

# Can Information and Communication Technology be interesting to students? Take Rain Classroom as an example

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## Abstract

Rain Classroom is popular Information and Communication Technology (ICT) software in China's universities. This study examined how teachers can attract students' attention and improve teaching efficiency in ICT environment such as Rain Classroom. Based on regulatory focus theory, students can be divided into promotion and prevention types. This paper carried out a survey in study 1 and the result suggests that if proper advocates could match students' personalities, learners would be encouraged to take part in Rain Classroom. In addition, applying this ICT software could improve learners' enthusiasm and teaching efficiency. In study 2, a real database was analyzed and the result strengthens the conclusions in study 1. The second experiment also implies that a matched teaching method guided by regulatory focus theory would not necessarily result in higher evaluation score given by students.

**Keywords:** Information and communication technology, Rain Classroom, Regulatory focus theory, Factor analysis, Teaching management system

## 1. INTRODUCTION

Due to the development of science and technology, there are many various ways to make the class become much more interesting in order to attract students' attention. In China, using information and communication technology to assist teaching is a reform direction that is widely supported by the government and universities. Learning platforms such as Superstar Learning Kit and Rain Classroom occupy a large market. Taking Rain Classroom as an

example, it does not demand users' extra apps except the social software named WeChat, which is popular among students in China. As a university teacher, I would be willing to utilize Rain Classroom as a teaching tool since it is not appropriate to require students to install redundant software. Therefore, this teaching software provides teachers with a convenient choice. However, there are still many students who do not realize the necessity of using such ICT learning tool according to my observation.

So here comes the question: How can we motivate students to participate in ICT environment, especially this novel teaching method? To deal with this issue, I did a survey based on regulatory focus theory and found out what teachers can do to stimulate students' interests.

In recent years, researchers have started to pay attention to the psychological theory, regulatory focus theory, and explore the application of this theory in information technology education [1], and draw some interesting conclusions. The regulatory focus theory was initially proposed by [2-4] in order to discover the true nature of approach-avoidance motivation. According to this theory, students can be divided into two categories, promotion-focus and prevention-focus, and specific types of advocates would encourage students to adopt the ICT teaching tool. As a student with a promotion-focus, he or she would be stimulated by success and achievements because they want to achieve their ideal selves. As a student with a prevention-focus, he or she would be affected by responsibility and safety because they want to prevent making mistakes and breaking rules. However, up to now, there is very little published research on discovering how this theory can be developed in the area of education, compared to those other areas.

Enlightened by the regulatory focus theory, my conjecture is that teachers can motivate those students with a promotion-focus to accept ICT teaching method by informing them of some benefits of using this studying tool, and can encourage those students with a prevention-focus to advocate the ICT teaching tool through emphasizing the possible risk of not using this studying tool. I designed a questionnaire and conducted a survey to prove these speculations. There are 132 college students involved in this survey, every one of them has experienced the ICT environment. To verify the conclusion in study 1, a real case study was conducted in which the teaching quality evaluation data given by students was collected and analyzed.

The interesting findings in this work can provide some implications for future researches. First, many

researchers have scrutinized the influence of electronic teaching tools [5]. A major source of uncertainty is how ICT teaching tools can become interesting to students. This study would try to figure out this question. The answer would be of great significance to those emerging electronic teaching tools and will let them know how to improve their attraction to students. Second, many researchers have applied the regulatory focus theory in other areas, but applying this theory in educating is scarcer [6]. This study would explore the relationship between the regulatory focus theory and students' motivation in studying with information and communication technology. Education organizations and teachers would recognize what they can do to encourage students to use those ICT teaching tools such as Rain Classroom according to the result of this study.

## 2. RELATED LITERATURE AND HYPOTHESES

### 2.1 An ICT application in education: Rain Classroom

With the development of ICT, the traditional ways of working in various areas have changed. In China, Internet+ education is promoted by the government and universities. Teachers and students are encouraged to adopt proper software and hardware to improve teaching and learning.

In China, internet companies focused on education have emerged, outputting a large amount of ICT learning software, such as Superstar Learning Kit (SLK), Blue Ink Cloud and Rain Classroom. SLK is an app that is similar to a virtual online school. In those virtual classrooms, students can not only listen to the lectures but also ask questions and discuss with the teachers. The advantage of this app is that it can realize remote lectures at low cost. Blue Ink Cloud is an app with online sharing of materials and teaching interaction. Its characteristic is to make the interaction between teachers and students more convenient.

However, the above ICT teaching tools have a common shortcoming. They all require students to

download the app on their mobile phones in advance, which makes this tool not so convenient. Compared to these teaching tools, Rain Classroom is just an application attached to WeChat and Microsoft PowerPoint. Taking Rain Classroom for example, we study the students' behavior in ICT environment in this work.

This electronic teaching method was founded by an online studying platform called "School Online" and the online education office of Tsinghua University. At present, there are already 330,000 users in 200,000 classrooms in 114 countries using this teaching software. Rain Classroom has become the most active electronic teaching tool in China. Its purpose is to connect the intelligent terminals of teachers and students in order to maximize the teaching experience of students and thus improve the teaching effect [7]. Rain Classroom integrates complex information technology into PowerPoint and WeChat. By using it, teachers can send pre-study courseware with MOOC videos, tests, and audio to the student's mobile phone and students can give feedback in time [8]. Through Rain Classroom, students can answer questions and send barrage in class, providing a perfect solution for traditional teaching and student interaction. Nevertheless, there is also a shortcoming: it needs to be attached to Microsoft's software PowerPoint to be able to run. However, we believe that for a long time in the future, Microsoft PowerPoint will be the main courseware designing software. Therefore, I believe that Rain Classroom would become more and more popular all over the world in the future.



Figure. 1 Rain Classroom login interface

## 2.2 WeChat

WeChat is a popular application launched by Tencent in 2011, which is a social software can send timely message. It supports rich media materials such as text, voice, pictures. According to an industry research report, WeChat has become one of the largest social platforms in China [9].

Zhang studied college students' behavior of using WeChat during and after class [10]. The number of college students using WeChat per day accounted for 83.4%. Since the class information and the news of the community activities are transferred via WeChat, it will lead students to indulge in this app. To some extent, this attractive social software makes it difficult for students to concentrate in class. According to his research, most students have habits of browsing WeChat from time to time in class. 5% of the students often use WeChat in class and 50% of the students will use WeChat occasionally in class. Using WeChat in the classroom will definitely reduce the efficiency of the class. It has been widely accepted that pulling students out of their mobile phones is difficult. Therefore, the software Rain Classroom has been designed and published, which makes use of WeChat as a teaching and learning tool. In Rain Classroom environment, a series of teaching materials are dispatched and the student has to come back to the teaching process so that the teaching and learning efficiency can be improved.

## 2.3 Regulatory focus theory

Although Rain Classroom is widely applied in China's colleges, still quite a few students have limited interest in the new teaching environment, thus have not devoted themselves to course learning. This survey therefore applies psychology, namely regulatory focus theory, in education and studies the behavior of students' learning to analyze their attitudes towards such teaching tools.

The previous study has explored that people can be divided into two kinds (promotion focus and prevention focus) in line with their respective self-

regulatory foci [2, 4]. People who are promotion focused pay more attention to success and achievement, they would be more likely to experience joy or relaxing; while people with prevention focus pay more attention to responsibility and security, they are more likely to experience frustration or anger.

Regulatory focus theory explains the different scenarios that produce promotion focus or prevention focus. The motivation to approach the positive target state can be either to promote orientation or to prevent orientation; likewise, to avoid the state of negative goals. From this perspective, the regulatory focus orientation explains how people approach the positive target state and avoid the passive target state. For example, two people currently have good interpersonal relationships and want to perform well at a dinner party (have motivations to approach a positive target state). Among them, one regards this as an opportunity to further improve its social status, while the other sees this as necessary to maintain the existing social connections. That is to say, although both people are willing to attend this party, the first one is more promotion-oriented, while the second is more prevention-oriented.

These two self-regulatory foci can be determined by parents' teaching method, expressed as a chronic personality trait [11], while in others' view, can also be temporary due to situational factors [12]. Advocates of the chronic regulatory focus theory believe that a person's self-regulatory focus is a stable characteristic that can not change in the short-term. In the later view, a person can be affected by the different situations. Whether a person's self-regulatory focus is chronic or situational have enriched previous studies and researches. Some published studies have assessed the effects of a specific environment on a person's self-regulatory focus.

Some studies have applied this theory in education [13], but just observed the effect on students' behavior and come up with an abstractive conclusion. Some researchers studied ICT, like the Rain Classroom [7, 8], however, they did not apply any scientific theory in

the study. They merely ask some students to finish the questionnaire thereby drawing the conclusion. Previous studies have failed to examine the role played by electronic teaching tools in courses. Up to now, there have been no attempts to apply the psychological theory to researches of ICT environment in education. This paper gets inspired from the previous studies on what feature of learning software would affect students' studying and employs the regulatory focus theory to make the conclusion more reliable and perfect. In addition, the paper also draws conclusions through analyzing the real teaching evaluation data from TMS. That is rare in previous studies.

When the ICT education environment is mentioned, MOOC is also a hot research topic. Previous research applying the regulatory focus theory in MOOC has found that if teachers' advocates can match students' self-regulatory focus, students can recognize the helpfulness and effectiveness of this studying platform [1]. The conclusion is that the teacher should take different teaching measures to lead students to be more active. These researches' object is MOOC, which is usually employed for afterschool learning and has no meaning for teaching during class. On the contrary, the Rain Classroom is commonly applied during class. Accordingly, it is necessary to pay attention to the application of regulatory focus theory in Rain Classroom. This work can enrich the study of psychological theory in ICT education environment.

## 2.4 Hypotheses development

In this study, questionnaires were published to measure students' enthusiasm in studying and the efficiency of teaching process and measure whether students would support teachers using the Rain Classroom. As proposed in the regulatory focus theory, students with different regulatory focus would be affected by different advocates due to their different focus in their information processing. If teachers can encourage students to take part in this learning tool in a targeted way, students would be more willing to engage in this software. Hence, I proposed that:

Hypothesis 1. A match between the students’ regulatory focus and teachers’ advocates (I.e., promotion-oriented advocates match with promotion-focus students; prevention-oriented advocates match with prevention-focus students) would encourage students to support teachers using the Rain Classroom.

Hypothesis 2. Using the Rain Classroom would improve students’ enthusiasm in studying.

Hypothesis 3. Using the Rain Classroom would improve the efficiency of teaching process.

Hypothesis 4. Teachers who have applied the Rain Classroom are more popular than teachers who have not applied the Rain Classroom.

Hypothesis 5. Students would give the teacher higher score if teacher’s advocates matched the students’ regulatory focus.

### 3. RESEARCH METHODOLOGY

To evaluate how the regulatory focus theory can influence students’ attitudes toward the Rain Classroom, the research was conducted in my class to test the hypotheses. This research consisted of two studies. In the first study, students in my class were divided into two categories, promotion-focus and prevention-focus, according to the result of questionnaire 1. Then, questionnaire 2 was designed to examine students’ attitudes toward using Rain

Classroom. This survey explored whether this novel teaching method can improve students’ enthusiasm in studying and the teaching process’s efficiency. The second study analyzed the database of Teaching Management System (TMS) and focused on students’ evaluations of different teachers. The difference between these teachers was that some teachers utilized Rain Classroom while some did not.

#### 3.1 Study 1: two surveys

In previous studies, some scientists thought a person’s regulatory focus was a chronic personality and would never change easily <sup>[11]</sup>, while others thought a person’s regulatory focus was a situational personality and would change according to different situation <sup>[12]</sup>. In this study, I prefer that a person’s regulatory focus should be a chronic personality, and would affect people’s long-term learning progress according to the latest study (Haws) and my own experience. Assuming that students’ regulatory focus would not change in short-term guaranteed the validity and reliability of the data collected from experiments.

##### 3.1.1 Survey 1

In the beginning of last semester, I published a questionnaire as shown in Table 1 through the Questionnaire Star website in my two student WeChat groups. These students are from the same course “R & Data Mining”.

Table 1:Regulatory focus measurement

Promotion-focus (6 Measures)	1. Do you always imagine how you can achieve your dreams and wishes in the future? (Original)
	2. Do you always try to do different things well?
	3. Do you think that you have made progress on the road to success in recognizing life?
	4. Did you find that there are very few hobbies and interests in your life that can make you work hard?
	5. Compared with most people, are you always unable to get what you want outside of your life?

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	6.	When you are about to complete a task that is very important to you, do you find that your performance is not as good as you think?
Prevention-focus (6 Measures)	1.	Do you always worry about bad things happening? (Reversed)
	2.	During your growth, have you ever done something beyond the boundaries that parents can't tolerate?
	3.	Will your parents feel uneasy during your growing up?
	4.	Do you often obey the rules and requirements set by your parents?
	5.	Are you sometimes in trouble because you are not careful enough and careful?
	6.	Is your main goal at school to avoid failing the final examination?

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In China, almost every student uses WeChat for social interaction. Therefore, our teacher would create a student WeChat group in each class in order to inform students to finish their homework or to preview course content. Students were told that questionnaire was vital, everyone needs to finish this work seriously and the result would be a part of the final examination. There were 12 questions in this questionnaire. And a pair of totally different questions (the Original & the Reversed) examined whether the student finished this questionnaire carefully or not. Due to the result of the questionnaire, 6 students did not objectively complete this questionnaire because they gave the same answer when answering the opposite questions. Those questionnaires are invalid and deleted. Finally, 132 pieces of valid data were collected. According to the result of questionnaire, students would get 1 if they answer “Yes” in promotion-focus questions, and receive 0 if they choose “No”. In prevention-focus questions, students would get -1 if they choose “Yes” and receive 0 if they choose “No”. Based on students’ final total score, they were classified into two categories according to a median split. As a result, 69 students were marked promotion focused for their scorers are larger than or equal to 0 and 63 students were marked prevention focused for their scorers are less than 0.

### 3.1.2 Survey 2 Experiment Design

This survey was conducted in a controlled condition so that those possible external factors such as environmental interruptions can be controlled. All of the students who participated in this survey were in the same semester and in the same course, so that the full factorial (Table 2) design’s validity can be ensured. In survey 2, all students in survey 1 were included, except for those students who do not seriously complete the investigation in the first part.

Table 2: 2 by 2 full factorial design

Promotion focused type	Prevention focused type
Promotion focus advocate (34)	Promotion focus advocate (32)
Prevention focus advocate (35)	Prevention focus advocate (31)

#### Independent variables

Previous studies have utilized different advocates to motivate people’s interest [14, 15]. I designed the advocates as demonstrating outcome-gain orientation or outcome-loss orientation respectively. I gave the gain orientated advocate by telling students: “If you keep learning in the Rain Classroom app and gain excellent scores in tests, you can get a higher score in the final exam (because the learning behavior will be recorded and counted into the final score).” The loss orientated advocates were created by telling students: “If you do not use the Rain Classroom, you will be considered as absent and the score of your daily performance would be much lower than others.”

## Dependent variables

This survey measured both the process variables and the outcome variable so that we can better understand the students' thoughts toward using the Rain Classroom. I chose the extent to which students support teachers in using this online teaching method as the outcome variable. The questionnaire was designed to gain students' attitudes toward the ICT environment. These questions were largely derived from previous studies<sup>[16, 17]</sup>. The extent of students' support was evaluated by the following questions: 1) To what extent do you support teachers using the Rain Classroom in teaching? 2) To what extent do you support universities popularizing the Rain Classroom?

In order to measure the influence of this app, I considered students' enthusiasm in studying and efficiency of the teaching process. What we know about how to measure the process variable comes from previous works, such as those of<sup>[1, 18, 19]</sup>. To evaluate students' enthusiasm in studying, I asked students the following questions: 1) Compared with those teachers who do not apply any information technology, are you more willing to interact with teachers who use the Rain Classroom? 2) Students can post bullet screen comments on the screen, will you post bullet screen comments in the class? 3) Students can send their questions to teachers through the Rain Classroom, are you willing to send your question by the Rain Classroom? 4) If there are two teachers, one teacher uses the Rain Classroom while another does not, and other situations are similar, will you more likely to choose the second one's course? and 5) Compared with the class where the teacher does not apply the Rain Classroom, are you more willing to finish the test in the Rain Classroom? To measure the efficiency of the teaching process, I asked students the following questions: 1) I agree that using the Rain Classroom would increase students' concentration in class. 2) I agree that using the Rain Classroom would make interacting between students and teachers more convenient. 3) I agree that using the Rain Classroom would save the time which is not spent on teaching (like roll call, uploading PPT, etc.).

and 4) I agree that using the Rain Classroom make scoring daily performance more fairly.

## Experimental procedure

This experiment was carried out two weeks after the last survey. Before the class, I divided students into two WeChat groups according to their different regulatory foci and told them the assignment was random. The number of students with promotion-focus was almost the same as the number of students with prevention focus in each group. At the beginning of the class, I sent two different questionnaires in two WeChat groups through the QR code, asking students to finish the questionnaire seriously. Before students need to complete their demographic information at the beginning of the questionnaire, there were some sentences on the top of the questionnaire, which are actually different regulatory focused advocates. One questionnaire was created in order to provide students with a promotion advocate, while the other was created to offer students a prevention advocate. In the group 1, there were 34 students with promotion focus and 32 students with prevention focus, and they would accept the promotion-oriented advocates. In the group 2, there were 35 students with promotion focus and 31 students with prevention focus, and they were arranged to receive the prevention-oriented advocates. Before we began the survey, these students were told they could gain a good score if they finish this questionnaire honestly. After they opened the questionnaire, they would see either promotion-oriented advocates or prevention-oriented advocates at first, and then they were asked to answer some questions about their attitudes toward the Rain Classroom. In each answer, students can use 7-point scales to express their different extent of agreement.

### 3.1.3 Results

The analysis included all students' data, except for those 6 students who do not complete all the questions in the questionnaire. As we can see in the demographic information, the sample included 40 male students and 92 female students, and the average age was 20.23. In order to measure the efficiency of the construction, I did a factor analysis with principal

component analysis and correlation matrix through the SPSS software program at the first step. The main basis of the factor analysis was dividing different factors into various groups, variables in each group have a high correlation. Whether the construct is efficient or not was evaluated by analyzing the loading level. As we can see in Table 3, the rotated

component matrix showed that both the correlation and efficiency of the constructs were good. Meanwhile, the internal reliability analysis of the multiple-item constructs also illustrates the reliability, the Cronbach's alpha for support was 0.96; for enthusiasm was 0.909, and for efficiency was 0.936.

Table 3:Factor loading analysis

	Support in using the Rain Classroom	Enthusiasm in studying	Efficiency of teaching process
support1	0.897	0.323	0.210
support2	0.906	0.156	0.324
enthusiasm1	0.270	0.837	0.311
enthusiasm2	0.075	0.867	0.265
enthusiasm3	0.248	0.679	0.534
enthusiasm4	0.299	0.782	0.339
enthusiasm5	0.320	0.780	0.430
efficiency1	0.319	0.384	0.851
efficiency2	0.388	0.462	0.707
efficiency3	0.182	0.307	0.896
efficiency4	0.312	0.519	0.669

Table 4:Descriptive analysis of variables

	Promotion-focus advocates		Prevention-focus advocates	
	Promotion-oriented students (N = 34)	Prevention-oriented students (N = 32)	Promotion-oriented students (N = 35)	Prevention-oriented students (N = 31)
Support1 for the Rain Classroom				
Mean	5.76	4.09	5.06	5.48
Standard deviation	1.119	1.355	1.187	1.338
Support2 for the Rain Classroom				
Mean	5.52	4.12	5.00	5.39
Standard deviation	1.326	1.244	1.138	1.476

### 3.1.4 Control and manipulation check

A great deal of previous researches were focused on using different items to focus on promotion orientation and prevention orientation to check the manipulation, such as [1, 20, 21]. Different students would accept different advocates, and would believe that: “I can gain a higher score in daily performance by finishing the test in the Rain Classroom seriously” and “I would fail in the final exam because of the low score in daily performance if I do not use the Rain Classroom to enter the class.” We can see there is a vital difference between students’ attitudes toward this teaching method with different advocates. Students’ answers were totally different when they are answering the supporting questions. In the first group which is given a promotion-focused advocate, the results were significantly different ( $p < 0.05$ ), and the answer of promotion-oriented students (mean = 5.76; SD = 1.119) was much higher than those prevention-oriented students (mean = 4.09; SD = 1.355). In the second group, we can also see significant differences between the answers in different types of students ( $p < 0.05$ ), prevention-oriented students (mean = 5.48; SD = 1.338) got a higher score than the promotion-oriented (mean = 5.06; SD = 1.187). Thus, Hypothesis 1 can be supported.

Table 5: Descriptive statistics for questions

	N	Mean	Standard Deviation
enthusiasm1	132	4.83	1.509
enthusiasm2	132	4.45	1.705
enthusiasm3	132	4.84	1.497
enthusiasm4	132	4.73	1.382
enthusiasm5	132	4.61	1.512
efficiency1	132	4.50	1.496
efficiency2	132	4.92	1.387
efficiency3	132	5.20	1.570
efficiency4	132	4.68	1.443

To test Hypothesis 2, I ran a descriptive analysis in the results of five questions which is used to measure

students’ enthusiasm for studying. As can be seen in Table 5, all of the means of the answers were above 4.45, and score 4 represents students’ neutral attitude. The above analysis confirms that the use of Rain Classroom can enhance students’ enthusiasm for learning. We can see a similar result in Hypothesis 3. Questions 22 to 25 were designed to check whether the Rain Classroom can improve the efficiency of the teaching process. All of the means of the answers were above 4.50, which mean that most students would agree that the teaching process can be improved after using this software. Hypothesis 3 is fully bolstered.

In order to prevent being influenced by some personal characteristics such as gender, age, and the ICT environment experience, the participating students were mostly from the same grade so that these variables can be controlled. According to the previous study, the MANOVA analysis reveals an important result: gender ( $p > 0.05$ ) and age ( $p > 0.05$ ) do not significantly influence the results, while experience ( $p < 0.001$ ) significantly affects the results. After obtaining the data of the questionnaire, the study conducted independent sample t-test on the degree of support of the Rain Classroom (Table 6) according to different genders, ages and different ICT environment use feelings, and found that the foregoing conclusions were fully verified.

Table 6: The result of independent sample t-test

	Support1	Support2
Gender	Sig=0.474 F=0.517	Sig=0.962 F=0.002
Age	Sig=0.321 F=0.993	Sig=0.290 F=1.130
Experience1	Sig=0.029 F=4.968	Sig=0.087 F=3.025
Experience2	Sig=0.018 F=5.862	Sig=0.005 F=8.369

### 3.2 Study 2: retest of Hypothesis 2 & 3 in study 1

In study 2, we quoted the students’ evaluation score of the teacher in the TMS. The teaching quality

evaluation was a mandatory duty, students need to submit their assessment through the TMS, otherwise, they can not select courses of the next semester via the system. Students were obliged to give a score from point 1 to 10 according to a different extent in each field. Finally, the system would output the final grade of each teacher based on students' ratings, and students can give their suggestions to teachers in the last blank.

### 3.2.1 Experiment design

The experiment was separated into two parts. In the first part, we quoted the students' evaluation of all teachers in the university and divided these teachers into two groups according to whether they utilized Rain Classroom in class. There were 758 records in the evaluation result and the amount is large enough to guarantee the dependability of this study.

In the second part, we chose the teaching quality evaluation of "R & Data Mining" from those 132 students who took part in study 1. In this course, Rain Classroom was frequently adopted. According to study 1, these students were divided into two groups. One group were students whose teaching advocates were not match their regulatory focus, the other group were those who accepted matched teaching advocates. Both groups concluded promotion-oriented students and prevention-oriented students.

### 3.2.2 Results

Two groups were generated, group 1 (671) included teachers who did not use the Rain Classroom, and group 2 (87) were teachers who apply the Rain Classroom more or less in class. According to the result of t-test, a significant difference was found in different groups ( $p < 0.05$ ). Teachers who employed the Rain Classroom in their class earned a better score (mean = 95.05; SD = 3.247) than those who did not exploit the Rain Classroom (mean = 94.73; SD = 2.465).

The most surprising aspect of the data was that teachers in group 2 gained a higher score especially in the following scale questions: 1) I think the teacher make reasonable arrangements for the lecture time. 2)

I think the teacher can inspire students to think, thus improving students' thinking ability. 3) I think the teacher can make the classroom atmosphere easy and enjoyable. 4) I think the teacher can improve the student's interest in learning. 5) I think the teacher can enhance students' enthusiasm for class.

Among them, questions 1 to 3 were to see if the teacher's teaching method is appropriate. We can see a significant difference between group 1 and group 2 ( $p < 0.05$ ). This result can justify the conclusion in study 1 that using the Rain Classroom can improve the efficiency of the teaching process. Questions 4 and 5 were to determine whether teachers can improve students' enthusiasm for learning, and the result showed that students would be more likely to listen to those teachers who use electronic tools in class. To sum up, the results of experiment 2 suggest that Hypothesis 4 is right and can strengthen the conclusions drawn in experiment 1. Most students would agree that using the Rain Classroom would help teachers teach more efficient and make students more active in class. Therefore, teachers who apply electronic teaching tools would be much more popular in students while compared to those who do not exploit electronic tools.

In the second part, we quoted 132 students' evaluation, these students have participated in the first study. 65 students accepted teachers' advocates that match their regulatory focus and 67 students accepted teachers' advocates that do not match their regulatory focus. According to the independent sample t-test, the average score of students who accept appropriate advocates (mean = 94.377; SD = 2.207) was a bit higher than those who do not accept proper advocates (mean = 93.866; SD = 2.2607). However, the difference was not significant ( $\text{sig} = 0.828$ ) therefore the result can not support the hypothesis. Teachers would not gain a higher score even if they apply Rain Classroom in teaching so that Hypothesis 5 is not supported. A possible explanation is that students may think that teachers would use the Rain Classroom to save their time so that they can do things irrelative to teaching, though Rain Classroom can improve the teaching efficiency.

## 4. DISCUSSION

### 4.1 Findings

We can deal with the previous questions according to this research. As hypothesized, students would be more likely to participate in the Rain Classroom course if advocates can match their regulatory foci. Students with promotion focus are more likely to be persuaded by those promotion-oriented advocates, while students with prevention focus are more likely to be persuaded by those prevention-oriented advocates. And the result of the questionnaire suggests that applying Rain Classroom can truly improve students' learning enthusiasm and teaching efficiency

In previous studies, the helpfulness and enjoyment of learning from teaching aids are considered to be important factors<sup>[22]</sup>. It has been conclusively shown that these two factors would significantly influence students' attitudes toward the ICT environment<sup>[17, 23]</sup>. Based on this previous research, similarly, we measured that students' enthusiasm in studying and the efficiency of the teaching process with Rain Classroom. After analyzing the results of the test, it can be concluded that applying this software would improve most students' motivation in studying and would considerably increase the teaching process's efficiency. The degree to which each student is motivated to study is somewhat different. If the advocate can match students' regulatory focus, students are more likely to recognize the value of this ICT app thereby being willing to take part in the modern course.

The second study reveals that students' attitudes toward teachers who use/don't use the Rain Classroom are somewhat different. Students are more willing to interact with teachers if the Rain Classroom is employed, and students would agree that teachers could make a good use of time in class with assistant of such app. The ratings of teachers who apply the Rain Classroom are considerably higher than those who do not use the app. The second part of study 2 reveals that students would not necessarily rate teachers highly even if they accept suitable advocates.

A conjecture is that students may consider that teachers would deal with their own business by using Rain Classroom frequently.

However, there remains a question unanswered: how to explain the outcome? Why students are more likely to participate in the class when teachers use electronic teaching tools? We may wonder which aspect of ICT applications would be attractive to students, exquisite courseware, feedback effectiveness or something else. And what we can do in the future to improve the ICT teaching software to make it more suitable for students. I suggest in the future, researchers should do more studies to address these issues.

### 4.2 Implication

The result of this study provides some explanations as to how can ICT applications such as Rain Classroom become interesting to students.

First, the research reveals that the regulatory focus match can lead students to engage in ICT-aided classroom. The implementation of this theory is to improve teachers' teaching methods. Teachers can determine their advocates according to different students' personalities. If students are promotion-focused and attend to be the top students in the class, teachers should give the promotion-oriented advocate. If students are prevention-focused and only learn to avoid failing the test, teachers should consider the prevention-oriented advocate. Teachers should adjust their way of communication according to different students' type, thereby attracting all students' attention.

Second, there is very little published research on how teachers can efficiently apply various strategies to different students. Is this teaching method feasible? In the era of big data, teachers at colleges can adjust their teaching methods against different students conveniently with the help of ICT. Teachers can dispatch electronic questionnaire to learners at the beginning of the semester, and divide students into two kinds according to their answers through the ICT applications such as Rain Classroom. The software would send different kinds of messages and information to each student, matching their regulatory

focus. In addition, some extra functions can be designed to prevent those naughty students from playing truant, while other functions can motivate those excellent students to gain additional scores. In a word, specialized teaching process is more efficient and enjoyable with an electronic teaching tool.

Third, these results may help us to understand how ICT affect students' learning. Several attempts have been made to find out ICT's influence on studying [8, 24]. So far, however, there has been little discussion about students' intention in using ICT teaching tools. This would be especially vital to those emerging electronic teaching tools. To understand how electronic tools affect students, the previous research demonstrated that if students could recognize ICT tools' helpfulness and efficiency, they would be more likely to use electronic tools. This conclusion would be meaningful to those ICT teaching tools. Teaching tools should be designed to improve students' participation in the class by introducing some interactive activities between students and teachers. Students would be more willing to answer teachers' questions or complete teamwork because ICT teaching applications can make interaction much more convenient.

### 4.3 Limitations and future research

Although this research would be helpful in some areas, several questions remain unanswered at present.

First, the study is based on that students' personality is chronic and would not change in a short time [11, 25]. We may wonder whether students' attitudes toward learning would change in a period of time or not because there are too many uncertain factors in the college. Without providing the convincing evidence, we can not substantiate that students can be separated into two groups according to their regulatory focus. Therefore, further work is required to establish the reliability of college students' chronic personality.

Additionally, it is not safe to unfairly assume without substantiation that students would not be affected by different advocates. The data shows that the match between students' regulatory foci and teachers'

advocates would significantly stimulate students to accept electronic tools. This could turn to be the case, however, it would be problematic if students would be influenced by advocates and would be under great pressure. If so, anyone would be reluctant to accept the conclusion. So that in future investigations, it might be possible and necessary to find out whether there would be other influences on students while implementing advocates.

Another paramount problem involved in this study is that there is still an unaddressed issue about what would cause students' different personalities. Several previous studies have evaluated the influence of students' different regulatory foci in studying [26]. Despite the importance of personality, there remains a paucity of evidence on the factors affecting personality. The result of these findings would be meaningful and vital to educators and the teaching process.

## 5. CONCLUSIONS

In this study, we applied regulatory focus theory, a psychological theory, in education research. We focused on teaching method's influence on students' enthusiasm in participating in a novel ICT environment. Two studies were carried out to bolster our hypotheses. The first study analyzed the questionnaire result of college students (N=132). Some hypotheses are strengthened according to the analysis results in the first study: students are more likely to take part in Rain Classroom if teachers' advocates can match their regulatory foci (hypothesis 1). Exploiting this novel electronic teaching tool in class can improve students' learning enthusiasm and teaching efficiency (hypothesis 2 & hypothesis 3). In the second study, we quoted students' teaching quality evaluation from TMS, and found that hypothesis 4 was supported while hypothesis 5 was not confirmed. As shown in Figure. 2, hypothesis 4 would strengthen Hypothesis 2 and Hypothesis 3 because teachers who adopt Rain Classroom gain a higher score in those questions about students' learning enthusiasm and teaching efficiency. This result reconfirms that students would become more

active in class and teaching process would be more efficient if teachers apply this software.

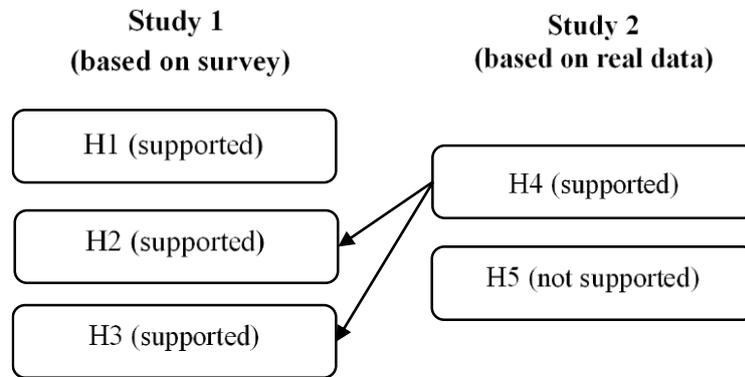


Figure. 2 Conclusions of two studies

As applying this ICT teaching tool can improve students' enthusiasm and teaching efficiency, teachers in colleges should take some measures to stimulate students to take these ICT tools. By studying the influence of psychology (regulatory focus theory) in education, teachers should provide different students with different advocates so that students can recognize the necessity of employing this software in studying. We have also discovered that whether students' personalities are chronic or situational is not decided yet. To date, few studies have examined the factors that would affect students' personalities. Research on the determinant of students' personalities, and in particular of regulatory focus, is worth pursuing.

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