is recommended in asynchronous frameworks because it increases the frequency and quality of discussions (Bliss and Lawrence 2009).

Some students appreciated the way that the group project brought together the course's theoretical and practical elements and created a community feeling.

"The term project was very good at giving students a chance to put into use the skills the course was meant to teach."

"Working on an actual CBA was my favorite part and also meeting regularly with him [the instructor] was very helpful. The fact that this was a group project helped a lot with making new connections and learning skills like coordinating through time zones and delegating tasks."

⁴ Use of Calendly was suggested by Abdullah Al Bahrani and Paloma Raggo.

5.1 Timeline and Grade Distribution

The group projects begin the day after announcement of the teams' composition.⁵ Teams were randomly formed because the online format made it difficult for students to establish their own groups. **Error! Reference source not found.** shows the deadlines for the project. The group project followed a four-step process that allows students to regularly work together and clearly understand deliverables.

Table 1. Important Dates for the Team Project

Dates	Work
September 28	Topic Announcement
October 30	Progress Report
November 23	Video Presentation
November 30	Report

The group project is worth 40 percent of the final grade. This 40 percent is distributed among three project components as shown in **Error! Reference source not found.**.

Table 2. Grade Distribution

Progress Report	Video Presentation	Report
10 percent	10 percent	20 percent

5.2 Topic Announcement

A week after the beginning of the group project, students must briefly describe the project or policy they want to analyze and sign a team contract. The contract requires the students to set internal dates for drafts, to book regular group meetings, and to set internal rules for discussion and conflict resolution. The instructor provides feedback on the chosen projects' relevance as well as feasibility within the given timeframe and then invites students to their first team-instructor meeting. Teams in the cost-benefit analysis course refined the scope of their projects on the basis of the instructor's feedback.

5.3 Progress Report

A progress report is due about a month after the topic is defined. The progress report allows the instructor to verify that students are making sufficient progress and for students to demonstrate that they (1) have completed the project's first steps and (2) have a plan for the project's next steps. These objectives entail provision of a bibliography and a description of how each reference will be used in the final project report. The syllabus states that

- Students themselves must write summaries; a copy/paste of the abstract is not an acceptable summary.
- The bibliography must include multiple academic references.
- Most of the information/data used in the final report should be presented in this bibliography.

Work on the bibliography was designed not only to ensure that students access existing knowledge—proficiency #1 in Hansen (2001) but also to give the instructor an opportunity to provide more targeted feedback and verify the intake of coaching in group meetings. If the bibliography is of insufficient quality, the instructor has an opportunity to advise the group to reframe their project.

⁵ In the institutional setting of the course presented in this article, many students move from course to course before making their final selections. To avoid the need to rebalance teams in the event that some students exit the course after the start of the learning term, the group project does not begin when the course begins. Another benefit of this strategy is to allow students to adapt to the Dynamic Learning model before having responsibilities related to the group project.

5.4 Video Presentation

At the end of the learning term, students must hand in a video. The video (15 minutes long) must demonstrate that students were able to select and organize the essential information—not an easy task when lot of content has been produced, as is typically the case. The video describes the project, important costs and benefits, principal sources of risk, and recommendations. The videos give the instructor an opportunity to offer additional feedback before final reports are delivered one week later.

5.5 Report

The final report is submitted on the last day of class. The report (50 or so pages in length) must document the process, conclusions, and recommendations of the team’s cost-benefit analysis.

5.6 Work Submission

Deliverables can be directly uploaded on the LMS in a module explicitly created for the group project. **Error! Reference source not found.** shows how the module is organized.



Figure 7. Team Project Module

5.7 Group Dynamics

As Watkins (2004) and Davies (2009) suggest, students sometimes do not behave fairly to one another when working in groups. Free riding, sucker effects, and other issues may arise. It is therefore essential to have strategies to mitigate negative behaviors as much as possible.

The cost-benefit analysis course followed Davies’ (2009) recommendations for mitigating negative behaviors. Specifically, students were instructed (1) to report any negative behaviors to the instructor (without fear of being identified as the giver of this feedback to other students), (2) to remain in one group for the whole term to foster socialization and solidarity, (3) to sign a team contract containing one set of rules for all groups as well as any other rules desired by team members (4) to create a task checklist, and (5) to voluntarily (and anonymously) nominate for extra credit another group member who made an exceptional contribution.⁶ In addition to these measures, regular group meetings allowed the instructor to observe any negative behaviors.

⁶ One section of the contract addresses how to behave respectfully in a group, acknowledging diversity of backgrounds and opinions.

6 Visual Organization of the LMS

Swan (2001) describes how a straightforward course structure and content delivery method facilitates students' interaction with course material. Both are essential for an online, asynchronous course because students must find their way mostly independently. Therefore, each important course element—textbook chapters, exercises, exams, and the team project—has its own module. **Error! Reference source not found.** shows some of the modules.

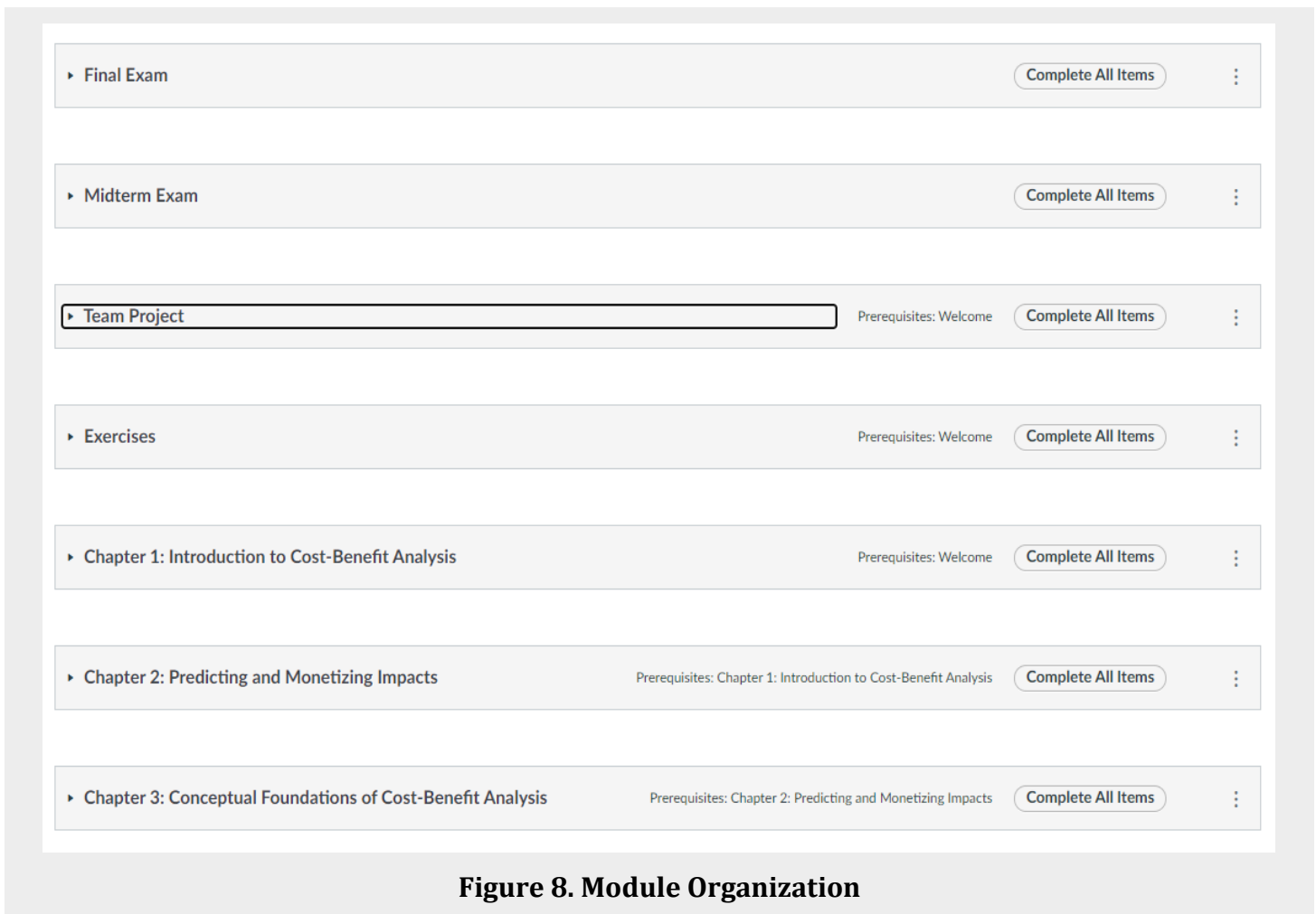


Figure 8. Module Organization

A Welcome module was designed to provide information about the instructor and the course. It included the syllabus, a short video of the instructor, the course schedule, and an FAQ page. Excellent visual organization improves the experience of students by creating consistency and structure, thereby engendering trust in the learning platform.

7 Concluding Remarks

This article presented an asynchronous content delivery model created in response to the COVID-19 crisis with three objectives: consistency, structure, and flexibility. At its core is the Dynamic Learning model, which helps students understand course theory and prepares them to apply it. The model was supported by an extensive offering of virtual office hours and group meetings to build a feeling of community among students.

Students responded positively to the asynchronous content delivery model, and they performed as well as students who had taken the course in person. The model seems to have created the guidance students were looking for during this abrupt but essential transition to online learning. However, further

research is necessary for this online teaching model to be applied efficiently to courses with large student enrollments. In such courses, frequent one-on-one meetings with students and management of large-scale group projects may not be feasible.

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