

Enhancement of Study Motivation Model by Introducing Expectancy Theory

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Abstract—Educational systems aim to help students discover their talents and develop a passion for learning. Hence, it is supposed that the education systems facilitate the efforts to motivate students. Hence, it is crucial to model students' motivation to develop such a motivation in a concerned educational system. However, to date, there are limited number of works reporting on motivation model in this area. In this light, most of previous works have showed that students are evaluated only by the students' test scores, not by students' attitudes or behaviors. On the other hand, companies have modeled the motivation based on employees' behaviors as explained by "Expectancy Theory" and have implemented it into a system called "Reward and Punishment". In fact, the implementation at companies has shown a great influence in improving employees' skills as they are motivated by all other employees. Hence, this research focused on modeling students' motivation by students' attitudes or behaviors. The reward and punishment are then used to comprehend this model. Thus, rather than by test scores, students will be evaluated by students' attitudes toward positive attitudes rather than negative attitudes. It is expected that appropriate reward and punishment for modeling motivation will improve students' motivation. For this reason, this paper proposed to construct an evaluation criterion by modeling students' motivation towards positive attitudes and behaviors. Students' attitudes will be evaluated and formulated into a motivation model. This model then will be tested in a normal existing classroom with a scenario using reward and punishment. Applying reward and punishment to existing classroom systems is expected to motivate students in improving their attitudes and behaviors.

Index Terms—education system, modeling motivation, expectancy theory, reward and punishment, positive attitude, behavior, evaluation criterion

I. INTRODUCTION

In today's educational settings, there are countless challenges in motivating students. The responsibility of education leaders and education system is to raise students' scores depends on their behaviors as they motivate them. However, as mostly practiced, the

educational systems relied on test scores to evaluate students' performance. People may even argue that success is largely based on the educational environment. In this regard, educational institutions are holding tests and judging students from the view point of their need to objectively evaluate the performance of students in schools. Assessing students' scores at school is essential to qualify them for their next entry. However, it is also essential to motivate students in developing their abilities. Finding the right way to evaluate students is an important step in an education system. Efforts must be made to find a more effective way rather than just simply graduating students.

Motivation is an essential factor in whatever we do. Humans need inspiration in order to achieve targeted goals and objectives [1]. In modern education, motivating students is the most necessary factor, assuming that students' future is also important on top of evaluating test scores. Various theories of motivation are defined by many psychologists and their causes and processes are explained [2], [3]. This paper suggests motivational modeling for students in the education system using 'Reward and punishment systems' based on Victor Vroom's Expectancy theory. In this model, the motivation of each individual student is evaluated by the reward or punishment given by the teacher based on his/her expected score comparing with previous one. If the student gets higher score than the expectation, he/she will get rewarded, otherwise he/she will be punished. Through the Expected results in Section 4, we show that our proposal motivates students. The remaining part is composed as follows. Section 2 provides existing works on Expectancy theory. Section 3 shows the proposal of our theory for motivating students. The methods and results of the proposed modeling are given in Section 4. Section 5 discusses the limitations, advantages and disadvantages of this study. Section 6 concludes this report.

II. RELATED WORK

Within a recent few year, technological changes happened tremendously around us. However, from an educational point of view, nothing had changed much. Of

course, as the Internet developed, students are able to learn more subjects interested by having online lectures. However, students' motivation is still poorly focused in the current technological changes. In the literature, there is no research on a system that can motivate students with the help of the teacher in public schools. Although, similar research in [4], talked about analyzing Victor Vroom's expectation theory to study the effects of tenure on productivity of higher education teachers. In [5], researchers attempted to present the characteristics, advantages and disadvantages of the theory of expectation in management, and then, they concluded that the theory of expectation is more advantageous rather than disadvantageous. In [6], researchers showed that expectation theory leads to a stronger motivation which will provide support for the importance of entrepreneurship education as a means to enhance entrepreneurial motivation among college students.

Victor Vroom's introduced three variables within the expectancy theory which are Expectancy (E), Instrumentality (I) and Valence (V). In the expectancy theory, (E) is a variable that one's effort will result in achievement of desired performance goals. (I) is a variable that someone who will receive a reward if the performance expectation is met [7]. (V) is defined as the rewards of an outcome of one's achievement value, which is based on their needs, goals, values and sources of motivation [8], [9].

The Expectancy Theory following:

$$\text{Motivation} = \text{Expectancy} \times \text{Instrumentality} \times \text{Valence}$$

In [10], reward and punishment through video games proved that this was related to the behaviors of game users (aggressive affect, aggressive cognition, aggressive behavior). In [11], [12], reward practices performance management system is effective when applied continuously to company employees, and proves that the greater the reward, the greater the effect. In [13], reward and punishment system biologically proved to be the core of motivation by stimulating human emotions. However, it differs depending on the individual environment and personality.

In this paper, we try a new approach that is modeling student motivation by appropriately using expectancy theory with, reward and punishment, and believe that this approach can be effectively reflected in the education system.

III. MOTIVATION MODEL

In this paper we propose our own theory for motivating students and improving their attitudes and behaviors based on Victor Vroom's expectancy theory including punishment.

A. Hypothesis

The differences between the expectancy theory and our theory lie on (E) and (V). In (E), we believe the expectation should come from the teachers instead of the students. Meanwhile, in (V), we add punishment as the result of not being able to achieve the expected score. In

summary, our research tried this follow: (E) is the expectation of the teachers towards their students, (I) is the actual score of the students and (V) is the corresponding reward or punishment.

B. Reward and Punishment

In our study, we marked in numbers the rewards and punishments of students, such as Table I. The score was divided by 10 points from 0 to 100.

TABLE I. A METHOD OF ASSESSMENT OF REWARD & PUNISHMENT

Reward		Punishment
$(E) < (I) + 10 \rightarrow +2$	$(E) = (I) \rightarrow +1$	$(E) > (I) - 10 \rightarrow -1$
$(E) < (I) + 20 \rightarrow +3$		$(E) > (I) - 20 \rightarrow -2$
$(E) < (I) + 30 \rightarrow +4$		$(E) > (I) - 30 \rightarrow -3$
$(E) < (I) + 40 \rightarrow +5$		$(E) > (I) - 40 \rightarrow -4$
$(E) < (I) + 50 \rightarrow +6$		$(E) > (I) - 50 \rightarrow -5$

If the student's actual score (I) is higher than the teacher's expectation score (E), students will get rewarded. Student will also receive a +1 if (E) and (I) are the same. Conversely, if (I) is lower than (E), the students will be punished. As a result, there will always be reward or punishment for students regardless of their score.

C. Problems Statement

Below are the problem statements of this study:

- 1) Victor Vroom's 'Expectancy theory' mainly focuses on only teachers. However, inferring from [3], students are also important contributors to the success of education system. Hence, we attempt to suggest the new theory focusing on both teachers and students.
- 2) In previous studies, reward and punishment were evaluated based on students' behaviors or attitude. However, in such a situation, the teachers' emotions were also involved and it was unclear whether the students were actually rewarded or punished. In this study, we are trying to evaluate their reward and punishment based on students' score without considering teachers' emotion.

IV. EVALUATION

A. Methods

As mentioned earlier in Section 3.3, there is a limitation of obtaining students' actual scores. Therefore, we made randomized scores of 4 tests a year on the assumption that there are 10 students in a class.

In Table II, we put in the Expectancy and Valence suggested in our study. The first test score in Fig. 1 started out equally.

Table II can be described as follows:

- The teacher estimates the scores of individual students based on the scores they have scored in the previous grade.
- Students get reward or punishment (V) by comparing them with (I) and (E).

- In the next (E), we make an estimate based on the previous test score (I).

There is one condition for using this system.
 $0 \leq E = I \leq 100$ **and** $-5 \leq V \leq 6$ ($V \neq 0$)

TABLE II. WITH REWARD AND PUNISHMENT

Student	Expectancy (1st exam)	Instrumentality (1st exam)	Valence	Expectancy (2nd exam)	Instrumentality (2nd exam)	Valence	Expectancy (3rd exam)	Instrumentality (3rd exam)	Valence	Expectancy (4th exam)	Instrumentality (4th exam)	Valence
A	80	64	-2	60	58	-1	50	74	+3	70	84	+2
B	90	52	-4	60	78	+2	70	65	-1	60	72	+2
C	30	36	+1	30	51	+3	50	62	+2	60	85	+3
D	40	65	+3	60	85	+3	80	76	-1	70	78	+1
E	70	90	+3	90	95	+1	90	97	+1	90	96	+1
F	40	39	-1	30	42	+2	40	46	+1	40	52	+2
G	60	86	+3	80	78	-1	70	83	+2	80	98	+2
H	30	24	-1	20	22	+1	20	35	+2	30	57	+3
I	60	54	-1	50	48	-1	40	42	+1	40	56	+2
J	50	65	+2	60	44	-2	40	78	+4	70	89	+2

B. Results

Fig. 1 and Fig. 2 show a comparison of nowadays' class (Normal class) with one using our proposed

hypothesis (Reward and Punishment), respectively. The data used for these figures can be obtained from Table I and Table III.

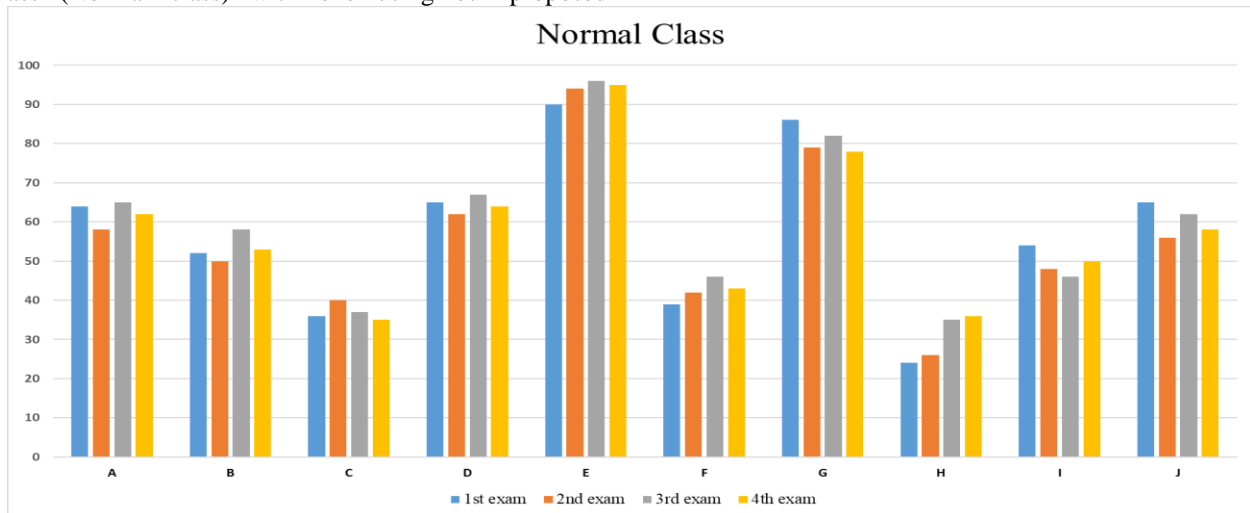


Figure 1. Normal class

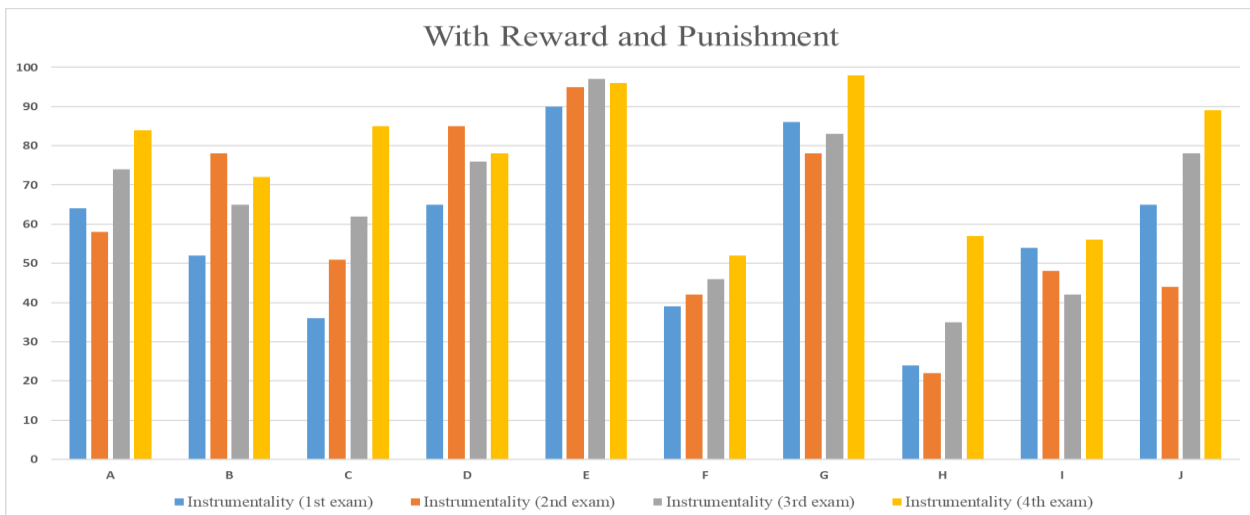


Figure 2. With reward & punishment

TABLE III. A RANDOMIZED NORMAL CLASS

Student	1st exam	2nd exam	3rd exam	4th exam
A	64	58	65	62
B	52	50	58	53
C	36	40	37	35
D	65	62	67	64
E	90	94	96	95
F	39	42	46	43
G	86	79	82	78
H	24	26	35	36
I	54	48	46	50
J	65	56	62	58

In here, as we can see that students' scores do not change much. As we can see here, there is a big difference in student scores comparing to Fig. 1. The results of the simulation show that the students scored significantly differently when rewards and punishments are not applied and when applied. Individual student results show that test scores are affected by the reward and punishment. In addition, students will find that they need to work harder for their next exams in order to avoid getting punishments or to earn more rewards. The final result (after the 4th exam) demonstrates that no student is punished and their scores are higher comparing to the 1st exam.

V. DISCUSSION

According to the expected result in Section 4, it is easy to recognize that the students' scores became better comparing to normal class, as a result of getting rewards or punishments. For example, student C, during normal class setting, his grade is fluctuated at 35 to 40. While, in the newly introduced reward and punishment setting, his grade has increased for every exam from 36 to 85. This suggest positive impact of applying our theory to real life scenarios in order to enhance students' motivation. The propose model is most likely working.

We also noticed that the proposed solution has minor impact on students whose scores were already high. For example, student E has already achieved high scores. However, the student E score does not fall further compared to normal class setting. In this case, their motivation is well maintained to be positive. Therefore, this proposal is still considered as positive impact to this kind of students.

However, the study was subject to the following limitations:

- **Randomized students' scores:** This is the biggest limitation in our study. Actual student scores are not available for personal information. As you can see in Section 4, students' scores are clearly improved, but they are theoretical.
- **Simulation tools:** There are lack of available simulation tools that can effectively support the evaluation of our proposal.
- **Reward & Punishment type:** It is not clear what kinds of reward the students want and what kinds of punishment they want to avoid in common. In

addition, how to attract students' attention to benefit from this proposal also needs to be examined.

These limitations will be taken into consideration in our future works.

VI. CONCLUSION

We proposed our new theory, including reward and punishment, based on Victor Vroom's Expectancy theory for motivating students to improve positive attitudes and behaviors. We simulated a year worth of tests, that means each student had four exam scores, then we compared with the current normal class without our theory and the class when using our theory. As shown in the results, the application of our theory and reward and punishment shows the possibility of students having higher test scores than normal class. Although they have some limitations in this study, through simulation, we showed that applying our theory to the education system motivates students to improve their attitude and behavior in order to get better grades than before in the next test.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGMENT

During my research I received many advice and suggestions from my colleagues who helped me to come up with better proposals. Specially, I want to say thank to Mr. Mustafa, Fahad, Othmar, Chanh and Ms. Abrar, Nina.

In addition, I would like to thank Shibaura Institute of Technology for giving this opportunity to be master student in the university.

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