



Exploring Collaborative Learning in Economics with Visual Aids

The literature on economics teaching has been advocating a pedagogical shift away from the traditional “chalk and talk” for more than two decades. One suggestion is to apply collaborative learning in teaching economics. This pedagogical approach can be implemented in class through viewing movies together as a group to motivate student interest and to encourage active engagement with peers in sharing knowledge. This paper aims to explore how benefits from the collaborative learning approach can be realized through teaching economics with the movie *Lord of the Flies*. Suggestions for the implementation plan and discussion questions will be provided.

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1. Introduction

It has been more than two decades since William Becker and Michael Watts (1996, 2001) initiated the discussion on the innovation of economics teaching beyond the traditional “chalk and talk” approach. However, lectures with “chalk and talk” prevail among economics instructors (Goffe & Kauper, 2014; Onger, 2017). Economics continues to lag behind other disciplines in adopting teaching pedagogies that align with more advanced technology (Carrasco-Gallego, 2017). As new generations of technology-savvy students who have shorter attention spans enter the university classrooms, it is no doubt that the traditional “chalk and talk” method will become increasingly less effective in meeting students’ learning needs (Burke, Robak, & Stumph, 2018). Ray (2018) pointed out that such a conventional lecture style using the chalkboard put students in a passive learning mode and failed to maintain students’ attention. In addition, economics has the reputation of being a “dismal science” (Perksy, 1990, p.165) of which many students feel discouraged by the formal presentation of abstract graphs and equations (Borg and Shapiro, 1996; Luccasen & Thomas, 2010). Recently, much effort has been devoted to identifying possibilities that can help to accommodate students’ learning needs and to improve students’ performance in economics courses. Factors that have been considered include students’ learning styles (Boatman, Courtney, & Lee, 2008; Leung, McGregor, Sabiston, & Vriliotis, 2014; Sabiston, Leung, & Terrazzano, 2017), assessment methods (Al-Bahrani, Holder, Patel, & Wooten, 2016; Leung & Kier, 2017), and teaching methods (Emerson & Taylor, 2004; Frank, 1997, Ray, 2018) among others.

Collaborative learning is one of the pedagogies suggested that can be applied to economics teaching (Monaco, 2018; Santicola, 2015). Elsewhere in the literature, the use of visual aids, such as TV shows and movies, have been shown as effective economics teaching tools (Geerling et al., 2018; Mateer, O’Rouark, & Holder, 2016). This paper aims to explain how visual aids such as movies can be useful economics teaching tools to enhance the collaborative learning experience in the classroom. The movie *Lord of the Flies* will be used as an example to illustrate how movie viewing can be set up in class so that students can benefit from collaborative learning.

2. Pedagogical Motivation

This section provides a review of collaborative learning and movies as a visual teaching aid.

A. Collaborative learning

Collaborative learning is a form of active learning where students learn from each other in an active social environment (Liverpool-Tasie, Adjognon, & McKim, 2019). Through active engagement in small-group conversation with peers, students exchange diverse opinions and relate new information to the set of prior knowledge (Monaco, 2018; Smith & MacGregor, 1992). Collaborative learning emphasizes the interdependence of students to work together in creating new knowledge that is shared with each other. Through such a process, students derive knowledge directly from their efforts that help them become more confident and autonomous learners (Monaco, 2018). The process of collaborative learning improves communication, teamwork, interpersonal, and critical thinking skills of students (Wentland, 2004).

According to the faculty guide put together by Barkley, Major, and Cross (2014), collaborative learning is specifically defined with three important characteristics, to be distinguished from the more general concept of group learning. First, collaborative learning is intentionally designed and carefully structured group activities to enhance students’ learning experience. Second, all students must actively participate and contribute more or less equally

in the assigned group tasks to achieve some shared learning outcomes. Third, the assigned group tasks must increase or deepen students' understanding of the course material. In short, "collaborative learning, then, is two or more students laboring together and sharing the workload equitably as they progress toward intended learning outcomes" (Barkley, Major, & Cross, 2014, p. 4).

Collaborative learning has been applied to various fields of teaching. In accounting, for example, Edmond and Tiggeman (2009) discussed the use of collaborative learning in accounting classes when students actively interact with each other in class to learn the material. Ravenscroft (1997) emphasized the role of collaborative learning to develop students' interpersonal skills despite student resistance to group work. However, Holt, Michael, and Godfrey (1997) criticized that collaborative learning could result in inefficient allocation of class time. Instructors must be cautious to recognize both the costs and benefits of using collaborative learning as a teaching strategy.

In language learning, collaborative learning "entails students working together to achieve common learning goals" (Nunan, 1992, p.3). One example of collaborative learning in second language learning is peer interaction and peer corrective feedback during communicative activities (Sato, 2013). When students engage in discussion with their peers, they will be able to share their ideas without the teacher's intervention. However, students' level of language proficiency and beliefs may have an impact on whether collaborative learning can be a successful teaching strategy. Instructors also play an important role. Instructors should divide students into groups such that more capable students can help their less capable peers within the same group to maximize the benefits from collaborative learning and knowledge sharing (Barnawi, 2010).

Various suggestions have been made to apply collaborative learning in teaching both microeconomics and macroeconomics. For example, Monaco (2018) provided the pedagogical motivation and implementation plan to incorporate collaborative learning in the teaching of microeconomics by assigning groups of students to study different theoretical concepts independently and then using the group knowledge obtained to teach their classmates. Santicola (2015) applied collaborative learning to teach macroeconomics by organizing students into small groups of four to research and present different viewpoints of various macroeconomic controversies. Evidence has shown support for a positive relationship between increased student knowledge and applying collaborative learning practices in economics teaching.

B. Movies as visual teaching aids

Research has shown that teaching economics through various forms of art and literature can help to capture students' attention and pique their interest (Al-Bahrani, Holder, Patel, & Wooten, 2016). Bohanon and Vachris (2012), for example, argued that noticing economic concepts indirectly from reading literature and novels helped students to gain a better and deeper understanding. This suggestion is further supported by the idea that such an approach reinforces traditional economic "story-telling" that uses graphical and mathematical models (McCloskey, 1990; Watts & Smith, 1989). Although reading literature and novels may have the additional benefits of improving students' writing skills, it does impose significant time cost on students with additional reading on top of required reading from economics text (Cotti & Johnson, 2012).

Another medium that has been suggested to increase the effectiveness of economics teaching is visual aids such as TV shows and movies. Willingham (2009) has suggested that students tend to remember clearly what they have seen on television, but not much from

classroom lectures. Evidence shows that images and visual stimuli can foster more efficient learning, better understanding, and fortified long-term memory (Sexton, 2006). In the education literature, it has been shown that visual aids and images are more effective to facilitate learning than relying solely on text reading (Van Amelsvoort, 2013). For example, visual aids such as animation videos and films have been shown to improve critical thinking skills and develop a more positive attitude towards writing among students (Yunus, Salehi, & John, 2013). It was also suggested that visual images were easier to recall than text descriptions (Davis, 2011).

Furthermore, eye-catching images, especially those from movies and animations that students are familiar with, have the added advantage of grabbing students' attention, keeping students' engaged, and more than likely increase students' retention of the subject matter (Conaway & Clark, 2015; Mateer & Stephenson, 2011; Samaras, 2014). For example, clips from familiar shows such as *Seinfeld*, *The Simpsons*, and *The Big Bang Theory* have been used to enhance economics teaching (Geerling et al., 2018; Ghent, Grant, & Lesica, 2010; Gillis & Hall, 2010; Hall, 2014).

The literature has discussed the benefits of using movies to improve students' learning in different subjects such as psychology and mathematics (Tabov & Gortcheva, 2016; Tagsold & Decuir-Gunby, 2012). In the field of economics teaching, Sexton (2006) said that "there is economic content in every movie" (p. 407) and discussed economic concepts embedded in numerous films. Mateer, O'Roark, and Holder (2016) compiled a list of the ten greatest films for teaching economics based on a survey conducted among 105 economic educators. Macy and Terry (2008) described how to promote critical economic thinking by displaying sets of discussion questions associated with different movies as examples. Mateer and Stephenson (2011) explained how to use film clips for teaching public choice economics.

Leet and Houser (2003) outlined an undergraduate economics course that included a weekly two-hour lab designed for film viewing along with a two-hour class meeting. It has been suggested that film viewing in class as a group can yield additional benefits on student learning. Not only are students more likely to pay attention to the economic content in the films when viewed in an economic classroom, class discussion can foster critical thinking and deeper understanding. The combination of viewing movies in class followed by class discussion can make the study of economics more interesting and relevant for the students (Samaras, 2014). Teaching economics with movies, when carefully executed, can deliver a positive student learning experience that is consistent with that of collaborative learning.

The example discussed below will follow the suggestion from Leet and Houser (2003) of viewing a film in class as a group to maximize the benefits from collaborative learning. The film chosen for illustrative purposes is *Lord of the Flies* (1990) for the following reasons: (1) the plot of the story is packed with applications of economic concepts; (2) *Lord of the Flies* is a classic novel written by Nobel-prize winning author William Golding that many students are familiar with, often as an assigned reading during high school; (3) the film is relatively short with no more than 90 minutes viewing time, especially if the credit-rolling at the end is not being shown; and (4) *Lord of the Flies* has not yet been mentioned in the literature as an example for teaching economics with movies.¹

3. An Application: *Lord of the Flies*

Lord of the Flies is the story of a group of young boys stranded on a deserted island and how social order gradually erodes. The story has rich economic content that can be

¹ The only economic application of class activities using *Lord of the Flies* appears to be designed for Social Studies at Grade 10 under Arkansas Standards of Learning. <https://web.saumag.edu/business/files/2016/09/Lord-of-the-Flies.pdf>

applied in various economics courses at the post-secondary level, for example, Principles of Microeconomics, Intermediate Microeconomics, Game Theory, and Economics of Crime. The student learning goals targeted by this paper are knowledge-specific goals. The main objective is for students to consolidate their knowledge previously learned from the course by identifying and applying economic concepts (that include but not limited to scarcity, comparative advantage, production possibilities, law of diminishing returns, demand and supply, elasticity, preferences, externalities and free-rider problem, and game theory) from different scenes of *Lord of the Flies* through collaborative learning (which will be further elaborated on later).

The main advantage with *Lord of the Flies* is that its total running time is under 90 minutes such that the whole story can be shown in no more than 80 minutes by trimming the credit roll at both the beginning and the end of the movie. An ideal context to show *Lord of the Flies* is within an undergraduate economics course that included a weekly two-hour lab designed for film viewing along with a two-hour class meeting as described in Leet and Houser (2003). However, any three-hour class session provides sufficient time for the viewing followed by class discussion. For a class that meets twice a week for 80 minutes each time, the film can be shown in one class followed by discussion in the next class. In this case, however, the instructor has to make sure students who miss the class when the movie is shown must view the movie at their own time before the discussion class. Alternatively, the instructor can assign the movie viewing and preparation of discussion questions as homework before the movie is discussed in class. In short, the relatively short length of the movie is an important advantage of this resource to accommodate different time constraints.

Due to its rich economic content, one particularly appropriate context to show *Lord of the Flies* is at the end of the term for an introductory microeconomic course, of which the primary learning goal is for students to identify the applications of different economic concepts throughout the film. Such brief activities can serve as a partial summary of the course and can encourage students to apply economic concepts to various contexts. A main underlying theme of the film, for instance, is strategic interaction between people. Hence, the content of the film is also applicable to any course that teaches a section on game theory. (For an alternative example, see Burke, Robak, and Stumph (2018) on how to teach game theory using *The Hunger Games*.)

Now that we have identified the general student learning goal and context for use, the next section will describe the implementation of collaborative learning activities in class.

A. Implementing the collaborative learning approach

This section aims to describe how *Lord of the Flies* can be used to teach economics with the collaborative learning approach. A combination of different sets of discussion questions can be used, of which two sample sets of questions will be described here. The first example relates specifically to game-theory applications that can be used in any course that has a game-theory component. The second example shows how *Lord of the Flies* can be used to illustrate a broad array of microeconomic concepts that are relevant for courses such as introductory or intermediate microeconomics.

The following discussion will describe a specific context on how to implement the collaborative learning approach with *Lord of the Flies* in an introductory microeconomic course during the last week of class, as a summary for the students to conclude the course. The specific students' learning goals are two-fold as follows:

- 1) to review key microeconomic concepts previously learned in the course through the collaborative learning approach; and

- 2) to consolidate students' knowledge and ability in identifying and applying microeconomics concepts as preparation for the final exam.

The sample implementation plan shown here will also assume a course that meets once a week for three hours. However, a course that has 80-minute class sessions twice a week can be easily accommodated as mentioned before.

At the beginning of the three-hour class, a handout is given to students with a brief description of the film that emphasizes the game theory content:

Lord of the Flies is the story about a group of children stranded on an uninhabited island in the absence of adult authority. Together the children recognized two main goals: (1) finding food and water to survive on the island while stranded, and (2) maintaining a smoke signal for rescue. Two of the children, Ralph and Jack, emerged as leaders. Over time, their strategies to interact shifted from cooperation to non-cooperation...

The movie will start as soon as the students have received the handout. The students will then find out from the movie that the children initially selected Ralph as the leader, who tried to organize survival activities consistent with that of the adult world. Over time, Jack started to challenge Ralph's authority by forming a new "gang" with Jack as the leader.

Along with the description of the basic plot, the handout also contains some discussion questions and students are instructed to outline their answers to these questions during the viewing of the movie. This constitutes the individual work portion of the class activity that serves as preparation for the group discussion. This part is scheduled to take about 80 minutes and concludes the first half of the lesson.

In the second half of the activity, the class is divided up into small groups of three or four students and 15 to 20 minutes are allocated for the students to discuss and compare their answers to the questions. To conclude the lesson, the instructor will facilitate class discussion for students to share and compare their answers from their small group discussion. The collaborative learning approach is applied when students share their knowledge through both small group and class discussions.

In short, this activity begins with individual problem solving that prepares students for more effective group discussion to maximize collaborative learning benefits. Such a design is simple yet consistent with the three important features of collaborative learning laid out by Barkley, Major, and Cross (2014), that is intentional structured activities, active engagement of all students, and meaningful learning experience with deeper understanding. This implementation strategy also consolidates the student learning goal set out in the beginning by providing students with multiple opportunities to identify and apply key economic concepts covered in an introductory microeconomic course. Table 1 provides a summary of the lesson plan for the three-hour class as an example to class activity implementation.

Table 1 – Lesson Plan for Implementation

Background information:

- The following lesson plan is designed for the last week of class in an introductory microeconomic course that meets once weekly for three hours.
- All concepts and theories have been taught previously.

Steps of Lesson Plan Implementation:

Part 1

- 1a Distribute the handout with the brief description and discussion questions to students. (Just before class starts or at the beginning of class.)
- 1b Show the movie and remind students to outline their answers to the questions during the viewing of the movie. Allow a short break after the movie. (90 minutes)

Part 2

- 2a Students form small groups to discuss and compare their answers to the discussion questions. (20 minutes)
- 2b Instructor facilitates class discussion of the questions with the whole class when each small group of students can discuss and compare their answers with other groups (40 minutes).
- 2c Summary comments by instructor and Q&A with students (20 minutes)

Note: The lesson plan can be easily adjusted for a course that meets 80 minutes twice a week. Part 1 has a minimum time requirement of 75 minutes. The suggested time for Part 2 is much more flexible and easily adjustable.

B. An example of game theory applications

The brief description of the plot on the handout above implies that game theory is an important concept illustrated by the movie. As an example, for game theory applications, the students can be asked to consider the two games below and answer some questions. Regarding the students' learning goal, they are expected to identify and apply the key concepts in game theory that include Nash equilibrium, dominant strategy, Prisoners' Dilemma, and strategic interaction.

Case A

		Ralph A (RA)	
		cooperate (c)	deviate (d)
Jack A (JA)	cooperate (c)	JA=8, RA=8	JA=1, RA=6
	deviate (d)	JA=9, RA=5	JA=4, RA=4

Case P

		Ralph P (RP)	
		cooperate (c)	deviate (d)
Jack P (JP)	cooperate (c)	JP=7, RP=7	JP=4, RP=9
	deviate (d)	JP=9, RP=4	JP=5, RP=5

Questions:

Q1. Consider the two cases of strategic interaction between Jack (J) and Ralph (R), shown above. Each person can choose to cooperate (c) or to deviate (d), with the respective level of satisfaction shown on the table.

Answer the following questions for each of the two cases:

- (i) Find the **Nash equilibrium** by carefully constructing the “four logical statements” as shown in class. Explain your answer.
- (ii) Do Jack and Ralph each have a **dominant strategy**? If so, what is it? Explain your answer.
- (iii) Is it a case of “**Prisoner’s Dilemma**”? Why or why not?

Q2 Which of the two cases (A or P) is a better illustration of the **strategic interaction** between Jack and Ralph in the movie Lord of the Flies? Use examples from the movie to support your answer.

Q1 has definite answers as follows. For Case A, Ralph A has the dominant strategy to always cooperate, while Jack A has the dominant strategy to always deviate. Case A, therefore, has one Nash equilibrium when Ralph A cooperates and Jack A deviates. For Case P, both players have the dominant strategy to always deviate, and Case P has one Nash equilibrium when both players deviate. Since the optimal (best possible) outcome is for both to cooperate in this case, Case P constitutes an example of prisoners’ dilemma (Rapoport & Chammah, 1970).

For Q2, there is no definite answer. Like most literary interpretations of *Lord of the Flies* (Buskin, 1965), some students may think Ralph represents good and benevolent leadership while Jack represents evil and demonic order. Case A is the logical answer to this interpretation. Other students may think the situation becomes completely chaotic at the end of the story and the children end up with the worst possible outcome when Ralph and Jack both deviate, and so the students choose case P as the answer. This can be used as an illustration that answers can sometimes depend on the assumptions made for the case.

As an alternative implementation plan and teaching notes for the game theory applications, the instructor can choose to use a blank table without the payoffs and ask the students to fill out the payoffs such that they resemble the interaction shown in the movie. The advantage of using games with payoffs already set up as shown above generates specific answers such that the discussion can stay more focused and is less time consuming. If the payoffs are left blank, the advantage is that students are encouraged to be more creative in setting up and explaining the payoff structure. However, the payoff structure generated by the students themselves can end up with many different possibilities that require more time to explain. For additional game theory practices, the instructor can also assign a homework project for students to derive and discuss a game from another movie as per the suggestion of Burke, Robak, and Stumph (2018). Another possible alternative for higher-level courses is the extension to repeated games and to discuss the costs of cooperation under repeated games as opposed to a one-shot game.

C. An example of microeconomic applications

As mentioned before, *Lord of the Flies* is rich in economic content and offers vast opportunities for students to identify different economic concepts and topics especially from an introductory microeconomic course. To achieve the students' learning goal as stated earlier, the instructor can ask them to discuss and apply various economic concepts that they can identify from the movie. Table 2 provides a summary of how to link economic content to various scenes from *Lord of the Flies* based on the chapters in the *Principles of Microeconomics* textbook written by N. Gregory Mankiw (2017) as reference material for a template course syllabus. The instructor can show the various scenes as suggested in Table 2 during the class discussion. Alternatively, based on the suggestions made by Al-Bahrani and Patel (2015), the different scenes can also be shown throughout the term of the course when the different topics are covered. The approximate time for the different scenes from the movie is shown in brackets in the form of "minutes: seconds" with reference to the 1990 version of the movie directed by Harry Hook.

Table 2 – A (Non-Exhaustive) List of Linkages between *Lord of the Flies* and Microeconomic Concepts

Concept/Topic	Brief notes on <i>Lord of the Flies</i> illustration (approximate time in movie)	Chapter reference in the Mankiw (2017) text
Scarcity	Examples of scarce resources include food, water, shelter, leisure time, knife, Piggy's glasses, etc. (5:25-6:28; 50:00-50:18; 68:15-69:48)	Chapter 1: Ten Principles of Economics
Opportunity cost	Jack missed the fire watch and went hunting instead. The opportunity cost of getting food is the opportunity of getting rescued given up. (36:57-39:45)	Chapter 1: Ten Principles of Economics

Comparative advantage and production possibilities	Jack appeared to be better at hunting, and Ralph seemed to have more patience for tending the fire watch. (38:30-39:45)	Chapter 2: Thinking Like an Economist Chapter 3: Interdependence and the Gains from Trade
Demand and supply	Jack and his group stole Piggy's glasses. There was excess demand for various goods such as Piggy's glasses. (68:15-69:48)	Chapter 4: The Market Forces of Supply and Demand
Elasticities	The supply of both the survival knife and Piggy's glasses was almost perfectly inelastic (68:15-69:48)	Chapter 5: Elasticities and Applications
Externalities	Jack missed the fire watch and the whole group missed the opportunity of getting rescued. (36:57-38:20)	Chapter 10: Externalities
Free-rider problem	The children were playing instead of working (24:05-25:25)	Chapter 11: Public Goods and Common Resources
Law of diminishing marginal returns	Ralph expected the children to be always working without play time. (24:05-26:40)	Chapter 13: The Cost of Production
Market power	No one had any clue what to do when the children first arrived on the island. Then Ralph and Jack appeared to share leadership initially, with Jack gaining most power over the children later. (5:25-6:28, 12:30-12:57; 38:30-39:45; 74:15-74:45)	Chapter 15: Monopoly Chapter 17: Oligopoly
Strategic interaction and game theory	Strategic interaction between Ralph and Jack throughout the movie. (5:25-6:28, 12:30-12:57; 38:30-39:45; 74:15-74:45)	Chapter 17: Oligopoly
Preferences	Jack and Ralph had a preference for hunting and tending fire watch, respectively. (38:30-39:45)	Chapter 21: The Theory of Consumer Choice

The instructor can also choose to present discussion questions based on specific scenes from the movie to facilitate the students' learning goal of identifying and applying microeconomic concepts. Examples of discussion questions are provided as follows.

Questions:

- Q1. Why did Ralph call the assembly? (24:05-26:40)
- Q2. What economic concepts can be applied when a few kids missed the fire watch such that the whole group missed the opportunity of getting rescued? (36:57-38:20)

- Q3. Ralph attempted but failed to organize the children, and Jack started a new “gang.” What economic concepts might have helped Ralph to organize the children successfully? (38:30-39:45)

Note that the questions shown above were formulated based on the 1990 version of the movie directed by Harry Hook. However, these questions are still relevant based on the original novel by William Golding (1954). For courses with a specific focus or for any topic within a course, the instructor can also choose to limit the scope of students’ answers by listing specific concepts or theories that students must apply to answer these questions. The following discussion can serve as teaching notes for the three discussion questions listed above and further elaborates on the examples given in Table 2.

Teaching notes for Q1:

Ralph said, “The reason I am calling the assembly is too many people are screwing around when they should be working” (25:18). Examples of economic implications that can be applied here include the following.

Free-Rider Problem: The children appeared to rely on each other to do the work such as getting food and tending the fire watch. Just before Ralph called the assembly, the children were shown to be playing around the beach and the pond of water instead of working (24:05-25:25).

Scarcity and opportunity cost: The scene where the children spent time playing instead of working also showed that leisure time was a scarce resource. The opportunity cost of spending more time on leisure, for example, was work time given up to obtain food and shelter.

Demand and Supply: There was a relatively big group of children on the island such that the demand for food and shelter was quite high. When the children spent more time playing instead of working the supply of these necessities was low, hence creating a situation of excess demand. This phenomenon was implied when Ralph said “Come on, why isn’t anybody getting food or wood?” (23:55) Other valuable resources such as Piggy’s glasses (68:15-69:48) and the survival knife (50:00-50:18) also had excess demand when there was extremely limited supply with relatively much higher demand.

Teaching notes for Q2:

Ralph was furious and told Jack, “if you guys haven’t let the fire gone out, they would have seen it...we could have been rescued” (38:33). Different economic concepts can be inferred from this quote.

Externalities: The children who failed to tend the fire watch imposed negative externalities on other children when their action caused not just themselves, but also other children not getting rescued.

Preferences: Ralph failed to recognize that people had different preferences. When Ralph challenged Jack for missing the fire watch and the opportunity of getting rescued, Jack and his group responded, “we were hunting...we killed the pig” (38:30). Ralph seemed to have a strong preference for maintaining the fire watch to get rescued, while Jack appeared to have a strong preference to hunt for food.

Teaching notes for Q3:

At the end of the movie, Ralph was left alone as all of the other children had joined Jack’s gang of hunters. Ralph was able to survive due solely to the last-minute rescue by a group of

adults who finally discovered the children on the island. Ralph could have applied some of the following economic concepts to organize the children when he still had more power initially.

Comparative advantage and production possibilities: Ralph failed to recognize different people might prefer or be better at doing different things. This was shown when Ralph and Jack argued about the priority over hunting and fire watching (38:30-39:45). Instead of getting everyone to take shifts between hunting and tending the fire watch, Ralph could have let the children specialize in what they had a comparative advantage in. This strategy could allow the children to enjoy their activities more and likely to increase productivity. Opportunities for individuals to specialize and expand production possibilities through gains from trade were missed.

Law of diminishing marginal returns: Ralph did not seem to recognize the natural tendency of the children to want to play. At an early point in the movie, Ralph said, "Come on, why isn't anybody getting food or wood?" (23:55). This implies that Ralph expected everyone to keep working until they were burnt out and no longer very productive. Ralph should have recognized the children needed some time off from work to recharge and to stay productive.

Elasticity: The supply of certain items on the island, such as Piggy's glasses and the survival knife, were perfectly inelastic as there were only one pair of glasses and one survival knife. The demand for these items also appeared to be quite inelastic as these items were required for basic survival on the island. These were shown in the scenes when Jack and his group of hunters demanded the survival knife (50:00-50:18) and stole Piggy's glasses (68:15-69:48). Ralph probably recognized these facts but failed to establish clear rules or property rights on these items.

Market power: When the children first arrived on the island, no one had any clue what to do as Ralph said, "tomorrow we will figure out what we are going to do" (6:23). At this point, no one had any power over any resources. Later at a gathering Ralph was named the leader of the group but the children also respected Jack as the oldest boy (12:40). At this time both Ralph and Jack appeared to have established "market power" over the other children. While Ralph continued to focus on tending the fire watch for getting rescued, Jack emphasized hunting for food to survive on the island. The two boys appeared to compete in a duopoly situation with different appeals (differentiated products). After being accused by Ralph of missing the fire watch, Jack announced to the children, "I am going to make another camp of hunters" (39:00) as his rebellion statement against Ralph. Toward the end of the movie after the death of Simon and Piggy, all the children belonged to Jack's gang of hunters when Jack told Ralph, "You are on your own!" (74:20). Jack has clearly established monopoly power over most, if not all, of the resources on the island by then.

Numerous other possible topics can be discussed such as the conditions of entry and exit, the cost and benefit of switching to a different gang, the economic system on the island, rational and irrational behavior, cost of cooperation under a one-shot game as opposed to repeated games among many others. Sexton's suggestion (2006) that there is economic content in every movie seems to be especially true in the case of Lord of the Flies.

4. Outcomes and Conclusion

In discussing the greatest films for teaching economics, Mateer, O'Roark, and Holder (2016) concluded: "Some great movies of the day fade as the credits roll, whereas others become iconic" (p. 215). While this statement is certainly true regarding the movie industry, it also applies to the teaching of economics in that some teaching pedagogies may become less suitable as time rolls on while others remain useful over time. To keep the students interested

and to give them a most valuable educational experience, it is sometimes best to integrate different teaching practices to reap the combined benefits. This paper aims to show how to enhance the collaborative learning experience by utilizing benefits from viewing movies in class as a group.

It is somewhat surprising that *Lord of the Flies* has not been mentioned in the literature as a useful resource for teaching economics, given its rich economic content as shown in this paper. The experience of using *Lord of the Flies* as a review to conclude an introductory microeconomics course by one of the authors has been largely positive. When a question on the final exam asked students to explain three economic concepts based on *Lord of the Flies*, most students appeared to remember well what they have learned from the story.

We also found that it is important to provide students with concrete discussion questions before they view the movie. The discussion questions serve as important guidelines for students to focus on what they need to watch out for in the movie. A major limitation of this classroom activity is that the whole movie does take at least 75 minutes to show. This implies that adjustments are necessary in terms of implementation for classes that meet fewer than 75 minutes per class, for example, classes that meet 50 minutes each session three times a week. For such classes, the most straightforward alteration is probably to assign the viewing of the movie and the preparation of the discussion questions as homework and spend one class session (50 minutes) on class discussion.

Lord of the Flies also delivers the additional benefits that it is considered an “iconic” modern classic in the field of literature often assigned as required school reading material familiar to many students. This paper has provided a detailed description on how to incorporate *Lord of the Flies* with collaborative learning in the classroom that can enrich students’ learning experience and achieve the students’ learning goal of consolidating their knowledge in microeconomic concepts. The implementation plan suggested in this paper entails showing the whole movie during the last week of an introductory microeconomics course in the form of a one-time (short-term) collaborative learning activity. Further research can explore the use of *Lord of the Flies* as a longer-term collaborative learning activity throughout a course, for example, by showing short clips of different scenes in the movie throughout an introductory microeconomic course to illustrate different concepts and topics.

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