

Expectancy Theory and Online Education: Discussion Boards

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Abstract

This study attempts to apply expectancy theory to the degree of use of embedded discussion forums within online higher education courses. Simple descriptive statistical methods are used to test two hypotheses in terms of students meeting/ exceeding instructor expectations measured in a) timing of postings and b) quantity of postings (N=1,334). The findings of this study indicate that students tend to meet minimum instructor expectations for discussion board activity in terms of both timing and quantity of postings.

Keywords: Online Learning, Distance Education, Expectancy, Discussion Boards

1. Introduction

Expectancy theory is a prevalent topic in organizational and industrial psychology. It is often found in common management program courses pertaining to human relations and organizational behavior in relation to employee motivation. It has also been applied rather extensively in other areas such as education (Rosenthal & Jacobson, 1968; Brophy, 1983; Raudenbush, 1984). This study seeks to differentiate and expand from the existing education focused research of expectancy theory to explore its relevance in fully online (not hybrid) learning environments, specifically in higher education. The primary goal is to examine the behavior of students participating in completely online courses in terms of the timing and depth of participation in required weekly discussion forums, based on posted minimum expectations.

2. Literature review

2.1 Expectancy theory & Education

With a focus on elementary school aged children, Rosenthal & Jacobson (1968) conducted a study to test the presence of the Pygmalion Effect in that setting. They wanted to see how much change would occur in student performance in relation to an expectation of the teacher. The result in this case was supportive of the notion that one person's (the student) behavior may come to be a self-fulfilling prophecy based on the expectation of another person (the teacher), but only in the cases of younger students in grades 1 and 2. Later, Brophy (1983) sought to gain clarity for practical purposes by testing further 'the controversy' that had developed over the years of research on the self-fulfilling prophecy effect. This study showed that very few teachers had an influence on student achievement by way of expectation effects. Brophy concluded that teachers are far too different in their individual personality types, and their approaches to teaching and learning.

To attain a broader view of prior research, Raudenbush (1984) conducted a meta-analysis to sort out the differing results of prior studies. The primary finding was that the more a teacher knew a student at the point where expectancy is induced; there would then be a smaller effect. The result being the higher the familiarity with a student a teacher has, due to prior interactions and observations, the less impact a newly introduced expectation would have on the student's performance.

Moving to expectancy theory specifically, Vroom (1964) decomposes the idea into component parts. The larger model is made up of valence, strength, and force. Vroom defines 'valence' as anticipated satisfaction that would result from a behavior. He further defines the concept of 'expectancy' as the degree to which one believes an outcome to be probable (i.e. expectations or subjective probabilities). Additionally, it being a temporary belief about the likelihood that a certain act will be complemented with a particular outcome.

Vroom describes expectancies in terms of their strength with high strength signifying a specific action will be followed by the consequence while minimal (or zero) strength is indicated by the action not being followed by the expected consequence. Vroom's theory states that a combination of the two, which is referred to as 'force', is what ultimately determines the actions that are carried out.

2.2 Online discussion boards & forums

The general topic of discussion boards and issues pertaining to their use and efficacy has been viewed from many angles. Before formal discussion forums that are embedded within course modules, Chen & Chiu (2008) focused on a similar platform of an online bulletin board on a university website. This early study was attentive to the progression of online discussions and how earlier messages could affect later messages with the results indicating that course facilitators could manage online discussions to encourage critical thinking and reduce status effects. Moving to a study of an embedded yet voluntary discussion forum within a course (Cheng, et al., 2011) examined an undergraduate course setting. The results provided support for the effectiveness of the voluntary forum use and its relation to higher performance in the course. Because the forum was voluntary in this case, the researchers were able to gauge the two groups (forums users and non-users) performance in relation to each other. Interestingly, the results also indicated that the amount of time the course facilitator spent on the forum had little influence, merely the presence and use of the forum was enough to have an effect, which is contrary to the earlier work of Chen & Chiu in 2008.

In a later study by (Kim, 2013), the effects of group size on the discussion forum was examined. By comparing two small group forums with three class wide forums by way of measuring interactions through message click counts, it was shown that course facilitator interaction levels and class guidelines made for an increased number of total messages and clicks counts to show students' overall participation in the forums. By categorizing the level or depth of the message content this study showed that in the small group forums there were higher levels of interaction (i.e. more depth) than in the larger class wide group, indicating that higher quality postings could be achieved in smaller sized forums.

Several more recent studies have focused in on assessing a link between forum use and student course performance. Again honing in on undergraduate students, Romero, et al (2013) approached the notion of a link by way of testing the association with a novel algorithm method. By using this approach, the authors were able to support the idea of predicting later course failure by assessing forum participation earlier in the course. Simultaneously, Wen-Yu Lee (2013) was testing other aspects of the relationship to academic performance. While this study also looked at contributions to discussion forums, it differed in that it also tested the students perception of online discussions as well as the student's approach to learning. Questionnaire methodology was used to assess the students' approaches to learning and their perceptions of online discussions. Their postings were later categorized to fit the general labels of "Initiation, Elaborated Response (ER), and Response with Resources (RWR)." After creating clusters which resulted in three groupings, a significant finding was that students in the group, "who adopted deep approaches and scored highest in the perception scales" performed better than those in the other groups in terms of academic performance.

Due to the massive growth in the use of asynchronous online discussion (AOD) at all levels of education, Loncar, et al (2014) conducted a meta analysis to sort out the expanding collection of related research. The analysis developed four primary research areas related to the topic: analytical, argumentative, comparative, and relational. Lastly, in a very recent study, Goggins & Xing (2016) again pursue online discussion affects on student learning, and the factors associated with student participation behavior. Since the authors found prior research to be sequestered in nature or inconclusive they chose to progress their understanding by using social cognitive theory as a basis for their study. Feeling that the factors of a) collective efficacy, b) social ability, c) reading behavior, and d) the time dimension of participation were in need of more emphasis they examined the causal relationship of these factors and their influence on learning. The findings showed a complex connectivity among all the factors involved and most remarkably that participation in terms of time was shown to be the most significant factor affecting student learning, even more so than posting and reading activities.

3. Materials and methods

3.1 Research framework

This study is conducted by analysis of trace data from discussion forums selected from four fully online sections of a course.

To maintain consistency in the same number of total participants per forum this study is limited to twenty-nine individual discussion board forums with twenty three students per forum. Since there are two factors being measured per case, per week the total sample size is $N= 1,334$. Each forum is limited in accessibility by students to within a seven day time frame. All the students are given the instruction to make a minimum of three posts throughout the seven days according to the following guidelines.

- a) First, make one initial posting in response to an instructor posted question pertaining to an assigned reading, by the fourth day at the latest.
- b) Make at least two response posts to other students' postings.

From these instructions, two instructor expectations are set in terms of timing (initial posting on days 1, 2, 3, or 4) and quantity (minimum of three postings total). Applying the concepts from expectancy theory this study will use basic descriptive statistical methods to support or not support the following hypothesis statements.

3.2 Research hypotheses

The essential question in this assessment is to what degree are instructor expectations of discussion board activities met? According to the expectancy theory outlined earlier, students with varying levels of 'valence' and 'strength' will have differing levels of performance in relation to the expectation or 'force'. To test this premise the following hypothesis and null-hypothesis statements are formed.

3.2.1 Timing Expectations

Null Hypothesis 1

H_0 : Students will tend to submit their initial discussion board posting on the latest day of the module without penalty (day 4) at a significantly higher rate than earlier days of the module.

Alternate Hypothesis 1

H_a : Students will not tend to submit their initial discussion board posting on the latest day of the module without penalty (day 4) at a significantly higher rate than earlier days of the module.

3.2.2 Quantity Expectations

Hypothesis 2

H_0 : Students will tend to submit the least amount of total discussion board postings (3 posts) per week at a significantly higher rate than additional postings beyond the minimum required.

Alternate Hypothesis 2

H_a : Students will not tend to submit the least amount of total discussion board postings (3 posts) per week at a significantly higher rate than additional postings beyond the minimum required.

4. Results & Discussion

4.1 Descriptive statistics

Initial results of general descriptive statistics are presented first.

	Timing	Quantity
Minimum	1	1
Maximum	7	13
Range	7	13
Mode	4	3
Mean	3.3518	3.7733

Table 1: Descriptive Statistics

From this first output we can see general support of the null hypotheses emerging. For the day of the week (timing measure) that the initial posting was made, it can be seen that the full spectrum of the week was present. There were occasions where students made that post on the very first day, the very last day, and every day in between. However, the mode for the dataset was four, which is the last day required without penalty by the instructions. While the most common day those students would post was on the fourth, the mean for the dataset was 3.35 which would indicate that while the fourth day was most common, there would be more postings occurring generally before the fourth than would occur after the fourth.

Continuing on this output, it is shown that for the total postings for the week (quantity measure) there was a large spectrum present as well. It is shown that some students would only make a single post in a week and at other occasions there could be as many as 13 posts made by a single student. Here the mode is 3 which again coincides with the minimum required without penalty by the instructions. However, for this factor the mean was 3.77 which would indicate generally that although the most common total posting amount was the minimum required, there would more often be more than three postings than there would be less than three postings. While based on this output alone general support can be seen for the hypotheses, further analysis can be conducted to obtain a richer representation of the results.

4.2 Histograms

Visual representation of the data analysis results are presented in the form of histograms.

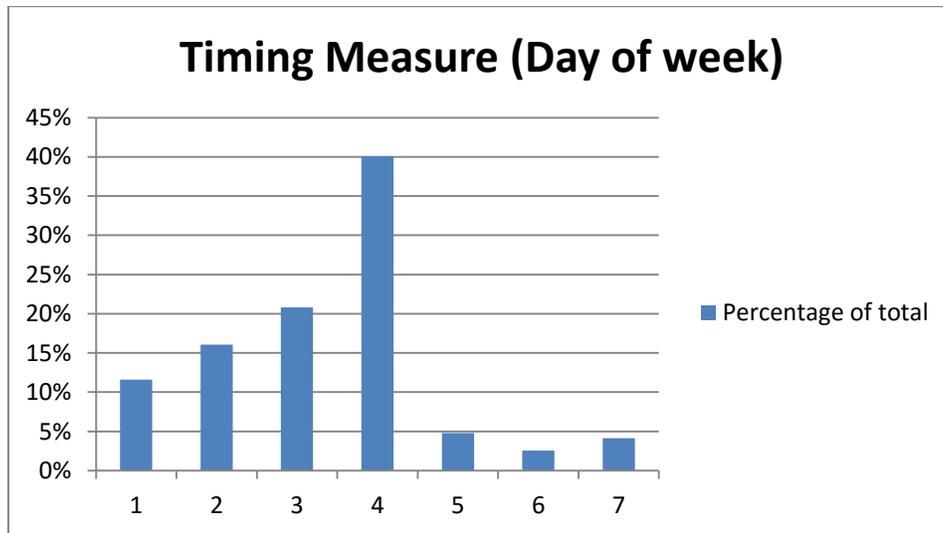


Figure 1: Histogram for Timing Measure

Figure 1 above shows the frequency distribution of the day of the week for the initial posting from the sample dataset. The descriptive statistics section indicated that the fourth day was the most common day for initial postings and with the mean being less than 4 that more posting days would be before the fourth day than after it. The histogram shows that 40% of the initial postings were on day four with the next closest posting day being day 3 at 21%. This outcome of day 4 being more prevalent by nearly double the next closest day supports the null hypothesis 1 that students would tend to submit their initial discussion board posting on the latest day of the module without penalty (day 4) at a significantly higher rate than earlier days of the module. The raw data shows that 89% of initial postings occurred on or before the fourth day.

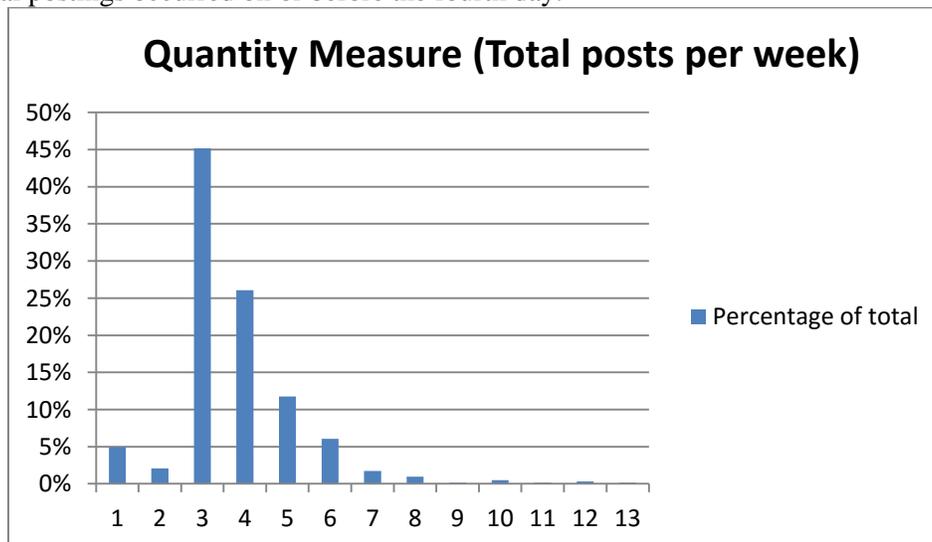


Figure 2: Histogram for Quantity Measure

Figure 2 above shows the frequency distribution of the total number of postings per week from the sample dataset. The descriptive statistics section indicated that 3 total posts was the most common number of postings per week and with the mean being more than 3 would indicate that there would be more total postings of more than the 3 post minimum than less than it. The histogram shows that 45% of the total postings were at the three day minimum without penalty required with the next highest total posting count was 4 at 26%. This outcome of the 3 post amount being nearly 20% more prevalent than the next closest day count supports the null hypothesis 2 that students will tend to submit the least amount without penalty of total discussion board postings (3 posts) per week at a significantly higher rate than additional posting beyond the minimum required. The raw data shows that 93% of total postings occurred at the minimum level or more.

5. Conclusion

The analysis of this study has indicated that students tend to meet instructor expectations for discussion board activity in terms of timing of postings and amount of postings. It also shows that student performance seems to be linked to minimum requirements by mostly posting on the latest day possible without penalty and by most often posting only the minimum amount of times per week. To further examine the validity of this phenomena future research may be conducted by shifting the parameters and testing if the factors of “day of week” for first posting and “total posts per week” using different initial posting days and variable total posting requirements has similar findings or not.

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