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Students' Perceptions of a Token Economy in an Undergraduate Science Flipped Class-Room

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Abstract: Engaging students in higher education is a critical aspect of student learning (Barkley, 2009; Coates, 2005).Flipped classroom are being reported in the literature as a means to engage students in the learning process, compared to traditional lectures (O'Flaherty & Phillips, 2015). However, flipped classrooms are difficult to implement without students taking an active role in the learning process (Long, Cummins, & Waugh, 2017). Token economies, which are widely used in primary school settings but rarely reported in higher educational settings, enable instructors to provide students with rewards to reinforce targeted student behaviors (Hine, Ardoin, & Call, 2018; McClurg & Morris, 2014), and may be useful in the flipped classroom model. In this mixed methods case study, the researchers collected survey and focus group data from 48 undergraduate students who attended a science course with a token economy to determine the students' perceptions of the token economy and satisfaction of the novel rewards offered. The findings indicated that over 90% of the students participated in the token economy and 74% of students indicated that the reward system reinforced the student behaviors necessary for an effective flipped classroom. The students also discussed how the token economy provided motivation and additional opportunities to master course content, decreased student anxiety, and enhanced the student-teacher relationship.

Keywords: token reward system, positive reinforcement, flipped classroom, active learning, motivation, student anxiety, student-teacher relationship, student engagement

Introduction

Higher education professors are being urged to rethink traditional lecturing modes and shift toward student-centered learning (Morrison, 2014). There is much research to support the effectiveness of flipped classrooms as one pedagogical approach to meet this need (Chen, Lui, & Martinelli, 2017; Eaton, 2017; González-Gómez, Jeong, Rodríguez, & Cañada-Cañada, 2016). A flipped class is characterized by presenting students with important information and homework outside of the classroom, leaving time for active learning and application activities during the class period (Kim, Kim, Khera, & Getman, 2014; Tucker, 2012.).

A well-facilitated flipped classroom encourages class participation, which is constantly associated with critical thinking (Smith, 1977) and linked to performing better in school (Jalongo, Mahoney, & Gerlach, 1996) and mastery of course material (Beekes, 2006). However, a flipped classroom structure is only successful when the students complete the out-of-class assignments and participate in class activities (Long, Cummins, & Waugh, 2016). When students arrive to at flipped classroom unprepared, it is difficult for the instructor to conduct the in-class activities successfully (Kim et al., 2014). Students are reluctant to complete assignments without a grade and have difficulty understanding the importance of learning the material to do well on the exam. To encourage students to complete the homework, instructors may assign these assignments points. However, it can become tedious and time-consuming to grade homework for each student each class period (Long et al., 2017).

Additionally, students must exhibit behaviors such as being punctual to class and participating in the class activities for the flipped classroom structure to run effectively. Awarding student points for each behavior is time-consuming on the part of the instructor and can inflate grades by awarding behavior instead of their knowledge (Long et al., 2017). Token economies are one method that can be used to encourage targeted student behaviors with minimal additional effort for the instructor (Hine et al., 2018).

A token economy, also called a token system of reinforcement, is a form of behavior modification where a person is provided with a token upon demonstration of a desired behavior, which can be exchanged for a meaningful item, privilege, or benefit (Ayllon & Azrin, 1968). Token economies are used across many settings and employed by psychologists, teachers, and applied behavior analysis (Hine et al., 2018). In education, token economies are used often in elementary and middle school educational settings but have been utilized much less in higher educational settings (Boniecki & Moore, 2003; Junn, 1994; Nelson, 2003). When a token economy has been used in higher education, instructors have used extra credit for unit exams or the final course grade as the reward (Boniecki & Moore, 2003; Junn, 1994; Nelson, 2003). Students prefer extra credit above other motivational factors (McClurg & Morris, 2014). While extra credit may motivate a student and increase their grade, extra credit does not ensure students have learned course material.

In prerequisite courses especially, it is critical that student master the course content (Terry, de La Harpe, & Kontur, 2016). The constructivist theory of learning suggests that students build knowledge based on a foundation of previous knowledge (Bodner, 1986; Mayer, 1996). Terry and colleagues (2016) study indicated that students who perform poorly in the prerequisite course subsequently have more difficulty in higher level courses.

Our study investigates the use of a token economy in a flipped classroom of a pre-requisite science course. Instead of the reward being extra credit, however, the rewards used in this token economy were privileges to allow students extra attempts to learn and master the course material.

The purpose of this study was to determine the students' perception of the effect of the token economy on motivation to complete course activities. A secondary purpose was to ascertain the students' opinions of the novel rewards which permitted students opportunities to master course content.

Literature Review and Theoretical Framework

Flipped Classrooms

The traditional lecture-based pedagogical model in a higher educational classroom has been challenged recently, and research has supported the effectiveness of flipped classrooms (Abeysekera & Dawson, 2015; Bishop & Verleger, 2013; Herreid & Schiller, 2013; Galindo, 2014; Gilboy, Heinerichs, & Pazzaglia, 2015). A flipped classroom is characterized by students learning important information out

of class prior to the class period, with the subsequent use of active learning and application strategies of the content during class. Pre-class assignments often include videos, voiced-over power point presentation, assigned readings, or worksheets designed to deliver facts and information. During the face-to-face classroom period, the instructor has more time to address misconceptions and guide students through application, analytical, and creative activities (Kim et al., 2014; O'Flaherty & Phillips, 2015).

Recent literature has demonstrated the effectiveness of flipped classrooms to increase attendance and exam grades (Mason, Shuman, & Cook, 2013). The literature also reports flipped classrooms have helped students improve problem-solving (Karabulut-Ilgu, Yao, Savolainen, & Jahren, 2018), communication (Ferreri & O'Connor, 2013), collaboration (Gomez-Lanier, 2018), and application skills (Chen, Lui, & Martinelli, 2017) throughout varied disciplines. Students described being more engaged in flipped classrooms (Gilboy, Heinerichs, & Pazzaglia, 2015; McLaughlin et al., 2014; Roach, 2014). Students also perceive flipped classrooms to be more interactive, enjoyable, and applicable (Boevé et al., 2017; Kim et al., 2014; O'Flaherty & Phillips, 2015; Roach, 2014). It has also been reported that flipped classroom increase student empowerment, independent learning, and innovation (O'Flaherty & Phillips, 2015).

The flipped classroom model works only when the students are actively participating in the educational experience (Morrison, 2014) and fully engage in the in and out of class learning opportunities (Kim et al., 2014; O'Flaherty & Phillips, 2015). Instructors who have facilitated flipped classrooms emphasize that the pre-class assignments are essential as class activities are designed to build on the content the students learned prior to the class period (Long et al., 2017). However, many instructors report that students come to class unprepared and have not completed the out of class assignments. This complicates the instructors' ability to facilitate the flipped classroom, and students are frustrated as they struggle to connect the face to face content with the critical information they missed (Long et al., 2017; O'Flaherty & Phillips, 2015). When students come to class unprepared, instructors must find methods to motive students to complete the pre-class assignments, which often involve extra time-consuming grading (Kim et al., 2014; Long et al., 2017; O'Flaherty & Phillips, 2015)

Student Motivation

An important assumption in education is student motivation is one of the most important factors that contribute to learning (Brophy, 1987). Motivating college students learning is an essential goal for educators in higher education and motivation is an important key for successful and effective learning (Halawah, 2011). In higher education, motivating students can be complicated, as instructors work with students from many backgrounds and have students that face many challenges (Petty, 2014).

Motivational Theories. Motivation is a concept that describes what prompts a person to begin, guide, and complete behaviors (Maslow, 1943). Within education, several of the foundational motivational theories that can be applied to learning include intrinsic and extrinsic motivation theory, self-determination theory, the ARCS theory, cognitive theory, and expectancy theory.

The intrinsic and extrinsic motivational theory assessed whether a person is motivated by their own drive and desire or through an external stimulant. Students with high intrinsic motivation will complete activities because they are fun or challenging, while students who respond to extrinsic motivators work for either positive or negative rewards (Gopalan et al., 2017). An amotivated state is when a student is not motivated by either intrinsic or extrinsic factors. Studies have correlated higher intrinsic motivation with GPA (Komarraju, Karau, & Schmeck, 2009). While some researchers

question if external reward may decrease intrinsic motivation (Deci, 1971) other research postulates that students who have combined high intrinsic motivation and medium extrinsic motivation achieve well in their courses, suggesting that instructors can further encourage even highly intrinsically motivated students (Lin & McKeachie, 2003)

Derived from intrinsic and extrinsic motivation theory, self-determination theory proposes there are three factors to drive behavior: autonomy, competence, and relatedness. Setting guidelines, such as deadlines can decrease intrinsic motivation, whereas increasing a person's options and choices can increase their intrinsic motivation (Zuckerman et al., 1978). A study conducted with students in an organic chemistry course indicated when instructors are autonomy-supportive in a higher education course by making the course student-centered and encouraging active engagement with the material, there is higher student satisfaction and achievement and less student anxiety (Black & Deci, 2000).

Pertaining directly to education, the ARCS model of motivation suggests that four factors enhance students' motivation: attention, relevance, confidence, and satisfaction (Wlodkowski, 1978). In Keller's (2009) exploration of each factor, three questions arise when considering satisfaction: 1) How can I support learners' intrinsic enjoyment of the learning process (intrinsic motivation)? 2) What will provide rewarding consequences to the learners' successes (extrinsic motivation)? and 3) What can I do to build learner perceptions of fair treatment (equity)?

The social cognitive theory is a motivational theory that is used across many domains, including education, communication, and psychology (Gopalan, Bakar, Zulkifli, Alwi, & Mat, 2017). The primary concept of this theoretical construct that people learn based on their social influences. The things they observe, their experiences, their unique interactions, and media influences are factors for people's behavior and knowledge (Bandura, 1989a). Self-efficacy is an important construct in the social cognitive theory. Van Dinther, Dochy, and Seger's (2011) review determined that mastery experiences are one of the most powerful means to help a student create a sense of self-efficacy.

Motivational Factors for College Students. The literature has demonstrated a correlation with GPA and intrinsic motivation demonstrated through self-discipline, determination, and curiosity (Komarraju et al., 2009). However, several studies that have surveyed thousands of students investigating overall motivation to attend and succeed in college classes suggests that instructors have the ability to promote extrinsic factors to aid in student success (Gorham & Christophel, 1992; Halawaj, 2001; McClurg & Morris, 2012)

Gorham and Christophel (1992) surveyed students in over 300 classes seeking to determine college students' strongest motivators. Among the highest reported motivation factors were content relevance, teacher's effectiveness and enthusiasm, and grade or credit motivation. Similarly, Halawah (2011) found the most significant motivation factor described by students is an open and positive atmosphere created by the instructor. Student ratings also indicated the availability of rewards had a very high correlation with the atmosphere created by the instructor.

Another study by McClurg and Morris (2014) asked students to rank possible incentives to classroom performance. According to this study, the students reported having 10 points added to their final course grade, a good grade for the course, and fear of getting a bad grade were the three highest rated motivators for classroom success. Competing with other students, the love of learning, and fear of looking bad to the instructor were among the lowest rated motivational factors (McClurg & Morris, 2014).

Token economies are an extrinsic motivation method that is used across many disciplines and are a potential method higher education instructors can use to not only create an encouraging

and positive classroom environment but also provide equitable means for students to improve grades (Hodge & Nelson, 1991).

Token Reward Economies in Higher Education

While token economies have been reported as used extensively in primary school settings, there are fewer reports in the literature of this being used in a higher educational setting. The types of tokens used have varied from personalized, printed paper (Nelson, 2003; Junn, 1994), wooden checkers (Boniecki & Moore, 2003) and checkmarks on a board (Hodge & Nelson, 1991). The rewards, almost every case, were extra credit, either for individual exams or the final course grade (Boneicki & Moore, 2003; Junn, 1994; Nelson, 2010)

Junn (1994) provided students with index cards marked "Pearls of Wisdom." Every time students spoke up in class, they cashed in one card. The students had to participate a minimum of 20 times during the semester for their participation grade but could cash in up to 60 "pearls of wisdom" throughout the semester, with each classroom contribution over the initial 20 counting for extra credit at the end of the semester. The students indicated they spoke up in their class more than in their other classes and it was a non-threatening way to encourage participation.

Boneiecki & Moore (2003) gave wooden checkers to the first student who answered the instructor's questions in an undergraduate psychology course with 63 students. At the end of the class, the students could redeem their checker for one point on their next exam. Their study found that the rewards decreased the latency period between the question and answer and increased the directed and non-directed class participation. The number of questions asked by the students increased as well, although that behavior was not rewarded.

In a study of 318 undergraduate students enrolled in multiple psychology courses, they were given a piece of paper marked "Bonus Point" if they asked a good question in class (Nelson, 2010). The students could only earn one bonus point per day and it could be applied for a percentage of their final course grade. Nelson defined good questions as ones that "related to the course content, made sense to the instructor, related directly to the course material, and did not repeat a question already asked." His study indicated bonus point correlated positively with students who had a performance approach or mastery approach to the material but showed no correlation with students who demonstrated performance avoidance. His study also indicated that students who asked more questions earned higher grades on their homework and had a positive relationship with exam grades (Nelson, 2010).

Research Purpose and Differentiation

The primary purpose of this study was to assess students' perceptions of a token economy in a flipped science classroom, specifically as it related to student motivation to complete in and out of class activities. The secondary purpose of this investigation was to evaluate the students' perception of the unique rewards, such as re-taking exams or submitting assignment late that have not previously been reported in the literature.

Very few studies have investigated token economies in higher education (Boniecki & Moore, 2003; Junn, 1994; Nelson, 2003), and none were conducted in the context of a flipped classroom. The previous studies have investigated the impact of a token economy on the targeted student behavior of class participation, whereas this study focused on the targeted student behavior of completing out-of-class assignments. In addition, this study provided novel rewards to the students, including opportunities to master course material, rather than extra credit, as has only been reported in the literature.

Course Structure and Token Economy Implementation

The token economy was implemented in two courses: Human Anatomy and Physiology I and Human Anatomy and Physiology II. Both were 4-credit 200-level courses within a Kinesiology program and were pre-requisite foundational courses for a majority of the classes within the program. The instructor used the same class structure and token economy in both courses.

Flipped Course Structure

On the first day of class, the instructor outlined the daily class structure for the students. Before each class, the students were given an assigned facilitated reading and a corresponding worksheet. The facilitated reading homework was assigned through the textbook's online software program, McGraw Hill's Learn Smart. The students were also expected to complete a pre-class worksheet (called the "pre-class assignment") which was created by the instructor and very clearly matched the information in the textbook. The purpose of these assignments was to have the students read and engage the information prior to attending the class.

The students were expected to be punctual to each class. The class started immediately with a quiz that lasted ten minutes. The students were allowed to use their pre-class assignment worksheet, but not their textbook, to answer the quiz questions.

During the class, the instructor conducted a variety of learning activities to approach the material from several perspectives, including group discussions, physiology videos, active learning strategies, individual assignments, practice questions, and application activities.

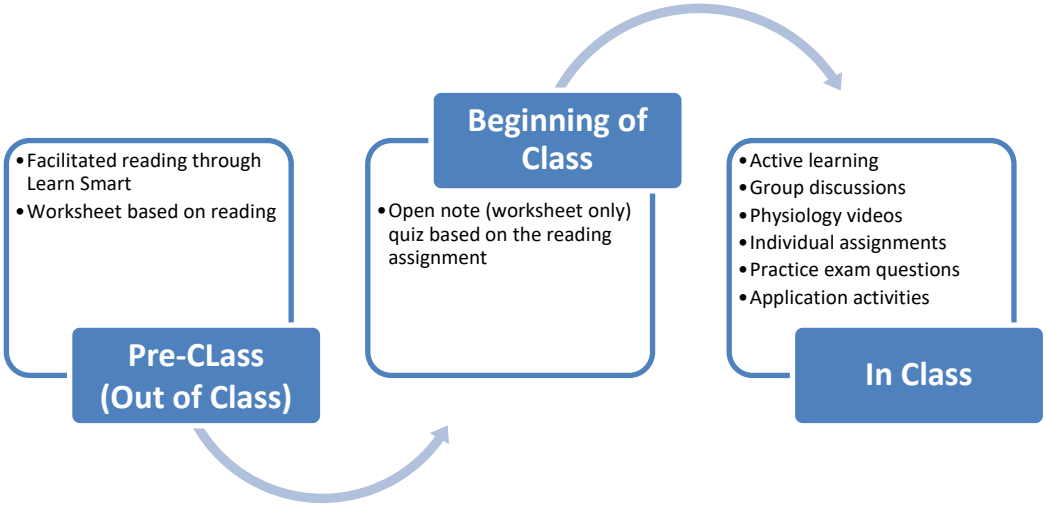

Figure 1. Flipped Classroom Structure

The Token Economy in the Flipped Classroom

The instructor considered the four aspects of the token economy—targeted behaviors, tokens, rewards, and exchange periods—as they fit into the context of this science-based flipped classroom.

Targeted behaviors. To facilitate the flipped classroom, the instructor chose targeted behaviors to help with the class flow. The instructor to awarded students with tokens if the student was punctual

(defined as in their seat when the class period started), if they completed their pre-class worksheet assignment (had to be completely filled out with appropriate answers based on a quick visual skim), if they brought their textbook or had pulled up their e-text. The instructor also awarded tokens throughout the class to encourage timely completion of group activities or to students who asked good questions or contributed to conversations. To build rapport with the students, the instructor practiced their names daily. After the second week of class, the instructor gave tokens to any student to whom she incorrectly identified. The instructor estimates that students could have earned approximately 125 tickets throughout the semester.

Tokens. The instructor used carnival roll tickets for the token. They were handed out at the beginning of the class while the student completed their quiz. Students also earned tokens by completing activities during class.

Rewards. The students could redeem their tickets for the following rewards: to take an exam they missed, to retake an exam on which they performed poorly the first time, to turn in late facilitate reading or other homework assignments, or to have exam "helps." The exam "helps" were styled after the "Who Wants to Be a Millionaire" lifelines and included a fifty-fifty (instructor crossed off two incorrect answers from a multiple choice question on a student's exam), "Am I Right?" (student pointed to an answer and the instructor only said "yes" or "no"), and "Hints" (instructor gave the student a non-obvious hint regarding a class activity or construct to help the student critically think to process an answer). Each student could only use six "helps" per exam and only one "help" per questions. Fifty-fifty and "Am I Right?" "helps" could only be used on multiple choice questions.

Exchange Periods. The students were permitted to exchange their tickets for a reward at any point during the semester. If a student wished to make-up or retake an exam, they were allowed to do so by appointment or at the instructor's office hours. Exam "helps" were available for all in-class exams, and students could turn in tickets to make-up homework assignments any time they saw the instructor.

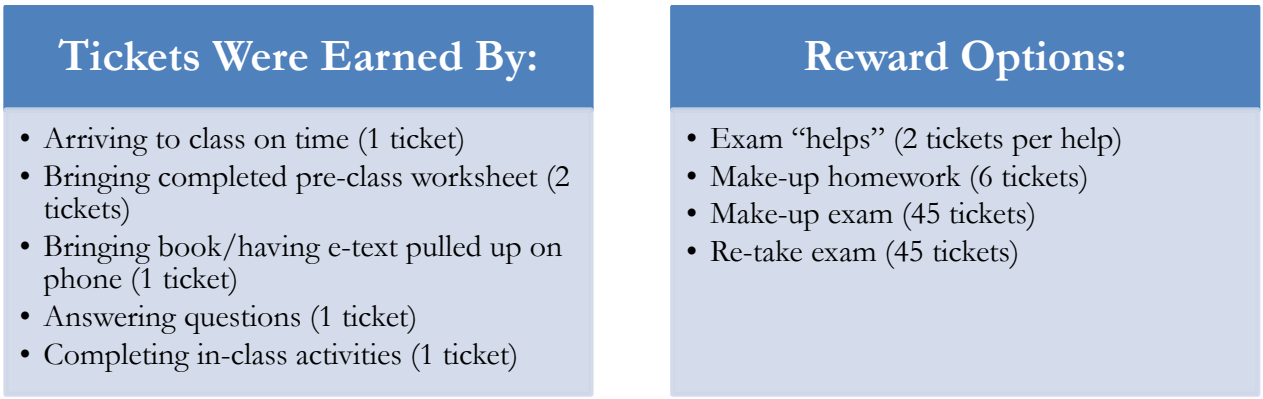

Figure 2. Token Economy Tickets and Reward Values

Methods

This study was designed as a single case study of two classrooms at one university. Both qualitative and quantitative data were obtained and analyzed (Yin, 2017).

Participants

The participants were recruited from a Human Anatomy and Physiology I and II courses offered the same semester, at the same university, and taught by the same instructor. These courses were listed in the curriculum as a sophomore level course but were attended by students of all undergraduate levels. Some students were retaking the course due to failing the course the first time or desiring to earn a better grade to enhance their grade point average.

Instrument

The researchers developed this survey to specifically address the unique course structure and rewards. The tool contained 18 items; the first six questions were demographic questions, the next five items assessed how the students redeemed their token. Item 13 assessed students' motivation as it related to the token system and the specific flipped classroom structure with statements that the students responded to with a 5-point Likert scale with options of "strongly disagree," "disagree," "neither agree nor disagree," "agree," or strongly agree." The remaining five questions were open-ended questions asking for the students' opinions on the token system, the rewards, and student motivation.

The students were also invited to participate in focus groups. There were five focus groups with 8-12 students per group. The focus groups facilitators used the same question prompts for each group and followed up with further questions per the line of each group's discussion.

Procedure

Two weeks prior to the end of the semester, the students were sent an email inviting them to participate in the study. The email contained a link for the student to complete the survey created in Survey Monkey. The final question asked the student to participate in a focus group and allowed students to choose a focus group time that fit in their finals schedule. The researchers emphasized the students' anonymity, and reassured the students that the instructor would not have access to the survey or focus group data until after the final grades had been posted and their opinions would not impact their grades. The students were told that the study was to assess their perceptions of the "Ticket System" (the nomenclature used by the instructor in the course) and that the benefit of the study was to evaluate course instructor's methods of motivating students.

The focus groups were hosted by the Director for the Center of Teaching and Learning, Education Department Faculty, and other faculty members within the Department of Public and Allied Health Science.

Data Analysis

Both qualitative and quantitative data were collected. The researchers used SPSS18 to analyze the quantitative data with descriptive statistics. The qualitative data were analyzed with NVivo18 and researcher triangulation. Qualitative data were collected through open-ended written questions on the survey and through the focus group data. The focus group interview data were transcribed and debriefed among the researchers. The researchers separately coded the data (Creswell & Poth, 2017; Patton, 2014). To evaluate the qualitative data, the researchers used NVivo18 as an organizing space and analysis tool. They used open coding to derive themes based on the research questions. In a second round of debriefing, the researchers used axial coding to determine common themes through qualitative analysis.

Research Quality

The study was approved by the university IRB board and met all university requirements for ethical research. This study relied on data triangulation and researcher triangulation to enhance the quality of the methodology (Patton, 2014). The data were gathered from multiple perspectives as students provided their opinions on the token economy through survey questions, open-ended written questions, and group discussions. The data were also reviewed from several coding methods by a team of researchers.

Results

Participant's Demographic Characteristics

Fifty-five students in the Human Anatomy and Physiology I and II courses were invited to participate in the study, and 48 students participated in the study and the focus group resulting in an 87% response rate. The mean age of the participants was 21 years old (+/-2.1 years old). There were 32 female participants (68.0%) and 15 male participants (31.9%). The majority of the participants were sophomores (n = 25; 53.1%), with two first-year students (4.2%), 16 junior students (31.9%), and five seniors (10.6%). African American/Black students composed 72.3% of the participants (n = 34) and eight students identified as Caucasian/White (17.0%), two identified as Latino/Hispanic (4.3%) and three identified as Multiracial or Other (6.4%). Fifty-three percent (53%, n = 26) of the students were enrolled in Human Anatomy and Physiology II and 44.7% (n=21) of the students were enrolled in Human Anatomy and Physiology I.

Table 1—Participants' Demographics Characteristics

Characteristic	No.	%
Age, y (n = 47)		
18	7	14.9
19	1	2.1
20	18	38.2
21	11	23.4
22	3	6.3
22<	7	14.9
Sex (n = 47)		
Male	15	31.9
Female	32	68.0
Class in School (n= 47)		
First Year	2	4.2
Sophomore	25	53.1
Junior	15	31.9
Senior	5	10.6
Race/Ethnicity (n = 47)*		
African American/Black	34	72.3
Caucasian/White	8	17.0
Asian/Pacific Islander	0	0
Latino/Hispanic	2	4.3
Native American	0	0

Multiracial	1	2.1
Other	2	4.3
Course (n=47)		
Human Anatomy and Physiology I	21	44.7
Human Anatomy and Physiology II	26	53.0

*Percentages may exceed 100 as participants could choose all the options that applied

Ticket Redemption

A majority of the students (n = 43; 91%) indicated that they had redeemed or planned to redeem the tickets that they earned in their class. Eighty-five percent (85%) of the students redeemed their tickets to make up a missed assignment, 40% (n = 19) used their tickets to take a test that they missed, and 57% (n = 27) redeemed their tickets to re-take a test on which they had initially performed poorly. Forty-nine% (n =23) redeemed their tickets for a "help" on an in-class exam ("helps" were similar to "Who Wants To Be A Millionaire" show lifelines).

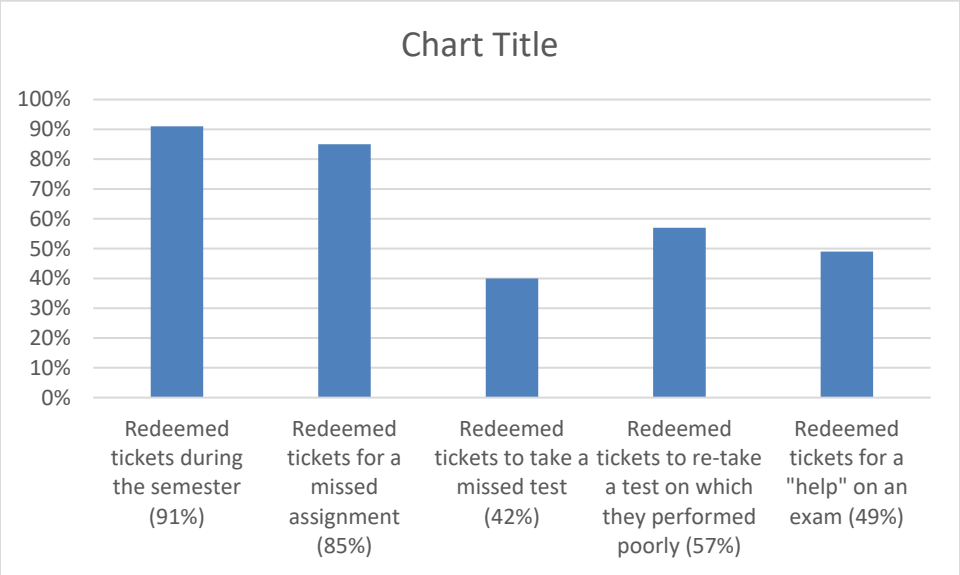

Figure 3—Students' Report of Ticket Redemption

Motivation

Nearly 60% (n=28) of the students indicated that they would have completed their homework without receiving points or tickets. Seventy percent (70%, n=33) of the students reported that the tickets motivated them to complete homework assignments, and 85% of the students indicated that the rewards offered were an incentive to earn tickets. Students responded that the quiz at the beginning of class alone (76.6%, n=36) would have been enough incentive to complete the homework assignments, and 42% of the students would have been more motivated to complete the homework for points instead of the tickets.

Table 2—Students' Perceptions of the Token Economy and Motivation

Statement	Mean	St. Dev	Percent and Number of Agree/Strongly Agree
I would have completed my pre-class assignments without receiving participation points or tickets.	3.55	1.18	59.5% (n = 28)
The daily quiz alone would have been enough motivation for me to complete my pre-class assignment.	4	1.04	76.6% (n = 36)
Earning tickets motivated me to complete my pre-class assignments.	3.78	1.06	70.2% (n = 33)
I would have been more motivated to complete my pre-class assignment for participation points instead of tickets with the opportunity to redeem the tickets for making up exams or assignments.	3.27	2.0	42.5% (n = 20)
The rewards (making up missed assignment or tests and in-class test "helps") motivated me to earn tickets.	4.17	0.87	85.1% (n = 40)

Continued Use of a Token Economy

When students were asked if they would recommend a token economy in other classes, 96% of the respondents (n = 45) replied yes. The students who recommended this pedagogical approach included statements such as: "Motivates students"; "Gives students a second chance"; "Made a difference in my performance"; and "A good way to pull your grade up if you want the next letter grade."

The student who would not recommend a token economy to be replicated in another class indicated that he/she were "motivated without tickets." One student chose not to answer this question.

In an open-ended question, students were also asked what other rewards they wished were offered. Extra credit was the most frequent answer, followed by points, a letter grade, skip assignments altogether. There was also an indication that the rewards offered were desired and fair for that level of education [higher education].

The last question allowed students to share any other thoughts they had about the token economy. Responses included:

- "Good system and worth implementing in other classes"
- "Love it" "Keep it"
- "It was useless for good students"
- "Need ways to redeem extra tickets at the end of the semester"

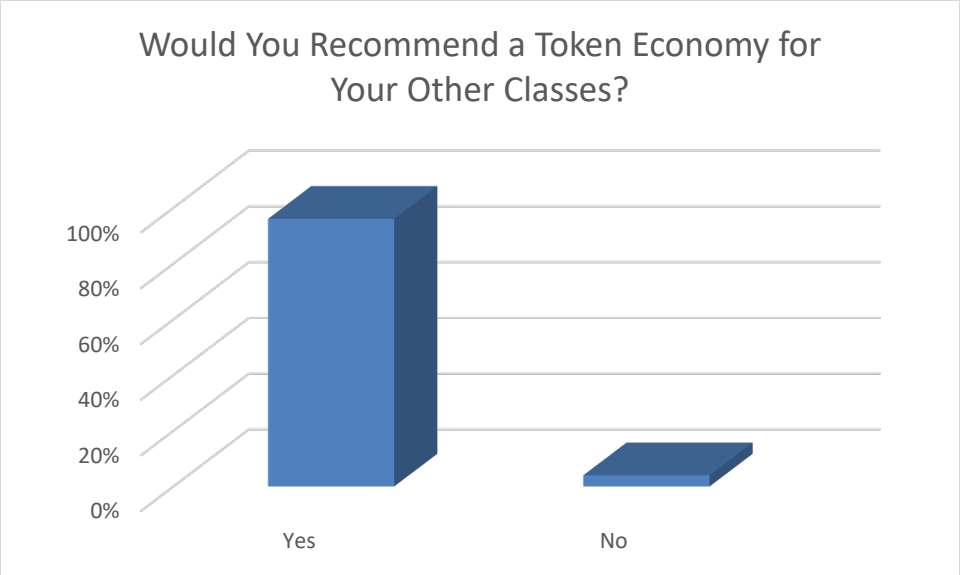

Figure 4: Recommendation of a Token Economy for Other Classes

Focus Group Themes

Four themes emerged from the focus group discussions: 1) motivation to complete course assignments, 2) equitable way to earn second chances, 3) decreased student anxiety, and 4) student/teacher relationship.

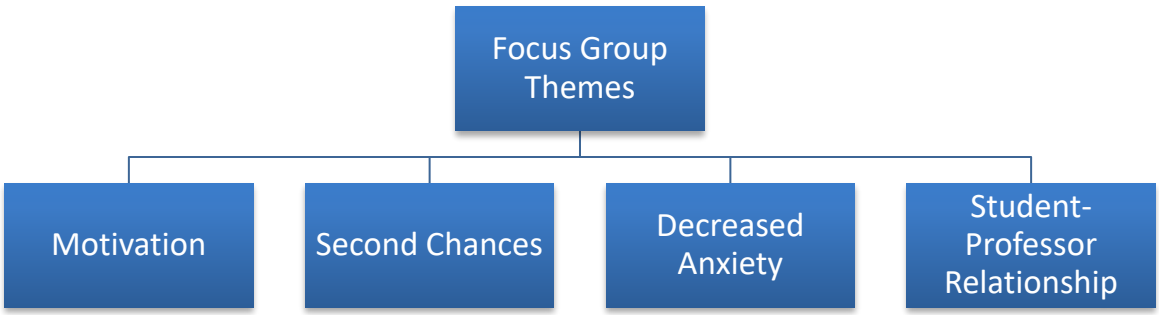

Figure 5. Focus Group Themes

Motivation. In the focus groups, many students indicated that the token economy was a motivation for them to come to class and complete course assignments. One student said:

> "It gave me incentive to go to class…you could be lying in bed and like, "Oh, man, I don't wanna get up, but hey, I can get them tickets, so, you know, maybe I should get up and go."

Other students echoed this sentiment as they described the token economy as an incentive to make the class work a priority.

> Student: "I think it's because sometimes we have a lot of stuff on our plate so I think the ticket made it so that, not to put something off until later, but the ticket made you want to make your work for this class a priority, because you knew you were getting tickets."

> Student: "Yeah, A&P wasn't always number one priority when it came to me doing homework and then them tickets just made it really number one, I wouldn't do any other homework until I finished his homework."

For some students, the simple concept of being recognized for their work was rewarding, in essence, like a pat on the back. One student said, "I was happy to be rewarded. Good job, Yasmin. Yeah." while another agreed: "It rewards you for being a good student, so, I think it was good." Many students described the tickets and the rewards as incentives or being motivational, as summed up by this student:

> Student: "I think more teachers should use the ticket system because it's an incentive to motivate you to do well and some people need that little bit of extra motivation."

Other students realized that the reward—retaking tests or making up homework—could be the difference in passing the course or obtaining the higher grade, which made the tickets of value to those students. Being able to redeem the tickets in more than one grading category was also of worth to the students, as they felt it allowed them the flexibility to improve the grading category in which they were the weakest.

> Student: "…because in case you didn't do good on a test. You just use your tickets…So, I'm gonna…come to class and get that done."

> Student: "I think the option of having to where you can use it for different things and it's not just for taking a test, I think that really helps because everybody doesn't do bad on tests or everybody doesn't do good and some people can remember to do [inaudible 00:13:19] every single day. Each person is different so having that flexibility where it's like, "I can use some for these points." That kind of helps."

For some students, the reward to make up missed assignments or re-learn information was not a valued reward, because they were doing well in the course. A student talking about her friend in the focus group said:

> "Towards the end of the semester, one of my friends, she was in the class, she has an A, so she was like, "I don't really need these tickets, I got an A in the class."

Conversely, the token economy may have had little or no motivation on those students who had no desire to come to class. One student said:

> "Yeah, I don't even think I got 45 tickets the whole year. But then that could be on me for not coming every time, or whatever but I don't know."

However, the token economy had a positive effect on motivating students who were on the cusp of passing the course or wanting a higher grade.

> Student: "It actually happened to me. I was on a borderline of a D and I used ... I think it was exam one, I did really bad on, and I used my tickets and I came in and retook it and I got like a high C or a low B on it and it jumped me to a 74, 75, so I was like in the C range."

> Student: "I had an 88 in the class, and I had some homework that I didn't do throughout the semester and I used my tickets to do them and it bumped me up to an A."

Other students, however, felt they would have been just as motivated to perform well in the class without the token economy. They cited intrinsic motivation and the desire to master the material or do well in the class as more influential factors than the token economy.

> Student: "A person is gonna be more motivated if they're motivated and if they're not, they're not. The teacher can only do so much to make you wanna come to class. It's class. It's something where you're going to have to sit down and you're going to have to learn stuff and you kind of have to have that internal motivation in yourself to do it like, "Yeah, I'm gonna get these tickets." In the end of the day, some people are like, "I'm not worried about those two tickets today." You have to have that internal motivation."

> Student: I think at the end of the day you can only motivate yourself to do your work. You can't be relying on some tickets. Because if you wanna be great at something, you're gonna put that work in that you need to do to be great.

> Student: "I just think at this point, in my opinion, because I'm a little older than some of the other students, so I think a little bit differently. I don't think you should have an incentive to do your work. Just do your work. Like, if you're dependent on tickets, like life is not gonna get easier. You can't be in your senior years, like, hey, I didn't get my tickets, if you want to graduate, you can't do that. You have to motivate yourself to do the work, so ... I mean, whoever liked it, they like it, but I was gonna do my work regardless, because I don't need an incentive. I'm paying for school, I don't need an incentive to take ... this is money out of my pocket. I'm just gonna do it because this is where I wanna be."

Several students suggested that the pre-class quiz was a more significant motivator to complete the homework that the tickets, as the quiz impacted their grade.

> Student: "Pre-class quizzes are what motivated me to go to the work."

> Student: "So if you didn't learn from this homework [inaudible 00:18:42], you weren't going to understand the quiz. That was an incentive in itself because the quizzes are participation, and our participation is huge."

Several students mentioned that even if the token economy was not the most significant factor in motivating them to complete coursework, that it was still beneficial.

> Student: "I think the ticket system really held you accountable for your grade because it's like you have so many different opportunities to bring your grade up, so if you're not coming to class, you're not earning tickets, if you're not doing your pre-class assignments, you're not doing tickets, if you're not doing your LearnSmarts, your participation is low so it really holds you accountable for your grade and if you don't take advantage of the opportunities that are available then it's your fault."

> Student: "Just because we're saying it didn't motivate us doesn't mean it's not a good thing because just like we said: If we wanted to redo something that we missed, it gave us that option. Stuff happens. Like: oh, I missed a deadline to turn in this homework at 12:00. Maybe I was at work that day, and my boss held me over time. I couldn't finish it."

Second Chances. Another substantial theme that emerged from the focus group was the opinion that this specific token economy provided fair and equitable methods for the professor to extend second chance opportunities for assignments and exams. The students cited many reasons why they struggle in classes. At times, students miss class or struggle in class due to circumstance for which it is difficult for them to document:

> Student: "Sometimes life just takes its toll and some professors aren't as understanding as others. Like if your mom is sick they're like, "Oh, I need documentation." How am I supposed to bring you documentation of my mother being sick? I think if more teachers did use the ticket system, I think a lot of students would see better grades."

> Student: "During one of the online tests, my computer messed up but I didn't have documentation, and the test was a 50. Which dropped my grade a bunch of points so, I just saved up the tickets and retook that test on a different computer."

The students also discussed how the reward of making up assignments or exams prevented them from being derailed in the course after not starting the course well or struggling mid-semester. For some students, a rough start to the semester has significant ramifications. Other students knew they had mismanaged their semester. The token economy helped those students go back to learn content they had missed and salvage their grade.

> Student: "Well, at the beginning of the semester, I didn't apply myself as much as I should have, and there was a lot going on. Now, towards the end of the semester, I was able to retake a test from the beginning of the semester using my tickets."

> Student: "If you messed up, then you could advance yourself."

Students also indicated illnesses or family emergency can disrupt a semester, and the rapid pacing of college course makes it difficult to catch back up. Using the token economy allowed those students to regain the footing they lost in the class.

> Student: "I know I was sick for a whole week with strep throat and the next week we had a test but I had missed everything that we learned for the test the week before, but I still had to take it because I was back that next week, and I did terrible on my third exam. But just retaking that one test really brought my grade up, because it wasn't good at all."

> Student: "I think it helps with our college life, if we have things that could've been not college life. You get sick or family emergencies, and you do end up missing a quiz or a test, it allows you to use those tickets to make them up."

Managing work commitments while taking classes was a reoccurring discussion in the focus groups. Students described how they worked many hours, and homework assignments could pile up at

times. The token economy allowed these students to make up work that they had missed and catch back up to with the class.

> Student: "Well, I work a lot, so a lot of times I come home from work and I just can't finish. So it's like ... and then if I have tickets, I can use them to make up the time."

> Student: "It seemed like in other classes, you'll be like, oh, I was at work late, I had to work a double shift. But like, you're a student too, but in this case, we didn't have to explain to her why."

Students feel they have a right to make up work without excuse notes due to family emergencies, work, and other life events, and approach their professors for make-up opportunities. However, the students discussed how they often observe the chance to make up work is an arbitrary decision from the professor and influenced by the professor's mood or relationship to the student, as indicated by this student:

> Student: "Because I mean, you could give another teacher an excuse, and they might be like, I'll think about it. What does that really mean? If you're in a good mood, maybe you'll let us do it for after credit?"

A consensus among the students in the focus groups indicated they felt the token economy allowed them to earn the right to make up their work regardless of the reason for missing class. The students felt the token system helped the instructor to provide equitable make-up opportunities, regardless of the student's excuse. In addition, the students valued not having to submit excuses or justify why they missed an assignment or performed poorly on a test.

> Student: "She didn't press you, like, you know how you could go to teachers and then try and tell them a situation that's not a doctor's note or a funeral, and they'll decide. But she didn't even ask for an explanation for why you didn't. If you have the tickets, then you're allowed to make it up. She didn't try and judge you when you walked into the office. Well, why did you miss it?"

The students overall agreed that earning the tickets provided a means to ask the professor for the second chance. The students noted though, that the reward was getting the chance to redo the material, not have a free pass. As one student said:

> Student: "It's not as simple as it actually sounds. You would actually have to sit and take the test all over again."

Decreased Student Anxiety. In the token economy used in this study, the rewards offered to the students included the ability to make up missed assignments or exams, or ask for "helps" on exams (similar to "Who Wants to Be a Millionaire" show lifelines). A major theme that was revealed through the focus groups was decreased student anxiety. The students felt those opportunities helped reduce anxiousness because there was a recourse if they made a mistake or struggled in the class. Phrases that the students verbalized in the focus group describing the token economy included:

- "Decreased stress"
- "Safety net"
- "Wiggle room"
- "Insurance"
- "More confidence"
- "More relaxed"
- "Less anxiety"

Even students who did not use tickets expressed that the token economy decreased their stress in the course. Students who regularly practiced the targeted behaviors often earned many tickets. Some of these students performed well on the exams and did not need to use their tickets to re-take an exam. However, knowing they had enough tickets and the opportunity to exchange them to re-take a test, should they perform poorly, decreased their anxiety.

> Student: "I didn't really use my tickets, but it still decreases stress because I could still use them, if I needed them, so that helped."

> Student: "I had a secret weapon."

One concept the students discussed was how the token economy provided some leeway for them. Students juggle many courses while navigating life responsibilities. The students viewed the rewards as space to make mistakes and manage other responsibilities.

> Student: "I think some professors are not understanding as if they weren't in our shoes before. Like we all are still 20, 21, 22, so we have different things that are thrown at us in life, so once they get to the professor stage they're like, "Ohh..", like she said, "You got to bring a note", "You miss one class you can't make up a test," like just no wiggle room. The ticket system provided wiggle room."

> Student: "If - not even if you fail or bomb a test, but say at the end of the semester you have like a 78 or 79 or an 88 or an 89 then you can say, "Well, now I'll retake it and see if I can bump my grade up just another point or two to get a different letter grade.""

A reward that the students could choose was a "helps," similar to the "Who Wants to Be a Millionaire" show lifelines during in-class tests. Students could redeem two tickets to change a multiple choice question to a 50/50 by asking the professor to cross off two incorrect questions on their individual exam. Students could also ask the professor: "Am I right?" To which the professor would respond only: "yes" or "no." Students could only redeem six "helps" per exam. As students often second-guess themselves on exam questions, many agreed this was a worthwhile reward. Forty-nine percent (n=23) of the student used a help on an exam and indicated that it helped increase their confidence during exams.

> Student: I just used [helps] for a couple of tests, to help me out with the answers, and like, it's just like, insurance, like everybody was saying, it was good to be able to kinda have a little bit of a safety net, and walk out of a test feeling a little bit more confident than when you walked in. So ... And even though there was a limit, you could only use, like, what, six tickets, or-

Student often are aware when they fail exams. One reward in this token economy was the opportunity to re-take a test for full credit. Due to the number of tickets a student could earn in the semester, they could retake a maximum of two exams, if they had earned most of the available tickets and had not redeemed many tickets on other reward options. Another reward option was to submit missed assignments for full credit. Students indicated that being able to exchange tickets for these rewards helped give hope to students who felt like they had failed an assessment.

> Student: "That [reward system] was a good thing. If [the exam] is a real car wreck, then [the student] can just save [salvage] it. Otherwise, it's just like you're screwed. Right?"

> Student: "You get to relax a little bit because if you didn't do as well as you hoped."

> Student: "Some assignments I missed, and then, I didn't stress over it too much because I was like: well, I have those tickets, so I can make them up at the end of the year. It kind of decreased the stress."

The students even used the tickets to encourage each other when they did poorly on assignments:

> Student: "We all sit on this side, so sometimes people would be like: man, I ain't do that assignment or I got a bad grade. We'd be like: don't worry. You got your tickets. Oh, yeah. We got our tickets."

Many of the rewards offered in this token economy included opportunities for students to re-take or master the course material. The students discussed how that sense of "insurance" decreased their overall anxiety regarding the course, whether or not they needed to take advantage of the opportunities.

*Student-Teacher Relationship***.** A fourth major theme that emerged from the focus group discussions was how the students perceived the token economy to improve the student-teacher relationship. The students discussed how the rewards in this token economy, which the professor designed to offer second chances, indicated that the professor cared about them and wanted them to succeed.

> Student: "Well, right from the beginning, the ticket system showed me that [the professor] was lenient with us, and just in case something happened, she had this opportunity for us. She gave us an opportunity, to be able to make up our work, or do something, like, that showed me that she actually does care. Some professors they won't have a ticket system, and if you fail then, if you don't do that test ... that's it, you just get an F."

Knowing that the system was set up to help students succeed, rather than fail, helped make the professor more approachable.

> Student: [One professor said] that they make it so you won't get an A in this course. So when you are coming into a course and you hear that and it makes the student intimidated to go talk to the professor on the side to ask for the extra help or to get to know them so they can understand their situation. Whereas, when you come in and you got a professor that's giving you unlimited opportunities, it makes it easier to walk into their office and be like,

> "I'm struggling with this, is there a way I can figure out how to do this?" or "I missed this information, is there a way I can do this?" It just makes it easier for that communication.
>
> Student: "Like some professors in some classes are designed for you to fail. Like they are. But it's hard to learn it all sometimes, so I think, systems like this, they're kind of necessary."

Some token systems can be designed so that only a few students earn the tokens—for example, the first student to raise their hand received the ticket. In the token economy in this study, all students had the same opportunity to earn the same amount of tickets. The student's perceived this distribution of tickets and the equitable ability to earn rewards as fair.

> Student: "I mean, I feel like if [the professor] gave out tickets for participation to individuals in the class, that would make it be unfair because if you didn't get a ticket, and you felt like you participated, that might make you feel like: oh, dang. She don't like me."
>
> Student: "Watch what you do because people are sensitive, and I think she made the ticket system very fair."

Using a token economy where everyone had the same chance to earn the same amount of tickets enabled the students to be less concerned with the competition and more focused on how the tickets they earned could help themselves.

> Student: "Everybody earned tickets so I wasn't worried about how many tickets she had, I was worried about how many tickets I got."

Discussion

The survey and focus group data indicated that the students have a favorable opinion of the token economy. This study confirms and supports several motivational theories applied to behaviors of students in higher education.

This project determined that several factors motivated the students to complete the out-of-class assignments in the flipped classroom. Sixty (60%) of students indicated that they would have completed the assignments for no homework or points, although this does not collaborate with instructors' experiences of having difficulty getting students to complete pre-class assignments without a grade (Kim et al., 2014; Long et al., 2017; O'Flaherty & Phillips, 2015). Seventy-seven percent (77%) of the students responded that the daily quiz was impetus alone to complete the class assignments, and 85% of the students were motivated by the rewards offered. Earning tokens was an incentive for students to prioritize the homework in this course or come to class when they did not feel like it. While some students expressed that they would have succeeded in the course without the ticket system, other students were encouraged by earning the rewards.

The students who were most motivated by the token economy where students in the D, C, and B grade ranges. Students who had a high intrinsic motivation discussed how they performed well in other classes without token systems or had strong reasons to succeed in the course and did not need the motivation. Other students who rarely came to class and had lower GPAs were not motivated to perform the targeted behaviors necessary to earn the tokens. However, students in the middle grade range discussed how earning the tokens provided them with opportunities to bump their grade up if they were on the cusp of a higher grade, found the token system to be a proverbial

"pat on the back" for displaying the studies activities, and claimed the rewards offered a sense of security.

These findings support both Komarraju et al.'s (2009) finding that students with higher intrinsic motivation do not need external rewards to succeed and Lin et al.'s (2003) work which suggests that even highly intrinsically motivated students can be further encouraged by external rewards. From the focus group discussion, there was no evidence that the extrinsic rewards decreased intrinsic motivation, contrary to concerns from Deci (1971) and that even high intrinsically motivated students valued the tickets as "insurance."

Some students demonstrated an amotivated state as they were not intrinsically motivated to perform well in the course nor were motivated by the token economy or daily quizzes, agreeing with literature that indicates that not all students are motivated with external rewards (Lin et al., 2003). As instructors are increasing held accountable for pass rates in their courses, more research may be needed to find ways to identify and assist amotivated students in a higher education setting.

Through the focus groups, the students discussed how the novel rewards of being able to make up exams or assignments helped them feel as though the instructor wanted them to succeed. They also described feeling less judged for missing assignments and that they had the autonomy to decide when they needed to prioritize non-school responsibilities (e.g. jobs, family). Zuckerman (1978) suggests that this autonomy is a foundational construct for self-determination theory.

The ability for the instructor to provide a fair system to permit make up work was widely discussed by the students in our study, aligning with Keller's (2009) model of the ARCS motivational theory, which suggests perceived fairness is necessary for a student to feel satisfied and motivated. Reward systems, or even participation policies, based on subjective measures may lose their value if the students perceive they are not being fairly rewarded for their behaviors.

Token economies reported in the literature have previously only used extra credit for the reward (Boniecki & Moore, 2003; Junn, 1994; Nelson, 2003). In this study, the rewards offered allowed students opportunities to redo assignments or exams on which they had performed poorly. A majority of students in both the write-in section and focus groups expressed that they wished extra credit was offered as a reward, corresponding with studies by McClurg and Morris (2014), Halawah (2011), and Christobel (1992). However, 85% of the students in our study *agreed or strongly agreed* that the rewards offered were enough motivation to work for the tokens. The option specifically to re-take an exam in which they had initially performed poorly provided students with options to master the course material. Mastering content helps students improve self-efficacy (van Dinther et al., 2011) and increase their foundational content knowledge (Bandura, 1989) . While extra credit is strongly desired by students and may be an effective reward with short-term impact, our study indicates that incentives that have a longer lasting impact on self-efficacy and foundational knowledge (van Dinther et al., 2011) were motivational enough to encourage students to display the targeted classroom behaviors.

An unanticipated effect of the novel rewards in this token economy was decreased student anxiety. Academic pressure is one of the leading factors of anxiety in college students (Beiter et al., 2015) as students report pressures of making good grades, time management, test-taking, and volume of material to learn (Kumaraswamy, 2013; Misra & Mckean, 2000). Students used terms such as "insurance," "safety net," and "decreased stress" when describing the token economy. One student suggested that in other classes, failing one exam meant that there was little chance for success in the course, so the knowledge that he could earn the right to retake an exam was reassuring. Other students said that being able to ask for the "helps" on the exam gave them more confidence and less anxiety when leaving an exam. The students felt encouraged and empowered in this token economy, which has been demonstrated by the literate to correlate with higher student satisfaction and achievement (Black & Deci, 2000).

Limitations

The results from this study should be viewed within the framework of its limitation. First, the data for this study came from two classrooms taught by the same instructor. While the results of this study cannot be generalized to other students, the data indicates that this pedagogical approach could be used in other classrooms and could be easily adaptable by instructors in other disciplines with difference sized classrooms. The focus group discussions also explore the concept that the teacher's personality may be an influencing factor to the atmosphere of the classrooms.

Second, both the survey and focus group relied on self-reported student data. Anxiety levels, grade improvements, motivation levels, and engagement levels were not directly measured. However, the open-ended nature of the questions allowed students to discuss aspects of the token economy that have not yet been reported in the literature.

Further Research

Further research can investigate the impacts of a token economy on the instructor's overall pedagogical approach. Perspective and analysis of the instructors' point of view would be the next step. Additional research can investigate the effect of the rewards on the students' class grades and mastery of content. Further research can investigate the effects of the token economy on direct measures of student anxiety, motivation, and engagement.

Conclusions

In summary, this study sought to ascertain students' perception of the implementation of a token economy in a flipped classroom. Specifically, the students were asked if the rewards offered were motivation to complete out-of-class assignments, which are critical in for the facilitation of flipped classrooms. The rewards, which were opportunities to make up missed assignments or re-take exams, were novel as all previous research on token economies in higher education has used extra credit as the reward. This study explores the students' responses within the framework of several motivational theories as they related to undergraduate students. An engaging, student-centered classroom environment that provides students with opportunities to increase self-efficacy and decrease anxiety can motivate students to perform targeted classroom behaviors.

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Appendices

Appendix 1: Token Economy Pre-Focus Group Survey.

The purpose of this study is to explore your perceptions of the Positive Reward System (Ticket System) used in your course during the Spring 2017 semester. This survey will take approximately five minutes to complete. Thank you for your participation! Please fill out the following information.

Today's Date: _____ Age: _____ Gender: _____
Course: ___MVSC 201 ____MVSC 202
Class in School (Circle one): Freshman Sophomore Junior Senior
Race/ethnicity: (Check all that apply)
____African American/Black
____Caucasian/White
____Asian/Pacific Islander
____Latino/ Hispanic
____Native American
____Multiracial
Your Expected Class Grade: _A __B __C __D __Not pass
Your Current GPA: _1.9 or lower __2.0-2.4 __2.5-2.9 __3.0-3.4 __3.5 and higher

Your course instructor of the Spring 2017 Human Anatomy and Physiology I and II (MVSC 201 and 202) courses utilized a Positive Reward System ("Ticket System") in your course. Please answer the following questions based on YOUR perception of this teaching strategy.

Did you redeem tickets that you earned this semester?
__Yes __No

Did you redeem tickets that you earned to make up missed assignments?
__Yes __No

Did you redeem tickets you earned to re-take a test on which you initially performed poorly?
__Yes __No

Did you redeem tickets you earned to take a test that you missed?
__Yes __No

Did you redeem tickets to use for an in-class test "help" (50/50 multiple choice, "Am I Right"? or a hint) on a test?
__Yes __No

I would have completed my pre-class assignment without receiving participation points or tickets.
Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

Earning tickets motivated me to complete my pre-class assignments.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

I would have been more motivated to complete my pre-class assignment for participation points instead of tickets with the opportunity to redeem them for making up exams or assignments.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

The rewards (making up missed assignment or tests and in-class test "helps") motivated me to earn tickets.

Strongly Disagree Disagree Neither Agree nor Disagree Agree Strongly Agree

Open Ended Questions:

Do you think the Ticket System is worth implementing in other courses? Why or why not?

Besides making up assignments or exams, or "helps" on a test, what other rewards would motivate you to earn tickets?

How can instructors motivate students to complete out of class assignments?

Do you have any additional thoughts or suggestions about the Ticket System?

Appendix 2: Focus Group Guided Questions.

Focus Group Interview Investigating Positive Reward System-Guided Questions

These guidelines contain several talking points that are related to the research questions which are being explored in this study. The focus group facilitator will use these talking points during the data collection to generate discussion.

What do you think about the Ticket System Dr. Gomez used?

Were you motivated to earn tickets?

Were you motivated to earn tickets in order to redeem them to make up assignments or re-take or make up exams? What else would have motivated to you to earn tickets?

Did redeeming tickets to make up assignments or re-take exams impact anyone's grade? If so, how?

Did anyone not redeem tickets? Why? What do you wish you could have redeemed the tickets for?

Is the Ticket System worth using to help motivate students to complete assignments? If no, what would help students be motivated to complete work outside of class?

Do you have any other thoughts about the Ticket system?

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