Teaching and Educational Methods

So You Want to Run a Classroom Experiment Online? The Good, the Bad, and the Different

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Abstract
Agricultural economics has a rich history of using experiments in the classroom to teach applied topics and illustrate how economic theory translates into real-world phenomena. Despite the widespread attention classroom experiments in economics have received, relatively little attention has been devoted to whether and how instructors may use experiments as a teaching tool in the online classroom. We review the essential elements of three popular classroom experiments (public goods, prisoners dilemma, and pit market) and discuss how these experiments may be adapted or used in both the synchronous and asynchronous online classroom. Additionally, we discuss several online platforms and tools to make experimental games accessible with distance learning.

1 Introduction

Using economic experiments as teaching tools in the classroom setting can unlock core economic concepts for students and illustrate how economic theory translates into real-world phenomena. Experiments as teaching tools have been shown to increase learning (Dickie 2006), improve attitudes toward economics (Durham, Mckinnon, and Schulman 2007), and increase information retention for multiple types of learners (Durham, Mckinnon, and Schulman 2007).

Agricultural economics has a rich history of using experiments in the classroom to teach applied topics. In a survey of agricultural economics faculty, Barnett and Kriesel (2003) found that 90 percent of surveyed instructors had some knowledge of classroom economic experiments, and 60 percent had some experience implementing an experiment in their own course. Across departments, experiments were most frequently implemented in microeconomics, environmental/natural resource, and agribusiness courses (Barnett and Kriesel 2003).

In Wilson and Nelson (2009), the authors present three examples of adaptable games for the applied economics classroom including the double auction/pit market experiment (Davis and Holt 1993; Holt 1996), monopolistic production (Nelson and Beil 1995), and oligopolistic competition (e.g., Wilson and Nelson 2008). All three experiments can be played to illustrate and test different features of market structures, supplementing standard microeconomic theory with hands-on experience.

Despite the widespread attention classroom experiments in economics have received, relatively little attention has been devoted to whether and how instructors may use experiments as a teaching tool in the online classroom. Many classic experiments and accompanying resources are designed for in-person synchronous instruction that require significant adaptation to be run online.[1]

[1] EconPort (econport.org) and Games Economists Play (http://w3.marietta.edu/~delemeeg/games/) host online repositories of resources for using economic experiments in teaching and research. These games have built on the basic games referenced in this article and provide additional context and potential extensions. Their teaching modules are an especially good resource

In this article, we discuss ideas for how instructors can adapt three popular classroom experiments (pit market, public goods, and prisoner's dilemma) for the online classroom. Each section will proceed as follows. First, we briefly highlight the content and purpose of the original classroom versions of these popular games.[2] Second, for each original experiment, we identify the essential components of the game that should be captured in any online adaptation. Third, we then propose ideas for how each game can be modified to implement these essential components in both a synchronous and an asynchronous online classroom. For online implementation, tangible rewards such as money or gifts become challenging, so we recommend using class bonus points as the payoff to induce economic behavior. Fourth, we propose discussion questions that can be used to facilitate student learning outcomes related to their experience playing the games. These discussion questions can be implemented via a learning management system (LMS) discussion board or via synchronous discussion. Fifth, we identify some possible sticking points that we have encountered and how to troubleshoot these common problems and concerns with implementation. Finally, we discuss several online platforms and learning tools to make experimental games more accessible with distance learning.

2 Pit Market Experiment

Illustrating the concepts of supply, demand, and the competitive pressures driving market equilibrium are important to introduce students to the economic way of thinking. The purpose of this game is to illustrate how individuals with private valuations can interact in an open market to achieve an equilibrium. Students are able to see the forces of supply and demand in action by taking on the roles of buyers and sellers of a good. By trading goods and locking in negotiated prices, students are able to see how their trades correspond with both supply and demand curves and how an equilibrium price of a good emerges.

Building on the pioneering work of Chamberlain in experimental economics and Smith's double auction, Holt (1996) designed the "pit" market experiment where students interact to exchange playing cards in a competitive environment. Using the playing cards, the number of the card represents the private value or cost to the student (i.e., induced value), and the color of the card represents whether an individual is a buyer or a seller.

The game can be run in a single session or in smaller groups/markets to provide all students with the same experience. For large in-person classes, Holt (1996) suggested that the market can also be run with spectators who are provided full information on the distribution of values to increase their engagement in the activity. The pit market experiment can be easily modified to incorporate several different economic concepts in the context of the competitive market. This can include the implementation of price controls, government taxes, or even a monopoly/monopsony setting (e.g., Holt 1996; Ruffle 2003).

2.1 Essential Components

Types: There are two types of market actors: buyers and sellers. Students need to know their type to understand their action. Students should have the same type throughout multiple rounds of trading sessions to avoid confusion.

Induced Values: Each student needs to know their private value for a unit of a good. The distribution of induced values among buyers and sellers will correspond to the demand and supply curves, respectively. The distribution of the induced values will depend on the number of participants where the market needs

for classroom instructions, guidance, templates, and even modules to be used with clicker software in the classroom. These are great starting points for finding in-person games that may be adaptable for online experiments.

[2] We provide citations for each of the original classroom games and encourage interested readers to refer to the published article for full details and instructions for in-person implementation that can be modified for the online classroom.

Table 1. Payoff Calculation for Pit Market Trading

	Buyers Payoff			Sellers Payoff		
Period	Value	Price	Earnings	Price	Cost	Earnings
1						
2						
3						

a few extreme values (e.g., low and high numbers) and a larger number of moderate values. If working in a large course, it is possible to set up several “small” markets, which all use the same distribution of induced values across groups.

Payoffs: For buyers, they can only earn rewards (we recommend bonus points) if they purchase the good at a price lower than their private valuation (payoff = value – price). Similarly, sellers only earn points if they sell a good at a price higher than their private valuation/cost (payoff = price – cost). Table 1 (taken from Holt [1996]) is used to record payoffs during a three-period game.

Timed Trading Period: Students should have a set amount of time to interact and complete their trades. The trading process works through an open outcry process. Individuals who have a good with an induced value make offers to sell a good to buyers who have their own private value. Each individual wants to get the best deal, which provides the most consumer or producer surplus to the individual. Once two players decide to make a deal, they go to the instructor to record their trade and exit the market. Depending on group size, trades should be able to be completed in well under 5 minutes. The game should be repeated several times to illustrate the emergence of a market equilibrium.

2.2 Synchronous Online Implementation Considerations

Meeting with students in an online platform makes it relatively straightforward to permit students to engage in the game as well as the search and bargaining process between buyers and sellers using built-in chat functions. You can let students know their private value for a good by posting a list with anonymous student identifiers or by creating a nongraded assignment in the LMS gradebook and letting students know that their point total will be their value for this “fake” assignment. The latter method has the benefit of being private as well as easy to monitor and change for the instructor.

By making open offers to buy or sell in chat, students could then accept a trade in the group chat or continue negotiating in a side chat with one specific individual. Once students want to lock in a trade, they can message their induced values and trade price to the facilitator. Because instructors may be managing a relatively large class size, the use of breakout rooms can help accommodate students in smaller markets. For example, providing students with instructions, induced values, and market groups before the class session can speed the process of dividing students into individual breakout rooms to run the experiment.[3] This procedure has the added benefit of allowing a facilitator to remove students from

[3] Classroom participants can be preassigned to breakout rooms by accessing the meeting options for any scheduled Zoom meeting (using the desktop client or web portal). Instructors can assign students using a CSV file of student email addresses or by manually clicking and dragging students into the correct group.

an individual market and back into the general course room once a trade has been locked in or time has expired. One facilitator per market is strongly recommended.

2.3 Asynchronous Online Implementation Considerations

The pit market experiment can be performed asynchronously by placing students into small groups or discussion boards in the LMS and giving them a specific amount of time (e.g., 24 hours) to lock in a trade. One drawback to this approach is that students may have time to learn complete market information, which could affect the equilibrium prices across rounds. Additionally, students who fail to participate could leave crucial transactions out of the market (e.g., a high value buyer who just does not participate). However, it is possible to schedule smaller groups of the market with as few as six people (three buyers and three sellers), which may make it possible to schedule a synchronous market activity in an asynchronous course.

2.4 Suggested Debriefing Questions[4]

(1) What does economic theory predict the equilibrium price and quantity to be?
(2) How much consumer and producer surplus was generated by the market outcomes you observed? Is this market efficient?
(3) Were there any profitable trades that were not executed in the market? Why or why not?

Additional questions related to price controls, taxes, or any other features of the market could easily be added to relate to the concepts being studied.

2.5 Troubleshooting Common Problems

Time: Restricting students to make trades within the given amount of time is important. Conducting the experiment manually online may add some time due to messaging and reporting back to the facilitator. Instructors may want to experiment with different time periods and share a timer with all participants.

Repeated and Incorrect Transactions: Because of the finite supply of units to trade, students may want to try to enter into the market a second time to make a transaction in a given round. This is especially true when extra credit points are at stake for the highest earners. The facilitator should take care to write down student names involved in recorded transactions or remove students from the market after a transaction is made (perhaps to the waiting room or the main room) to ensure this is not an issue. Additionally, the facilitator should check that only mutually beneficial trades occur, so the agreed-on price should be greater than the seller's private value and lower than the buyer's private value.

3 Public Good Games

Since Holt and Laury (1997) first implemented a public good game in a classroom environment, it has become a mainstay in courses of economics, particularly those that emphasize market failure and behavioral economics. The idea of the public goods game is that students are asked to choose whether to voluntarily contribute resources from a private endowment to the provision of a public good (nonexcludable, nonrival). Any resources kept in the private endowment only benefits the student they are assigned to. However, all contributions to the public good provide some smaller benefits that are shared by all, regardless of contribution to the provision of the good. Real-life examples of public goods include parks, clean air, and national defense. While economic theory predicts zero contributions to the public good by students playing the game, students are sometimes able to coordinate and sustain continued contributions over time. This experiment is a great example of the tension between individual and group incentives. The game itself can be easily adjusted to any classroom setting and has been

[4] See Holt (1996) for more detailed guidance for instructors on how to analyze the step-wise supply and demand curves to motivate discussion questions.

further formalized into a learning module by the Georgia State University Experimental Economics Center on EconPort (Swarthout n.d.). The original game requires the use of playing cards and is thus limited to face-to-face classes.[5] As will be shown, this exercise can be easily adapted for online play.

3.1 Essential Components

Endowment: In the original form of the game (Holt and Laury 1997), students are endowed with 4 playing cards. Two of these cards have value, and two are placeholders. Each round, a student submits two of their four cards.

Contribution: Each round, students choose how much to contribute (from their endowment) to the public good. Submitting two placeholder cards means the student contributed nothing to the public good. Submitting two value cards means the student contributed the maximum amount to the public good, and submitting one value card and one placeholder card mean that the student has contributed half of the maximum contribution to the public good.

Public Good: Using the results of the cumulative contributions, the instructor counts up the units contributed to the public good by students. Then, using the predetermined conversion rate, the instructor announces how much of the public good was provided by students.

Calculation of Private Benefits: A student's private benefit is the sum of the public good plus however much of their endowment, if any, they kept that round. Students should keep track of their private benefits each round (Table 2).

Table 2. Public Good Game Payoff Calculation Table

Endowment (e)	Contribution (c)	Public Good (pg)	Total Private Benefit (e – c + pg)
Game 1: *n* units	Decided by each student	Determined based on collective contributions	This can be transformed in any way appropriate for your class.

3.2 Synchronous Implementation Considerations

In an online setting, students can be endowed with any amount of the private good because the game is not constrained to playing card parameters.[6] The private good benefits only the student; however, their contributions can fund the provision of a public good that benefits the class as a whole. Students can submit their public goods contributions through a simple poll. If, for example, students are endowed with 4 units, the poll would allow contributions 0, 1, 2, 3, or 4 units to the public good. The poll should be anonymous to peers, but not anonymous to the facilitator. If students are not anonymous to peers, they will face social pressures to contribute (reducing free riding) or may be ostracized by peers for not contributing (if the platform is open). It is interesting to play this game multiple times with the same simple poll but with different parameters. For example, Holt and Laury (1997) propose changing the group sizes or allowing students to revise contribution decisions. Other variations may involve changing the conversion rate associated with the public good (see EconPort variations) or allowing students to vote or discuss contribution rules (e.g., Kroll, Cherry, and Shogren 2007).

[5] Leuthold (1993) and Swarthout (n.d.) expand the framework to accommodate larger class sizes.
[6] Based on the instructor preferences, you could also endow students with a resource (e.g., tokens) and allow them to contribute to a public account while keeping anything not contributed. The outcomes will be the same.

3.3 Asynchronous Implementation Considerations

In an asynchronous context, the contribution should be made privately through an assignment within a given time frame (typically 24 hours) in your LMS.[7] If the assignment is a "practice quiz," it will not appear in the gradebook. To demonstrate free riding, a one-off public good game would be sufficient. Once all contributions are made, the instructor communicates back to the students the amount of public good that was provided. Students then can calculate their own private benefit (see Table 2). This game can be repeated many times over the course of the semester to illustrate complexities within the public good game such as unequal endowments, threshold games, rulemaking, and so on.

3.4 Suggested Debriefing Questions

(1) What real-world phenomena do these games best represent?
(2) What sorts of behavior did you notice from yourself and your peers? Why do you think that behavior emerged?
(3) Can you think of a way to alter the environment in order to induce socially preferred outcomes (such as altruism) or reduce privately preferred outcomes (such as free riding)?

Create questions that address any adjustments you made to the game including the impacts of repeating games, threshold good (or bad) games, and larger/smaller endowments. Any discussion questions that get students thinking about individual welfare versus social welfare are appropriate and engaging.

3.5 Troubleshooting Potential Problems

Facilitating a productive and positive conversation around this game is key. If information is public and stakes are high (bonus points are sometimes a hot commodity), students may get very upset about the behavior of their peers. As economists know, this is part of the point of the game, but that angst can detract from learning if left unchecked. Some students may disengage entirely and ignore the social dynamics going forward if they feel like the game is "unfair" or if they write off their peers as awful people. It can be tempered by keeping contributions private so that students cannot identify the optimizers in the group and thus focus on the aggregate outcomes rather than individual behavior. In addition, the instructor can remind the students that only one game will be binding so if one game is particularly hard for students, they still have hope for a positive outcome.

4 Prisoner's Dilemma Games

In microeconomics classes, the prisoner's dilemma is a classic game used to illustrate the concept of a Nash equilibrium and highlight the idea that Nash equilibria are not always socially optimal. The prisoner's dilemma applies to many scenarios where two individuals interact and their payoffs are interdependent on one another's behavior. Examples may include the canonical confession and punishment of two prisoners, strategic pricing of duopoly firms, arms races, common-pool resources, and so on. The prisoner's dilemma arises from the idea that in a duopoly for example, firms have the potential to collude with each other and make monopoly profits; to compete with each other driving the market to the perfectly competitive outcome if both compete; or to a lucrative outcome for the competitor if the other party chose to collude. Playing this game, we expect students to have heterogeneous outcomes where some pairs of players are able to achieve a cooperative equilibrium, and some are driven to the Nash equilibrium. Students will learn how individual incentives may drive noncooperative behaviors and how there is potential to coordinate on improved outcomes.

Holt and Capra (2000) outline a classroom version of the prisoner's dilemma utilizing playing cards, pairs of students, and actual monetary incentives received by students based on their actions in the

[7] If the assignment is a "practice quiz," it will not appear in the gradebook.

game. To use this game in an online classroom, the instructor can use points (actual points on an assignment or bonus points) instead of money to induce equilibrium.[8]

4.1 Essential Components

Point Incentives: This game can be played for points on a homework assignment or for bonus points on an assignment or exam.

Student Actions: Each round, students will choose whether or not they would like to compete or collude with their classmates. For in-person classes, students are given one red (compete) and one black (collude) playing card and turn in their chosen card, face down.

Payoffs: An easy parametrization of the payoffs is illustrated below in Table 3 and are arranged so that the payoffs in each cell should correspond (Player A, Player B). When structuring payoffs, the cooperative equilibrium for an individual should provide a level of benefits (e.g., 5 points) greater than the noncooperative equilibrium (e.g., 2 points) and less than the unstable equilibrium where the individual competes and their partner colludes (e.g., 10 points). Each student's payoff per round depends on their chosen action as well as the action chosen by their partner. If only one round of the game is played, students can earn as many as 10 points or as few as zero.

Game Flow: Students are paired into groups of two and provided with the payout table (Table 3) and the designated way for them to submit their decisions. Instructors can choose to frame the problem and or modify Table 3 as they see fit. For example, in an introductory microeconomic course the prisoner's dilemma is often used to describe imperfect competition in a duopoly setting. One possible framing may make students executives at two firms that must decide if they are going to compete or collude on product pricing during a particular year.

Instructors can decide whether or not to allow communication before the start of the game and in between rounds. No communication generally leads to a faster convergence on the Nash equilibrium solution of compete/compete, while communication tends to allow collusion to last for several rounds. The game continues for 10 rounds, and students keep track of their payouts each round. Total points can be summed across rounds and then scaled accordingly to achieve the instructor's target point amount. If students manage to sustain collusion for all 10 rounds, they will earn 50 points. However, if they quickly collapse to the Nash equilibrium, they will earn closer to 20 out of the 50 possible points.

Table 3. Prisoner's Dilemma Game Payoff Matrix

		Player B	
		Compete	Collude
Player A	Compete	2, 2	10, 0
	Collude	0, 10	5, 5

4.2 Synchronous Online Implementation Considerations

When meeting with students synchronously, students can be preassigned to breakout rooms of twostudents for play of the game or randomly paired by the instructor to have their decisions matched

[8] Use of real money as a reward mechanism is not a requirement for students to play classroom games or to learn from them. In our experience, when using either no reward mechanism or bonus points, students still find the experience valuable. Before using real money in the classroom, we would caution instructors to ensure they are complying with all relevant university guidelines because money, even in a classroom experiment, may be strictly regulated.

against one another by an instructor or TA. A simple poll (e.g., Zoom/LMS/iClicker) with the options to compete or collude can be used to collect student decisions each round, and then displayed to students after all decisions have been entered. The instructor can choose to keep student names associated with their polling decisions so that they can confirm student points after the game has finished. Alternatively, if working on the honor system, students can submit their collected points after class using the same mechanism they are using to submit other assignments. Furthermore, if an instructor would like to allow student communication to illustrate how individuals can coordinate decisions, breakout rooms could be used similar to the pit market experiment to allow direct messaging or communication.

Another option avoiding breakout rooms would be to allow each student to submit an individual decision and allow the second player (Player B in Table 3) to effectively be determined by the majority of the class decisions. This would be simple for the instructor to implement by looking at poll totals. For example, if the majority of the class voted to collude then the Player B decision would be recorded as collude for every member of the class.

4.3 Asynchronous Online Implementation Considerations

This game can be implemented within any LMS. The decision for each round of play should be made privately through an assignment within a given time frame (typically 24 hours). When using a "practice quiz," the assignment will not appear in the gradebook. The number of rounds can be modified to as few as one round to accommodate the longer time horizon needed to collect decisions.

Similar to the individual vs. class format discussed above (Section 4.2), an identical approach (or a team-based approach) could be taken in the asynchronous format. However, to facilitate communication the instructor may want to allow students to make decisions as teams (perhaps following a majority vote of team members). Teams could have their own private discussion boards to discuss their vote as well as a class-wide discussion board to facilitate communication across the two teams.

4.4 Suggested Debriefing Questions

(1) What does economic theory suggest about decisions students should have made?
(2) If student decisions differed from theory, why did this occur? Do students think similar patterns would have occurred in a room full of strangers? In a room full of family members or close friends?
(3) Do students think their decisions would have differed if playing for bonus points (if choosing actual homework points or vice versa otherwise)?
(4) What decisions in real life have attributes of the prisoner's dilemma?

4.5 Troubleshooting Common Problems

Time: If communication is allowed, students may spend excessive time discussing strategy. A timer with a loud alarm helps to keep everyone on track in person. Online, the instructor can recall individuals from breakout rooms after a specific amount of time has passed.

Points: Some classes will end up with the compete/compete solution very early in the game, and students will start to get anxious about their points. When points in the game are linked to an assignment grade, students take the game more seriously, which can more closely mimic a true prisoner's dilemma scenario. The instructor should consider the general classroom dynamics, congeniality, and so on, before deciding how high to make the stakes in terms of assignment points. Similarly, some classes manage to sustain collusion for all ten rounds, the full 50 points.

5 Online Tools for Classroom Experiments

In addition to directly adapting experimental instructions for online teaching, there are many new tools that can be used to run and host experiments directly for students. We review several alternatives for running and customizing online experiments as well as alternatives for online polling software that may be used alongside classroom games.

5.1 Prepackaged Online Classroom Experiments

vEconLab software (veconlab.econ.virginia.edu/) provides a comprehensive and accessible set of experimental games that can be easily integrated into an online course. Designed in conjunction with the text *Markets, Games, and Strategic Behavior: An Introduction to Experimental Economics* (Holt 2007, 2019), the software includes over 60 games related to diverse topics including auctions, markets, finance, and public goods. Instructors are able to create an account to manage an experiment, while students log in separately as participants. All results from synchronous experiments are exportable for summary and analysis in class. These games are easy to use and take very little time or prior experience to operate.

Built on the oTree platform (Chen, Schonger, and Wickens 2016), economics-games.com provides a comprehensive set of experiments that can be initiated and run entirely online. Games include classic experiments, as well as more recent published experiments (e.g., Dissanayake and Jacobson 2016). Instructors simply set the parameters for the game (e.g., number of players) and then receive login information to distribute to students. Game data is available for download and analysis. In addition to interactive experiments, economics-games.com has several single player simulations on topics including monopoly and perfect competition, which could be effectively used in an asynchronous setting. Overall, this software is great for handling large numbers of students who may be in different locations; however, it may be less accessible and some more recent or more complicated experiments may take much more time to understand and to navigate the interface.

MobLab (moblab.com) is a paid learning management platform integrating experimental games with discussion boards, lesson plans, and an online gradebook. Access to economics games and related software requires a flat fee per student per class. This would likely require adding course lab fees to your offering. MobLab games cover experiments including auctions, markets, common pool resources, and more. These experiments are designed with graphics to match the play of the game. In addition to the cost, these built-in games may not be complex enough for more advanced students.

5.2 Design Your Own Experiment

As discussed above, oTree (Chen, Schonger, and Wickens 2016) is an open-source platform that allows you to customize and design behavioral experiments. Accessible for beginners, the oTree Studio platform has a point-and-click interface that aids in project design and learning platform syntax. In addition to oTree Studio, advanced users can program experiments directly in Python using the text editor of their choice.

LIONESS Lab is another free web-based platform for designing interactive economic experiments. LIONESS Lab also implements a point-and-click interface to aid in the design of customized experimental pages. JavaScript is used to make calculations in the experiment based on user decisions. Similar to oTree, LIONESS Lab can also be downloaded and run on your own local server.

In both cases, designing your own experiment is a significant time investment and may require a high degree of programming skill depending on what you are trying to achieve. With some experience, many basic experiments can be replicated in a day. For beginners, the process may take much longer. In our experience, this approach is best undertaken if you (or a graduate student) are also interested in doing research using the above software tools for economic experiments.

5.3 Online Polling Options

Zoom, the ubiquitous online communication platform in the COVID-19 era, has built-in polling software that is simple to use and already integrated into any classroom environment being hosted on the platform. While this polling option is free and easy to use for classroom participants, all questions in a single poll are displayed at once, and all questions have to be answered before they are submitted. This means that when separate sequences of questions are needed for different parts of a game, the instructor has to restart the poll or preprogram multiple polls. Preprogramming the polls takes place in the online settings for the scheduled class. You can also create polls in the moment, but it takes up precious online time.

Most LMS platforms (e.g., Canvas/Blackboard) have built-in quiz features that can be used to create polls that are either graded or ungraded. Using a LMS for polling is a strong option because individual student responses are stored for the instructor, and students have easy/free access to the platform, while likely being more familiar with its operation. The main drawback to LMS polling is that students have to be directed to access the poll at the correct time from the instructor, and there is less control over when it is presented to students.

Finally, there is a whole suite of third-party platforms integrating polling that are free (e.g., Mentimeter) or paid educational/survey platforms (e.g., TopHat, iClicker, TurningPoint, Qualtrics, etc.) that enable different features for real-time polling and feedback. Pending relevant university approval and/or subscriptions, instructors can choose a more personalized polling software that captures the functionality they need for their classroom balancing features, ease of use, and costs to students.

6 Conclusion

Classroom experiments are an important tool to promote active learning experiences among economics students at all levels. In the above discussion, we have shown how three classic experimental designs can be adapted for online teaching in both synchronous and asynchronous settings. Additionally, new tools to allow classroom games to be hosted online allow instructors with new ways to efficiently run an experiment and download the data from individual decisions.

While our experience with running classroom games online is continuously evolving, initial experiences and feedback from students during the switch to online instruction seem positive and provide interaction with peers that feels significantly different from a discussion board or other LMS tool. Collecting student feedback and preferences across different platforms, tools, and modalities of running the experiments will be an important step for future research. However, several important themes emerge across all three games. The first is the need to provide students with clear instructions on how to communicate and submit decisions in the game environment. This is the biggest request from students who enjoy experiments, but can have a negative experience if they are confused. Because games are focused on individual decisions, confusion among even one participant can even delay outcomes for the entire class. Second is the need to manage rewards and incentives to participate in the game. As economists, we focus on individual incentives and having students play games with bonus points at stake can help to create competitive pressures and motivate discussions surrounding incentive compatibility. Finally, there is the need to provide a framework for discussion and debriefing surrounding the behavior that goes on in the game. The equilibrium solutions to many classroom games involve noncooperative solutions, which may leave students with negative feelings about the outcomes. In face-to-face instruction, this is usually an opportunity for discussion surrounding the incentives that drive competitive behaviors. Instructors should ensure that these discussion options remain well-defined to guide experiential learning in an online setting.

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