# Dojo Tokens: The Effects of a Token Economy on Undergraduate Student Behaviour and Performance

**Jane Lee Saber**

**Purpose**: This purpose of this study is to investigate the effects of implementing a web-based token economy, ClassDojo, on the academic behaviour and performance of undergraduate Sales students at a large AACSB accredited university.

**Design**: Two experiments were used to investigate this issue. Consistent with the extant token economy literature which uses within-subjects experimental designs, Experiment One identified suitable target academic behaviours / rewards and then compared levels of student target academic behaviour before and after the implementation of the procedure for students in a single Sales class (n=72). The second experiment specifically compared levels of student performance as well as the variables considered in Experiment One for two separate classes; a control (n=76) and a ClassDojo section (n=71).

**Results**: Results from Experiment One showed that students had significantly higher levels of the selected academic target behaviours as well as higher self-reported effort, interest and enjoyment after the token economy procedure was utilized. Results from the second experiment showed that students in the ClassDojo condition had significantly higher levels of academic performance as well as higher levels of reinforced behaviours and self-reported effort, interest and enjoyment.

**Value to Marketing Educators**: Since the implementation of the ClassDojo token economy system is a simple seven step process which can result in significant improvements in both academic performance and levels of target academic behaviour for students, the ClassDojo system may be a useful class management tool to utilize in undergraduate marketing classes.

*Keywords*: token economy, academic performance and behaviour

**Jane Lee Saber B. Comm., LLB., LLM., Ph.D**, Ted Rogers School of Management, Ryerson University, Toronto, ONT, Canada.

## INTRODUCTION AND LITERATURE REVIEW

One of the fundamental pedagogical questions is how to increase student academic behaviours that tend to improve student performance (Keller, 2010). Numerous theories and models have addressed this issue and include topics such as motivation (Deci, 1971; Lepper, Greene & Nesbitt, 1973), personality, learning styles and trait theory (Cattell & Cattell 1995; Kolb & Kolb, 2005), emotion / affect theories (Martin & Briggs, 1986; Tennyson, 1992), cognitive systems and others (Keller, 2010; Reigeluth, 1999). Despite the extensive and varied solutions that this literature provides, none seem to be completely effective in increasing the levels of positive academic behaviour of university students. Thus, the question remains; are there any other simple but effective pedagogical techniques that could increase positive academic behaviours and potentially generate improved academic performance for students? Based on the results of this research, the use of the token economy in a marketing undergraduate classroom may be helpful in achieving this goal.

The token economy is a behavioural management technique which has been successfully used in a wide variety of settings (Bandura, 1969; Kazdin, 1977; Litow & Pumroy, 1972; Kazdin 1982; Boniecki & Moore, 2003). This operant conditioning system is primarily based on the Law of Effects which postulates that frequencies of target behaviors and associated neural pathways are likely to become greater when positively reinforced and similarly reduced when negatively reinforced (Thorndike, 1907; Skinner 1953). Positive reinforcements can include the administration of "something pleasant" (such as food, coins, perks, money or other benefits) or the removal of "something unpleasant" (such as a fines or fees payable, extra assignments or work or even physical punishment). Negative reinforcements can be the administration of "something unpleasant" or the removal of "something pleasant" (Hirst, Dozier & Payne, 2016; Keller, 2010). This study will be limited to the use of positive reinforcements (rewards) because the extant literature demonstrates that use of negative reinforcements reduces or eliminates potential learning / performance improvements due to negative emotions interfering with cognitive motivation and abilities (Skinner, 1953; Kazdin 1982; Bandura, 1969; Keller, 2010; Pintrick & Schunk, 2002).

Since operant conditioning or 'shaping' uses extrinsic reinforcers to motivate behavioural changes, an important aspect of the successful use of this system is to identify reinforcers that are valued highly enough by the participants to modify their behaviours to acquire these rewards (Karraker, 1977; Boniecki & Moore, 2003; Kazdin & Geesey, 1980) but not so valuable as to undermine intrinsic motivation (Lepper, Green & Nesbitt, 1973; Deci 1971). To achieve the maximal utility of the system, the literature therefore recommends that participants identify and appraise the reward values themselves without any evaluative contamination from external parties including the administrators of the system (Robacker, Rivera & Warren, 2016; Hackenberg 2003; Kazdin 1982; Dozier & Payne, 2016). Other factors that can also contribute to optimal efficacy of the token economy system include frequent reinforcement schedules, a relatively long duration of use (compared to the total time available for the behaviour management; O'Leary & Drabman,1971) and having the reinforcement provide both behaviour specific and generalized whole-system performance feedback to participants (e.g. you behaved appropriately (behavioural feedback) – you acquired a reward – you are a good student (whole-system feedback); Kazdin 1982; Kazdin & Bootzin, 1972).

The token economy has not only been shown to significantly enhance target behaviour levels but also has been shown to improve learning, study behaviour, academic achievement and attendance (Hirst, Dozier & Payne, 2016; Robacker, Rivera & Warren, 2016; Kazdin, 1982; O'Leary and Drabman, 1971). Potential problems in token economy systems can include staff errors (improper training /implementation) and subject resistance (Kazdin, 1982) but because of the design and procedures used in this study, these issues were not relevant here: there were no staff involved in this process and students had the possibility of opting out of the token economy if they wanted to.

With respect to the operational implementation of this technique, tokens (which can take a variety of forms including plastic chips, coins, stars, or electronic points) are given to participants when they perform the selected target behaviour or behaviours. Once enough tokens have been accumulated, the tokens may be traded for the various privileges or rewards that have been pre-specified by the participants as previously discussed (Kazdin & Bootzin, 1972). Besides communicating feedback, tokens also remind participants which target behaviours should be repeated for future reward acquisitions (Hackenberg, 2009; Litow & Pumroy, 1972). Ideally, after sufficient time and reinforcement, target behaviours will become habitual and the need for reinforcements will be extinguished (Law of Association; Skinner, 1953; Hackenberg, 2009;). This is one of the principal goals of token operant conditioning systems in most cases (Kazdin & Bootzin, 1972).

Although token economies have been extensively used in lower-level academic settings, this technique has not been commonly employed in more advanced academic settings such as universities (Robacker, Rivera & Warren, 2016). This lack of adoption may be because university students are perceived as more intrinsically motivated, skilled in academic self-monitoring (Young, 2005) and goal setting / goal achievement and are already knowledgeable about the consequences of their academic behaviours (Keller, 2010). Despite these perceptions however, the same instructor complaints about marketing students can be heard, year after year, class after class: "the students don't come prepared for class", "they don't participate in class", "they don't read the materials until right before the exams", "they don't come to office hours", "they just play with their phones", "they don't come to class" and many others. It appears that there is still room for improvement in a variety of student behaviours in marketing classes.

These student behavioural changes may at least be partially achieved through the use of the token economy. In particular, the potential utility of the token economy for improving student behaviours was discovered when the instructor noticed that when she gave out points for class participation in her undergraduate marketing classes, participation rates and numbers of students participating increased dramatically. Unfortunately, the instructor also noticed that with some rare exceptions, once all the possible points for class participation were accumulated by an individual student, that particular student would seldom participate again. Could the system be modified to reinforce multiple target behaviours contemporaneously? Could the system be designed to decrease or prevent the reduction / extinguishment of target behaviours? How would the system be managed? What behaviours should be reinforced and what rewards would be suitable? The instructor reviewed the token economy literature and located a free, easy-to-use, computer/tablet/phone compatible web-based class management system, *ClassDojo* (classdojo.com), into which she could import class lists, specify target behaviours, allocate tokens and facilitate students exchanging their tokens for specified academic rewards. The token economy technique was tested in two experiments; a within-subjects design for one Sales class and a between-subjects design using two separate Sales classes as described below.

## EXPERIMENT ONE: WITHIN-SUBJECTS DESIGN (N=72)

In the first stage of this study, the instructor had informal discussions with her colleagues to identify which student behaviours they felt should be reinforced to enhance student academic performance. Second, she asked students in one Sales class (n=72) to self-identify behaviours that they perceived led to academic success. Third, she consulted the extant literature to determine what types of student behaviours typically contributed to enhanced student performance in an academic setting classroom (Hay, Peltier & Drago, 2004; Brophy 1983; Keller, 2010). As a result of these processes, there were two main types of behaviours that were selected for inclusion in this study. First student experiential /active learning behaviours

including individual class participation, individual class participation using external sources and experiential in-class groupwork participation were selected because of their well-researched positive impact on student performance optimization through the mechanisms of deep / active cognition and learning (Chi, 2009; Carini et al., 2006; Catterall, Maclaran & Stevens 2002; Goby & Lewis, 2000; Kember & Leung 2005; Pelltier, Hay & Drago 2005). Next, weekly individual written submissions which summarized and / or reflected on the content of each of the classes were also chosen because through the mechanisms of regularly spaced rehearsal and repetition (Bacon and Stewart 2006; McIntyre and Munson, 2009) student learning and retention can also be optimized (Woodward, Bjork & Jongeward 1973; Clarck, Lansford & Dallenbach 1958; Darley & Glass 1975; Rock 1957; Ebbinghaus 1885/1913; Warburton 2003; Yonelinas 2002; Hintzman 2004; Dobbins, Kroll & Yonelinas, 2004). A total of five behaviours were selected for reinforcement in this research (Table B).

In the next stage of the process, as recommended by the extant token economy literature (Karraker, 1977; Kazdin & Geesey, 1980) the participants selected and evaluated the positive reinforcers (rewards) for their behaviors. Students submitted academic reward suggestions and then rated them from 0-100 where 0 represented a very undesirable reward and 100 represented an optimal reward. Rewards that were rated between 65-90 were selected for use in this research in order to ensure that the rewards were sufficiently motivating for most students but were not so substantial as to undermine existing student intrinsic motivation as previously discussed (deCharms, 1976; Keller, 2010).

Interestingly, with the exception of the reward which consisted of the deletion of two multiple choice exam questions in the token economy condition, (which was offset by adding two marks for the multiple choice results for the control condition students in Experiment Two), all of the rewards selected were already available either during regular office hours (assignment / exam or class discussions or career advice) or were part of the usual operating procedures of the instructor (e.g. exam hints). Essentially, every student in each experimental condition had fundamentally equal access to all of these academic rewards. Because of this equivalency, changes in student performance demonstrated in this research could be more likely attributable to behavioural increases rather than to the operation of the rewards themselves. The only real differences in the classes with respect to the academic rewards was framing: students in one condition perceived the Table B items as rewards and in the other condition, as part of the regular class processes (Kahneman & Taversky, 1983; Druckman, 2001; Lewin & Gaeth, 1988). Despite this, because the extant literature recommends against administrator interference in the reward identification and valuation procedure, these rewards were selected for inclusion in the research (Table B).

After the target behaviours and rewards were identified, in weeks two to six of the course, students were informed which target academic behaviours would be documented and baseline token allocations were recorded. There were no rewards for these behaviours during this time period. Next, in weeks seven to eleven, after providing the students an information sheet and discussing the ClassDojo token economy (Appendix A), the instructor again allocated tokens for the target behaviours, recorded the allocations into the ClassDojo web based system and allowed students to trade their accumulated tokens for the rewards. All token allocations for the target student behaviours were assigned by the instructor.

The posted menu of academic rewards changed regularly to generate student interest. In addition, selected rewards were occasionally discounted in terms of how many tokens were needed to acquire that reward, (e.g. rewards went on 'sale'), if the instructor felt that a particular reward was increasingly important to ensure student success in upcoming grade assessments. These steps were also employed in order to get students to check the course website regularly (Berlyne, 1954b). Students used name cards to facilitate accurate token allocation.

After the implementation of the token economy in the second half of the semester, the instructor received a surprising number of unsolicited positive student comments about the technique: "it made me check the website regularly", "made me think about the things I was doing in class", "I felt like I finally was getting recognition for all my hard work that you (the instructor) didn't know about", "I enjoyed it", "I worked harder because I wanted the tokens and the rewards", "I really liked when rewards went on sale: I always was checking to see when a sale would happen" and many comparable comments. Only one student said he thought the whole system was "a waste of time and stupid", however some subject resistance to the system was expected given the previous research (Kazdin, 1982). At the end of the course, the instructor used a pretested, anonymous questionnaire to ask students about the effects of the token economy on their levels of effort, interest, enjoyment and propensity to keep up-to-date with class materials as well as whether or not they would like to see the token economy used in other classes (Appendix B). The main research question addressed in Experiment One was to determine what effect the implementation of a token economy process would have on target student behaviours in one marketing class.

## RESULTS: EXPERIMENT ONE

This experiment was completed with seventy-two undergraduate students in one Sales course at a large AACSB accredited university. No students opted out of the procedure. The students were 58 % female, 66 % third year students and 52 % were business majors. After checking for data normalcy and using MANOVA procedures to ascertain that the student demographics did not have a significant impact on the results below, a series of paired sample t-tests was completed for the behavioural data which was collected from the same

students on two separate occasions: the week immediately after the first examination and the week immediately after the second examination (5 class weeks per data period). The results of this analysis (Table C) show that, except for the in-class group experiential activity behaviours, all the target behaviours were significantly higher in the token economy condition.

More specifically, class participation; $t_{(1,71)} = 23.508$, p=.000 and class participation using outside sources; $t_{(1,71)} = 10.174$, p=.000 were both considerably higher in the last five weeks of the course when ClassDojo was used as compared to the first five weeks without the token economy system. Thus, under the ClassDojo process, not only did students seem to pay more attention in class so that they could make valuable and appropriate contributions to the subject matter discussions, they also used extra effort to search for outside sources relating to the class topics being covered. And although the data collected in this experiment was not sufficient to determine if these target behaviours had a positive impact on student performance, since these results imply increased active / experiential participation and effort (which tends to imply deeper processing of information; Goby & Lewis, 2000; Kember & Leung 2005; Pelltier, Hay & Drago 2005) there is some potential that these behavioural increases could enhance student performance as well.

The lack of significant results for the in-class group experiential activities results may have occurred because peer group pressure encouraged vigorous and full participation in these exercises (Durham et al., 2000). Further, because the composition of class groups was the same as the groups for the major assignment, students may have wanted to maintain a good impression with their peers leading up to the assignment. Finally, there were relatively high levels of instructor observation and instructor-group discussions during these activities and this may have also impacted these results. The underlying causes for the lack of significant results for group experiential activities may be an interesting area of future research.

In terms of the weekly class summaries and class reflection submissions, both results were significantly higher for the last five-week period of the semester compared to the first five weeks: $t_{(1, 71)} = 12.122$, p=.000; $t_{(1, 71)} = 18.487$, p=.000. As discussed previously, since the literature widely supports the notion that regularly spaced repetition and rehearsal of class materials significantly improves student academic performance, it is possible that these behavioural changes also increased student performance. This proposition, however, is specifically tested in Experiment Two.

With respect to the survey questions, once the token economy condition was applied, 84.7 % of students reported using somewhat more or much more effort in the class (27.8%; 56.9%; μ= 1.6), 75% reported somewhat more or much more interest in the course (34.7%; 40.3%; μ= 1.88), 65.3% enjoyed the class somewhat more or much more (41.1%; 23.6%; μ= 2.26 ), 62.5% felt the system helped them somewhat more or much more keep up- to-date with the coursework (25%; 37.5%; μ= 2.29) and 70.8% of students would somewhat more or very much more like to see other courses adopt the token economy system (19.4%; 51.4%; μ= 1.94). Previous research has shown that increases in these factors tend to contribute to academic motivation and achievement (see Keller, 2010 for a review) thus these results may also lend some support to the adoption of this pedagogical technique. Finally, the open-ended question results mirrored the unsolicited verbal results described above in both content and frequency. Although the results of this experiment do provide support for the use of the ClassDojo token system as an effective technique to increase target behaviours and self-reported student factors, the actual effects of this technique on student performance were specifically tested in Experiment Two below.

## EXPERIMENT TWO: BETWEEN SUBJECTS DESIGN: N=76, N=71

Experiment Two participants consisted of students in two undergraduate Sales classes taught by the same instructor at a large AACSB University: a control class (n=76) and a ClassDojo class (n=71). The condition associated with each class (e.g. the control condition versus ClassDojo condition) was randomly selected by the instructor prior to the start of the semester. In the first class of the ClassDojo condition, the token economy system was explained in a one hour lecture and the list of the target behaviours and rewards were given to the students. The instructor posted the ClassDojo instructions found in Appendix A on the course website and told the students to read that document. The instructor also told the students that token allocation and the reward system were going to be implemented immediately and that was the last time that she spoke about the token economy to the class. Students were also informed that they could opt out of the procedure however none chose to do so. All token allocations for student target behaviours were assigned by the instructor for this experiment as well.

In the first class of the control condition, the instructor similarly gave a one hour lecture about the benefits of positive academic behaviours and also provided the list of the target behaviours to students. This was the last time the instructor spoke about the target behaviours in the class. Without the students' knowledge, tokens allocations for target behaviours were also implemented immediately but students were neither informed about this process nor were they made aware of the purpose or existence of the research. In both conditions, student name cards facilitated the allocation of the tokens.

The academic performances of the control and the ClassDojo classes were evaluated using two long answer/ multiple choice examinations (30% and 40%) as well as a substantial group project worth 30%. The examinations and project were identical for both classes and were graded by the same very experienced teaching assistant who was unaware of the nature of

the experiment. Students in the classes were not significantly different from each other in terms of gender, year of study or major and the teaching evaluations did not vary significantly between the sections. This experiment specifically investigated the differences in student behaviour, performance and other factors under conditions of either complete exposure to the token economy system and processes or complete non-exposure. For Experiment Two, the main research question was to determine what effect the token economy system had on student performance.

## RESULTS: EXPERIMENT TWO

After examining the data for normalcy and employing MANOVA procedures which showed that student demographic data did not have a significant impact on the results below, a series of independent sample t-tests was completed (Table D). The ClassDojo condition class performed significantly better on both examinations (Examination One; $t_{(2,145)} = -2.006$, p=.047; Examination Two; $t_{(2,145)} = -2.366$, p=.019) and the group project ($t_{(2,145)} = -2.033$, p=.044). As noted previously, in order to account for the two multiple choice questions that were selected for omission by every single ClassDojo student as a reward in both examinations, two extra marks were provided to the control condition students on their examination grades as well.

ClassDojo students also showed significantly higher levels of class participation; $t_{(2,145)} = -2.810$, p=.006, class participation with external sources; $t_{(2,145)} = -12.502$, p=.000, personal reflection; $t_{(2,145)} = -20.631$, p=.000 and study note preparation; $t_{(2,145)} = -25.292$, p=.000 but again there was no significant effect for the experiential group participation exercises; $t_{(2,145)} = -.405$, p=.686. ClassDojo student results were also significantly higher with respect to the amount of self-reported effort; $t_{(2,145)} = -2.602$, p=.010, interest; $t_{(2,145)} = -2.564$, p=.011 and enjoyment; $t_{(2,145)} = -3.239$, p=.001 in the class. The data also showed that the ClassDojo students felt that the token economy format kept them up-to-date more effectively than that used in other classes; $t_{(2,145)} = -2.775$, p=.006 and they also indicated that they would prefer the same class format for future classes more than the control students; $t_{(2,145)} = -5.918$, p=.000.

Finally, with respect to the qualitative data, although student comments for both classes were generally favorable there were significantly more positive comments from ClassDojo students. Many of the ClassDojo students indicated that they enjoyed the technique and that it helped them learn materials that could have otherwise be boring or too voluminous. A few ClassDojo students indicated that the token economy made the class feel like it was a game, which they said they enjoyed and felt improved their interest in the class content, consistent with the results found in the gamification literatures (Kapp, 2012). Some commented that the process reminded them to keep up with the class materials on a weekly basis. And so on. For the most part, students appeared well satisfied with the token economy class format.

As a whole, the results from Experiment Two tend to support the proposition that the ClassDojo economy process has a positive impact on student performance, target behaviours and other self-reported student measures. It is likely that the improved performance results occurred principally because of increased target behaviours because as noted previously, the literature has shown that both increased active learning (Goby & Lewis, 2000; Kember & Leung 2005; Pelltier, Hay & Drago 2005) and spaced repetition (Darley & Glass 1975; Warburton 2003; Yonelinas 2002; Hintzman 2004) tend to improve academic performance. Unfortunately, the precise causal mechanism which led to the improved student performance in the ClassDojo group cannot be specifically identified using the results obtained in this research, in that it is not clear whether it was the operation of the tokens, the rewards, the feedback from the token system (alone or in some combination) or some other factors that contributed to these results. This issue is an interesting area of future research which should be pursued. Despite this possible limitation, the experimental outcomes generated in this research tend to provided support the ClassDojo token economy system as a method to potentially increase selected target behaviours and student performance for marketing students in the classroom.

## DISCUSSION AND CONCLUSIONS

The results from Experiment One and Two offer some support for the adoption of token economy systems for undergraduate marketing classes. In Experiment One, in the five-week period after the token economy system was implemented, positively reinforced target behaviours which included experiential activities and reflection / content summary submissions tended to increase. In particular, the number of tokens distributed for class participation and class participation utilizing outside resources significantly increased by an average of approximately 7.92 and 4.5 tokens respectively per student. Because the literature has shown that these activities tend to lead to improved academic performance, this result provided some support for the use of the ClassDojo system. Next, the number of tokens distributed for submission of personal reflection summaries and study notes also significantly increased by an average of approximately 10.76 and 6.94 tokens respectively per student in the five-week period post-implementation. Since spaced rehearsal and repetition have also been shown to increase student performance, this result also provides addition support for this technique. Finally, in the five weeks in which the token economy method was used, the student self-reported measures of effort, interest, enjoyment, method usefulness and interest in future use of this system also increased significantly. Although these results tend to support the adoption of ClassDojo, because the experiment did not specifically test for differences in student performance once the ClassDojo

system was implemented, Experiment Two was employed.

Experiment Two compared target behaviour levels and self-report measures under token and non-token economy conditions similar to Experiment One but instead time compared the results of two separate classes: a control group which was not exposed to the token economy system and a class in which the ClassDojo system was implemented at the beginning of the semester. Because of this experimental design, direct comparisons of student performance based on two examinations and a group project was possible. In terms of the results for this experiment, not only were the target behaviour levels and student self-reported measures significantly higher in the ClassDojo condition but student performance on each of the two examinations and the group projects were also significantly better; the respective mean differences were 4.129%, 4.55% and 7.29% higher in the token economy condition. Thus, these results tend to offer additional support for the potential efficacy of the token economy process in improving student performance.

Taken together, the results from Experiments One and Two show that the token economy technique generally tends to increase reinforced target behaviors in students and may also lead to improved examination and group grade performance as well. Based on these experimental results, the token economy technique may be a useful technique to consider for use in undergraduate marketing classes.

## LIMITATIONS

Despite the encouraging behavioural and performance results that have been generated in this research, there are a number of limitations and areas of future research that should be pursued to establish additional support for the token economy technique. First, if the behaviours selected for reinforcement were different, (in that they were more or less related to student performance than those utilized here), performance results derived the token economy condition could similarly be different. As an extreme example, if the target behaviour selected for reinforcement was 'using pencils rather than pens to take class notes' increases in this target behaviour would likely have no impact on student performance, therefore the token economy process would appear to have no efficacy in this case. Similarly, if the rewards or valuations (token costs) of the rewards selected for the token economy were also extreme, (e.g. a reward which gave token economy students a 50% bonus for their examination grades acquired for a miniscule token cost) the effects of the token economy could also be either over-exaggerated or conversely, under different conditions, under-reported. Although both of these examples are highly unrealistic in any teaching scenario, they do serve to highlight the importance of identifying appropriate target behaviours, rewards and token values when using this method.

Second, given the relatively short reinforcement duration in both experiments, it is unknown if there is a constant linear relationship between the quantity of reinforcements used and changes in behaviour and performance or if there is a curvilinear or other type of relationship between reinforcements and the behaviours / performance. Is there an absolute maximum in this relationship where no additional reinforcements provide additional behavioural / performance effects? This issue could be addressed in future research as well.

Third, as indicated in Experiment Two results, these data do not identify which part or parts of the token economy process contribute to the improvements in behaviour and performance, nor in what amounts. Specifically, is it the target behaviours, the tokens, the number of tokens allocated for the behaviours, the rewards, the reward costs, the entire token economy process in its entirety or some combination of these that produces the effects on behaviour and performance? Research to isolate which of these factors contribute to the behavioural and performance effects found here should be completed in the future.

Fourth, although the literature generally suggests that negative reinforcement in an educational context reduces the total potential for cognition and learning, the literature does not indicate if that finding holds true for undergraduate university students and this issue can be explored in additional research.

Fifth, since the instructor, who was aware of the experimental conditions, allocated the tokens for the student target behaviours herself, this factor may have had contributed to the significance differences for the specific student behaviours considered in this research. This method may also not be appropriate for extremely large class sizes (because of the complexity of token allocation and administration for large numbers of students) or different types of students, class materials, instructors, teaching styles and performance evaluation types. Sixth, had the randomly assigned class conditions been reversed for Experiment Two, (e.g. the control condition was given the ClassDojo technique and vice versa), the results might have varied as well.

Finally, it is unknown whether long term or multi-class use of the token economy system would extinguish the potential benefits of this system or instead, cause selected target behaviours to become habits, as predicted by the Law of Association. This also may be an opportunity for future research with respect to the token economy systems. Despite these limitations, however, because the ClassDojo token economy appears to have the potential to enhance student behaviours and performance and can be relatively easily integrated into a variety of marketing classes, including both labs and lectures, using the following implementation strategy, this technique may be useful in an undergraduate marketing class.

## CLASSDOJO IMPLEMENTATION

If an instructor wishes to adopt the ClassDojo technique, there are seven general steps that should be followed for the proper implementation of this method as follows.

1. Define the target behaviours that you wish to reinforce and decide on related token values.
2. Define the academic rewards and related token costs.
3. Input the class list into ClassDojo.
4. Send out ClassDojo information sheets, discuss and set up redemption times and procedures on your course website.
5. Change the menu and timing of rewards periodically.
6. Have students email their reward requests to you and then update the ClassDojo student token record to reflect the reward acquisition costs.
7. Fulfill the rewards and determine if satisfactory levels of behavioural changes are occurring.

First, the instructor should decide which target behaviours would be most directly relevant and impactful for the instructional goals that he or she intends for the class. In some cases, the instructor may wish to reinforce 'courtesy' behaviours, such as not coming to class late, no texting during class, no extraneous talking during class, or other similar behaviours, if these are the behaviours that appear most useful to address. Alternatively, the instructor may wish to reinforce more substantive behaviours such as experiential participation, spaced studying (versus cramming), completing practice questions either before or during the class session and so on. Again, the behaviours chosen for reinforcement depend on the class management and instructional priorities of the teacher as well as the already existing behaviours of the students.

Next, the academic token values, the rewards and the reward valuations will also need to be identified and defined. Although ideally this information will be gathered by input from colleagues, students and the literature as demonstrated in this research, if the instructor is confident in the token and reward valuations that he or she has previously defined, this step may be truncated. Behaviours, token values and reward values may be changed in an iterative manner throughout the entire token economy process so adjustments can be made if results are not satisfactory at any point.

After the token and reward definition and valuation stage, the class list is input into the ClassDojo web system and the token economy process can be introduced to the class. Either verbal or written descriptions of the system should be provided to the students at the start of the process to ensure immediate participation in this token economy process. As previously noted, the possibility of opting out of the process should be given to students, particularly at the university level of classes to avoid subject resistance.

Throughout the semester, the instructor may wish to change the reward types, reward (token) costs or even the target behaviours utilized in the process, in the case of either unsatisfactory results or to generate continued interest from the students. The instructor should formally or informally monitor behavioural or performance data throughout the process to determine if any changes to the variables are needed and if the results of the system appear acceptable.

Of course, when this system is utilized for the first time, the identification and valuation of the behaviours, rewards and reward values can be time consuming. Once these steps have been completed, however, and if the instructor feels that the various classes of students are similar enough to utilize the same data, the ClassDojo system is relatively easy to implement Further, once implemented, except for monitoring of results and reward acquisition facilitation, the system requires minimal effort on the part of the instructor. Thus, although the steps to implement the token economy system may take some data collection, organization and time especially on initial use, because of the possible positive effects on student behaviours and performance, a token economy using the ClassDojo web based class management system may be a worthwhile technique to consider for implementation in undergraduate marketing classes in the future.

## REFERENCES


Bacon, D., Stewart, K. (2006). How fast do students forget what they learn in Consumer Behavior? A longitudinal study. Journal of Marketing Education, 28(3), 181-192.

Bandura, A. (1969). Principles of behavior modification. New York: Holt, Rinehart and Winston, Inc.

Berlyne, D. E. (1954b). A theory of human curiosity. British Journal of Psychology, 45(3), 180-191.

Boniecki, K.A., & Moore, S., (2003) Breaking the silence: Using a token economy to reinforce classroom participation. Teaching of Psychology, 30(3), 224-227.

Brophy, J. E. (1983). Conceptualizing student motivation. Educational Psychologist, 18(3), 200-215.

Carini, R. J., Kuh, G. D. & Klein, S.P. (2006). Student engagement and student learning: Testing the linkages. Research in Higher Education 47, 1-32.

Cattell, R. B., & Cattell, H.E.P., (1995). Personality structure and the new fifth edition of the 16PF. Educational and Psychological Measurement, 55(6), 926-937.

Catterall, M., Maclaran P., & Stevens, L. (2002). Critical Reflection in the Marketing Curriculum. Journal of Marketing Education, 24 (December), 184-192.

Chi, M.T., (2009). Active-constructive interactive: A conceptual framework for differentiating learning activities. Topics in Cognitive Science, 1, 73-105.

Clark, C., Lansford, T., & Dallenbach, K. (1958). Repetition and associative learning. American Journal of Psychology, 76, 22-40.

Claysen, D. E. (2004). A test of reciprocity effects in the student evaluation of instructors in marketing classes. Marketing Education Review, 14(2): 11-21.

Darley, C., & Glass, A. (1975). Effects of rehearsal and serial list position on recall. Journal of Experimental Psychology: Human Learning & Memory, 104, 453-438.

deCharms, R. (1976). Enhancing motivation change in the classroom. New York, NY: Irvington.

Deci, E.L., (1971). The effects of externally mediated rewards on intrinsic motivation. Journal of Personality and Social Psychology, 18, 105-115.

Declerck, C. H., Boone, C., & DeBrabander, B. (2006). On feeling in control: A biological theory for individual differences in control perception. Brain and Cognition, 62, 143.

Dobbins, I., Kroll, N., & Yonelinas, A. (2004). Disassociating familiarity from recollection using rote rehearsal. Memory & Cognition, 32, 932-956.

Druckman, J. (2001). Evaluating framing effects. Journal of Economic Psychology. 22: 96–101

Durham, C., Locke, E., Poon, J. M., & McLeod, P. (2000). Effects of Group Goals and Time Pressure on Group Efficacy, Information-Seeking Strategy, and Performance. Human Performance. 13(2), 115-138.

Ebbinghaus, H. (1913). Memory (H.A. Ruger and C.E. Bussenius, Trans.). New York: Teachers College at Columbia University. (Original work published 1885).

Goby, V., & Lewis, J. (2000). Using experiential learning theory and the Myers-Briggs Type Indicator in teaching business communication. Business Communications Quarterly, 63(3), 39-48.

Hackenberg, T.D. (2009). Token reinforcement: A review and analysis. Experimental Analysis of Behavior 91, 257-286.

Hansen, D. (2003). Using the Voeks method to improve student learning in Principles of Marketing classes," Journal of Marketing Education, 25(2), 108-117.

Hay, A., Peltier. J. & Drago, W. (2004). Reflective learning and on-line management education: a comparison of traditional and on-line MBA students. Strategic Change, 13(4), 169-182.

Hintzman, D. (2004). Judgment of frequency versus recognition confidence: Repetition and recursive reminding," Memory and Cognition, 32, 336-350.

Hirst, E. S., Dozier, C. L., & Payne, S. W. (2016). Efficacy of and preference for reinforcement and response cost in token economies. Journal of Applied Behavior Analysis, 49, 329-345.

Ifamuyiwa, S. A., & Akinsola, M. K. (2008). Improving senior secondary school students' attitude towards mathematics through self and cooperative-instructional strategies. International Journal of Mathematical Education in Science and Technology, 39(5), 569.

Jones, E. E., & Davis, K. E. (1965). From acts to dispositions: the attribution process in social psychology, in L. Berkowitz (ed.), Advances in experimental social psychology (Volume 2, pp. 219-266), New York: Academic Press.

Kapp, K. M. (2012), The Gamification of Learning and Instruction: Game-based Methods and Strategies for Training and Education, San Francisco, CA: Pfeiffer.

Tversky, A., Kahneman, D. (1981). The framing of decisions and the psychology of choice. Science. 211 (4481): 453–458

Karraker, R. J., (1977). Self versus teacher selected reinforcers in a token economy. Exceptional Children, 43, 454-455.

Kazdin, A. E. & Bootzin, R. R. (1972). The token economy: An evaluative review. Journal of Applied Behavior Analysis, 5, 343-372.

Kazdin, A. E. (1982). The token economy: A decade later. Journal of Applied Behavior Analysis, 15(3), 431-445.

Kazdin, A.E., & Geesey, S. (1980). Enhancing classroom attentiveness by preselection of back-up reinforcers in a token economy. Behavior Modification, 4, 98-114.

Keller, J.M., (2010). Motivational design for learning and performance. New York, NY: Springer.

Kember, D., & Leung, D. (2005). The influence of active learning experiences on the development of graduate capabilities. Studies in Higher Education, 30, 155-160.

Kolb A.Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. Academy of Management Learning & Education, 4, 193-212.

Lepper, M.R., Green, D., & Nisbett, R. E. (1973). Undermining children's intrinsic interest with extrinsic rewards: A test of the over justification hypothesis. Journal of Personality and Social Psychology, 28, 129-137.

Levin, I. P., & G. J. Gaeth. (1988). How consumers are affected by the framing of attribute information before and after consuming the product. Journal of Consumer Research, 15, 374-378.

Litow, L., & Pumroy, D. K., (1975). A brief review of classroom group-oriented contingencies. Journal of Applied Behavior Analysis, 8, 341-347.

Martin, B.L., & Briggs, L.J. (1986). The affective and cognitive domains: Integration for instruction and research. Englewood Cliffs, NJ: Educational Technology Publications.

McIntyre, S., Munson, M., (2008). Exploring cramming: student behaviors, beliefs and learning retention in the Principles of Marketing course. Journal of Marketing Education, 30(3), 226-243.

O'Leary, K.D., & Drabman, R. (1971). Token reinforcement program in the classroom: A review. Psychological Bulletin, 75, 379-398.

Peltier, J., Hay, A., & Drago, W. (2005). The reflective learning continuum: Reflecting on reflection. Journal of Marketing Education, 27, 250-263.

Pintrich, P. R., & Schunk, D. H. (2002). Motivation in education. Theory, research, and applications (2nd Ed.). Upper Saddle River, NJ: Merrill Prentice Hall.

Reigeluth, C.M., (Ed.) (1999). Instructional design theories and models: An overview of their current status. Hillsdale, NJ: Lawrence Erlbaum Associates.

Robacker, C. M., Rivera, C. J., & Warren, S. H. (2016). A token economy made easy through ClassDojo. Intervention in School and Clinic, 1-5.

Rock, I. (1957). The role of repetition in associative learning. American Journal of Psychology, 70, 186-193.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 80(1), No. 609.

Tennyson, R.D., (1992). An educational learning theory for instructional design. Educational Technology, 32(1), 36-41.

Warburton, K. (2003). Deep learning and education for sustainability. International Journal of Sustainability in Higher Education, 4(1), 44-56.

Woodward, A., Bjork, r., & Jongeward, R. (1973). Recall and recognition as a function of primary rehearsal. Journal of Verbal Learning and Behavior, 12, 608-617,

Yonelinas, A. (2002), "The Nature of Recollection and Familiarity: A Review of 30 years of Research," Journal of Memory and Language, 46, 441-517.

Young, M. (2005). The motivational effects of the classroom environment in facilitating self-regulated learning. Journal of Marketing Education, 27, 25-40.

## Appendix A: Token Economy Student Information and Rules

Hello students! From now to the end of the course we will be participating in a new system of keeping track of certain academic activities that should help you maximize your success in this course. This system, known as the 'ClassDojo token economy' will allow you to accumulate credits (tokens) for positive academic behaviours. These are the some of the same behaviours that you identified for me at the start of the semester.

There are a few tokens that you can allocate to yourself, (5 token weekly maximum) and there are some tokens that I will also be allocating (no weekly limit). You will get an account on the software system ClassDojo (and a personal ClassDojo monster which represents *you* which you can change) which will send you reports to let you know which tokens you have received for which behaviours and how many total tokens you have. ClassDojo has an app that can be downloaded to your computers, tablets or smartphones: go to ClassDojo.com for more information.

When you have accumulated enough tokens, once in a while you will be allowed to trade your tokens for one or more of the academic rewards that you recommended to me at the beginning of the semester. Watch the course website to see when you can redeem your tokens. **But be aware;** the rewards available to 'purchase' could unexpectedly change without notice so you will have to watch the course website frequently to make sure you don't miss out. In addition, once in a while a reward might go on 'sale' and you will be able to acquire that reward at a reduced token costs. You can see the full list of activities that will be recorded and the corresponding rewards on the course website but remember, only some of these will be offered at any one time. If you have any questions or want to opt out of this program, just let me know. Here are the list of rules for our token economy:

**Rules:**

1. Instructor tokens will be given out in each class and are awarded at the discretion of the instructor.
2. The activities for which student tokens are self-allocated (maximum 5 per week) must be emailed to the instructor every week, before the class, or the tokens will not be counted.
3. Periodically, as announced on the class website, you will be allowed to redeem your token for academic rewards. Please check the website regularly to know when the redemption period is open.
4. If rewards are related to examination hints or multiple choice question omission, the reward must be redeemed ***prior*** to the commencement of the examination. There is a maximum of 2 multiple choice deletion awards available to each individual student.
5. The instructor is the final arbiter of all disputes, token allocations and reward allocations in this system. Her decision on all matters relating to the token economy are final and cannot be appealed.
6. You may opt out of this program at any time however any tokens or rewards that you have accumulated but not used to that point will be invalidated.

## Appendix B: Student Survey Questions: Likert 5 point scales

**Experiment One Questions:**

1. Did the token economy change the amount of effort you put into the class?
2. Did the token economy change your interest level in the class?
3. Did the token economy change how much you enjoyed the class?
4. How useful did you think the token economy was in helping you keep up to date with your coursework?
5. Would you like to see other courses adopt a token economy system in the future?
6. Are there comments, concerns, suggestions or recommendations you would like to make about the token economy? (blank spaces provided)

**Experiment Two Questions:**

1. How much effort did you put into the class?
2. How much interest did you have in the class?
3. How much did you enjoy the class?
4. How useful did you think the class format was in helping you keep up to date with your coursework?
5. Would you like to see other courses adopt the class format used in this class?
6. Are there any comments, concerns, suggestions or recommendations that you would like to make about this class? (blank spaces provided).

**Table A: Selected Target Behaviours / Token Value**

| **BEHAVIOURS** | **TOKEN VALUE** |
|---|---|
| Contributing valuable comments or critiques in class discussions | **2** |
| Suggesting an online or other useful resource to enhance class content / materials | **5** |
| Actively participating in group experiential exercises in class (no 'ceiling watching', texting or other irrelevant activities) | **5** |
| Emailing instructor a 1-2 page personal reflection on the content of the last class within 24 hours of the conclusion of the class (individual work only) | **Up to 10** |
| Emailing instructor personally prepared study notes of class materials / content before start of class: (individual work only) 2-3 single spaced pages | **Up to 15** |

**Table B: Selected Rewards / Token Costs**

| **REWARDS** | **TOKEN COST** |
|---|---|
| Get one multiple choice examination hint during the examination | **5** |
| Get one short answer examination hint prior to examination | **5** |
| Get one short answer examination hint during the examination | **10** |
| Omit one multiple choice question on exam (Limit of 2 questions) | **15** |
| Instructor will discuss any class content issues or questions for up to 30 minutes | **7** |
| Instructor will discuss career advice for up to 15 minutes | **5** |
| Instructor will discuss career advice for up to 30 minutes | **7** |
| Discuss any issues or questions concerning an upcoming examination or assignment with instructor for up to 30 minutes *prior to the day before* the assessment | **7** |
| Discuss any issues or questions concerning an upcoming examination or assignment with instructor for up to 30 minutes the day before or the day of the assessment *(subject to availability)* | **20** |
| Instructor will review the entire group assignment and discuss areas of possible improvements: (group members can combine tokens here) | **50** |

**Table C: Experiment One: Paired Sample T-Test Results**

| **BEHAVIOURAL MEASURES** | **Non-Token Mean** | **Token Mean** | **Mean Difference** | **t** | **Sig** |
|---|---|---|---|---|---|
| Class Participation | 5.78 | 13.75 | 7.972 | 23.508 | .000 |
| Extra Resource Suggestions | 1.04 | 5.63 | 4.583 | 10.174 | .000 |
| Group Experiential Participation | 12.99 | 13.13 | .139 | .575 | .567 |
| Personal Reflection Email | 3.06 | 13.82 | 10.764 | 18.487 | .000 |
| Study Notes Email | 3.40 | 10.35 | 6.944 | 12.122 | .000 |
| Total Token Allocations | 26.26 | 56.67 | 31.097 | 22.446 | .000 |

**Table D: Experiment Two: Independent Sample T-Test Results**

| PERFORMANCE MEASURES | Non-Token Mean | Token Mean | Mean Difference | t | Sig |
|---|---|---|---|---|---|
| Exam One Grade* | 72.43 | 76.56 | -4.129 | -2.006 | .047 |
| Exam Two Grade* | 73.14 | 77.70 | -4.55 | -2.366 | .019 |
| Project Grade | 7.14 | 7.87 | -.729 | -2.033 | .044 |
| **BEHAVIOURAL MEASURES** | | | | | |
| Extra Resource Suggestions | .68 | 14.34 | -13.654 | -12.502 | .000 |
| Class Participation | 8.50 | 11.58 | -3.072 | -2.810 | .006 |
| Group Experiential Participation | 12.24 | 12.61 | -.369 | -.405 | .686 |
| Personal Reflection Email | .59 | 14.79 | -14.197 | -20.631 | .000 |
| Study Notes Email | 1.78 | 16.90 | -15.125 | -25.292 | .000 |
| Total Token Allocations | 38.72 | 98.59 | -59.868 | -12.689 | .000 |
| Effort | 5.58 | 6.68 | -1.097 | -2.602 | .010 |
| Interest | 5.08 | 6.23 | -1.146 | -2.564 | .011 |
| Enjoyment | 3.95 | 5.41 | -1.462 | -3.239 | .001 |
| Keeping Up-to-Date with Class | 5.13 | 6.48 | -1.347 | -2.775 | .006 |
| Use the Same Class Format in the Future | 3.71 | 6.31 | -2.599 | -5.918 | .000 |

*To account for omitting two multiple choice questions on each exam in the ClassDojo condition, which was chosen as a reward by every student in that condition, exams in the control group had two extra multiple choice points added to their exam scores.