

The Impact of Volitional Feedback on Learners' Self-Efficacy and Course Satisfaction in  
a College Assignment System

Wei Wang

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State  
University in partial fulfillment of the requirements for the degree of

Doctor of Philosophy  
In  
Curriculum and Instruction

John Burton, Chair  
Barbara Lockee  
David Moore  
Kenneth Potter

August 30<sup>th</sup>, 2011  
Blacksburg, Virginia

Keywords: self-efficacy, volition, feedback strategy, course satisfaction

Copyright 2011

# The Impact of Volitional Feedback on Learners' Self-Efficacy and Course Satisfaction in a College Assignment System

Wei Wang

## ABSTRACT

In contemporary Chinese higher education, classroom lectures combined with a web-based learning support system are broadly applied. This study investigated what kind of feedback strategy could be effective in improving students' self-efficacy and course satisfaction in a blended learning context. Standard volitional messages were constructed and—along with traditional feedback content (knowledge of results and knowledge of correct response)—distributed to a large undergraduate class in China. Sixty-seven freshmen participated in this pure experimental study. Results indicated that students' learning self-efficacy and course satisfaction were significantly correlated. In addition, participants who received the knowledge of correct response plus volitional messages (KCR+V) showed greater course satisfaction than those who received other types of feedback messages. No significant difference emerged in self-efficacy. Future research directions are discussed.

## ACKNOWLEDGEMENTS

To Mom and Dad, my greatest supporters.

To Xiaoxiao, with so much love, always and forever.

I have learned two things over the last five years, it's that men don't mature themselves—and leanings don't happen themselves.

John Burton, adviser and mentor, who has faithfully guided me from a novice to a scholar. He trusted me as always. He gave me the light when I was suffering in the darkness.

Jane Falls, a so good supervisor.

Ken Potter, a mystery man.

Mike Moore, an old funny boyscout.

Barbara Lockee, an earnest scholar.

Xibin Han, a hard-working scholar and a very helpful man.

Thanks again, and again, everybody ... and best wishes for you all!

## Table of Contents

List of Tables .....	viii
List of Figures .....	ix
Chapter I. The Need for Research on Volition	1
Blended Learning System .....	2
Volitional Feedback Strategies .....	3
Current Study .....	7
Chapter II. Literature Review	8
Self-Efficacy and Feedback .....	9
Cognitive Locus of Operation .....	11
Efficacy Expectation and Outcome Expectation .....	12
Sources of Efficacy Expectation .....	13
Dimensions of Self-Efficacy .....	15
Impact of Verbal Persuasion on Learners .....	16
The Role of Verbal Feedback .....	17
Social Cues .....	17
Interaction .....	18
Research of Self-Efficacy in Education .....	19
Motivation and Feedback .....	25
Goals and Feedback .....	26
Cognitive Model of Feedback .....	28
ARCS Model of Motivation .....	30

Volition and Feedback .....	33
Action Control Theory .....	36
Research of Volition in Education .....	39
Feedback and Related Research .....	43
Feedback in Programmed Instruction .....	43
Computer-Based Feedback in CIP Perspective .....	46
Constructivist View of Feedback .....	48
Feedback and Self-Regulated Learning .....	50
Peer Interaction .....	54
The Advantages of Web-Based Feedback and Interaction .....	56
Summary .....	57
Purpose Statement .....	58
Research Hypotheses .....	58
Chapter III. Methodology .....	59
Participants .....	59
Research Design .....	59
Independent Variables .....	59
Type of Feedback .....	60
Volitional Change Strategy .....	62
Sequence of Volitional Messages Delivery .....	65
Dependent Variables .....	69
Self-Efficacy .....	69
Course Satisfaction .....	70

Instructional Settings . . . . .	71
Procedure . . . . .	72
Stage 1. Consent Form, Pre-treatment Measurement and Group Assignment . . . . .	74
Stage 2. Treatment . . . . .	74
Stage 3. Post-Treatment Measurement . . . . .	75
Pilot Data . . . . .	77
Validity . . . . .	78
Chapter IV. Results . . . . .	80
Preliminary Data Analysis . . . . .	80
Group Equivalence Test . . . . .	80
Tests for ANOVA Assumptions . . . . .	81
Descriptive Data . . . . .	81
Self-Efficacy toward Learning . . . . .	83
Course Satisfaction . . . . .	84
Examination of Hypotheses . . . . .	84
Testing of Hypothesis 1 . . . . .	84
Testing of Hypothesis 2 . . . . .	84
Testing of Hypothesis 3 . . . . .	85
Chapter V. Discussion and Conclusion . . . . .	87
Overview . . . . .	87
Findings . . . . .	88
Self Efficacy and Course Satisfaction . . . . .	88

Self Efficacy toward Learning .....	89
Course Satisfaction .....	91
Limitations and Future Directions .....	92
References .....	94
Appendix A .....	110
Appendix B .....	112

## **List of Tables**

Table 1 Assumptions of Constructivism and Suggested Use of Feedback . . . . .	50
Table 2 The Role of Feedback during Monitoring Process . . . . .	53
Table 3 Procedure . . . . .	73
Table 4 Pilot Data Pre-Test Self-Efficacy . . . . .	76
Table 5 Pilot Data Pre-Test Self-Efficacy Continued . . . . .	77
Table 6 Item and Descriptive Statistics for Scales . . . . .	82
Table 7 Descriptive Statistics by Groups . . . . .	83
Table 8 One-Way ANOVA: Post-Test Self-Efficacy . . . . .	85
Table 9 One-Way ANOVA: Course Satisfaction . . . . .	85



## List of Figures

Figure 1. The Trends of Blended Learning . . . . .	3
Figure 2. The Difference between Efficacy Expectation and Outcome Expectation . . . . .	12
Figure 3. Source of Efficacy Expectation . . . . .	13
Figure 4. Selecting Level of Effort to Invest in a Task . . . . .	15
Figure 5. Five Stage Model of Mindfulness . . . . .	29
Figure 6. Certitude Model of Text-Based Feedback . . . . .	30
Figure 7. The Role of Volition in the Context of Learning and Motivation . . . . .	36
Figure 8. A Model of Self-Regulated Learning . . . . .	52
Figure 9. An Example of the Knowledge of Results . . . . .	61
Figure 10. An Example of the Knowledge of Correct Response . . . . .	62
Figure 11. The Sample of Emotion Regulation Message . . . . .	67
Figure 12. The Sample of Motivation Regulation Message . . . . .	68
Figure 13. The Interface of the Online Assignment System . . . . .	69
Figure 14. The Education Online of Beijing Institute of Fashion Technology . . . . .	71
Figure 15. Course Satisfaction by Groups . . . . .	86

**The Impact of Volitional Feedback on Learners' Self-Efficacy and Course Satisfaction in a  
College Assignment System**

**Chapter I: The Need for Research on Volition**

In the contemporary Chinese college educational system, classroom lectures combined with a web-based learning management platform (i.e., the blended learning context) are broadly applied. Most instructors use the assignment system in the learning management platform to publish, correct, and grade students' work. However, the college assignment system only functions as a file management tool. The ability of facilitating motivational feedback between students and instructor has been ignored. Motivational feedback has been approved as a critical factor in impacting students' learning attitude and satisfaction (Bandura, 1997; Bandura & Schunk, 1981; Krause, Stark, & Mandl, 2009; Lipnevich & Smith, 2009; Wang & Wu, 2008; Zimmerman & Tsikalas, 2005). In addition, it is difficult to establish personal contact with students in large lecture classes and make them feel that their personal needs and goals are being addressed by the instructor (Kim & Keller, 2008).

The topic of volition is intimately linked with self-regulation, which Zimmerman (1989) defined as the process whereby students keep motivated and actively sustain cognition and behavior toward attainment of their learning goals. Corno (Corno, 1993, 1994; Corno & Kanfer, 1993) defines volition as part of a larger self-regulatory system that involves motivation and other cognitive processes. Kuhl (1987) proposed his action control theory to describe the distinction between pre-decisional processing and post-decisional processing. In the pre-decisional state, learners are cognitively involved in the activities of making decisions and setting goals; in the post-decisional state, they deal with goal implementation and are volitional.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

As such, volition mediates the relation between one's learning goal and the accomplishment of the goal (Pintrich & Schunk, 1996).

Considerable debate exists as to whether volition needs to be separate from motivation (Pintrich & Schunk, 1996). Corno (1993) suggested that, in school, students typically do not have many opportunities to choose in which activities to engage; they generally follow a set curriculum to finish their studies. However, it is important for them to deal with post-decisional activities when facing difficulties and distractions. Volitional activities direct and control cognition and behavior to accomplish learning goals. The concern of Corno (1994) and Pintrich and Schunk (1996) is how important processes such as self-efficacy and attributions related to volition are involved during goal implementation. Additional research is necessary to address these concerns.

### **Blended Learning System**

The term *blended learning* is increasing used in articles. Indeed, in 2003, the American Society for Training and Development identified blended learning as one of the top ten trends for the knowledge delivery industry (Graham, 2006). Blended learning also relates to distributed learning, e-learning, open and flexible learning, and hybrid courses. Three definitions are commonly used to define blended learning (Graham, 2006): (a) the combining of instructional media; (b) the combining of instructional methods; and (c) the combining of online and face-to-face instruction. The first two definitions reflect the debate on the media comparison study of media versus method. In the *Handbook of Blended Learning*, Graham (2006) defined blended learning systems as “combining face-to-face instruction with computer-mediated instruction” (p. 5). Figure 1 depicts blended learning trends. According to Graham (2006), people choose

# IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

blended learning system for three main reasons: (a) to improve pedagogy, (b) to increase access and flexibility, and (c) to increase cost-effectiveness.

Figure 1. The Trends of Blended Learning

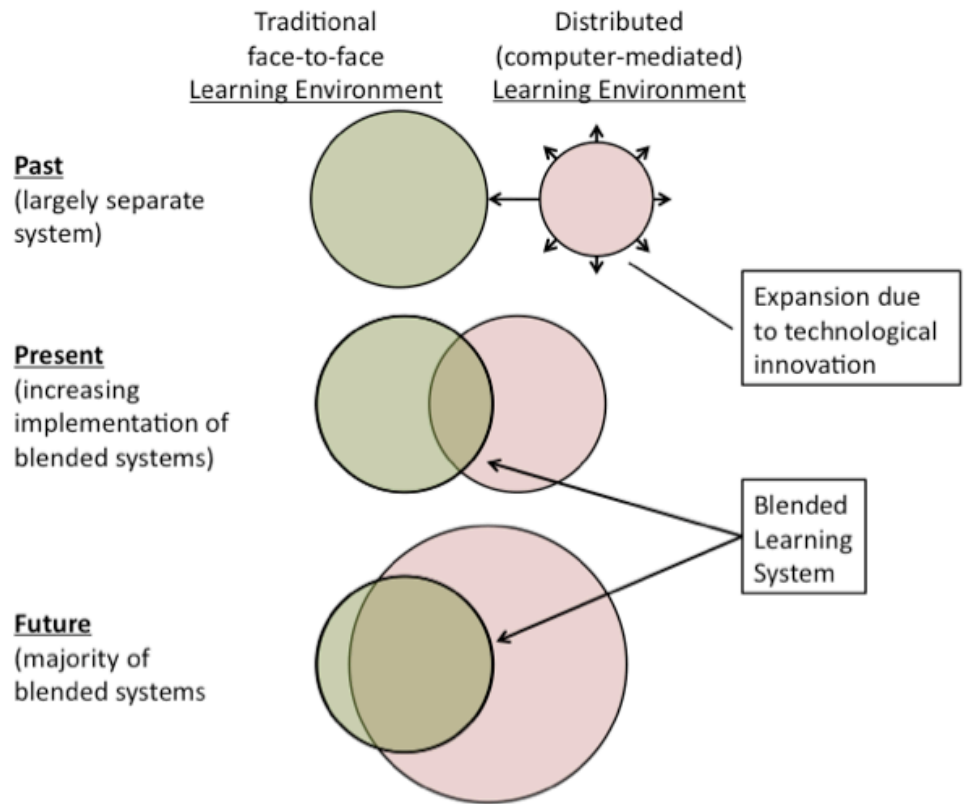


Figure 1. Adapted from “Definition, Current Trends, and Future Directions” by C. R. Graham, 2006, *The Handbook of Blended Learning: Global Perspectives, Local Design*. In C. J. Bonk & C. R. Graham (Eds.), p. 6. Copyright 2006 by the author.

## Volitional Feedback Strategies

Previous studies have shown the effectiveness of volitional feedback strategies. Kim and Keller (2008) conducted research using motivational and volitional email messages (MVEM) to examine the effect on students’ motivation for the course, study time, and test grade. In their study, 101 undergraduate students enrolled in an archaeology course at a southeastern public

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

university. The average age of participants was 20 years; 63.4% were male. The majority of participants were freshmen and sophomores. All participants were divided into two groups, according to their responses on the pre-survey related to satisfaction. The unsatisfied group, which contained 30 participants, was the MVEM with personal message group (PMG). The satisfied group, which contained 71 participants, was the MVEM with non-personal group (NonPMG).

The independent variable was the type of email messages sent to the participants. The first level of the independent variable was MVEM without personal message (NonPMG), which was constructed based on four categories of the ARCS model, Gollwitzer's (1996) concept of implementation intentions, and Kuhl's (1987) six action control strategies. The second level of independent variable was MVEM with personal message (PMG), which was constructed based on Visser and Keller's (1990) systematic design process; this level utilized individual audience analysis.

Participants' motivation was measured using pre- and post-surveys of an abbreviated version of Keller's (Keller & Suzuki, 1987) Course Interest Survey (CIS), which was developed with the theoretical foundation of the ARCS Model. The survey used a 5-point Likert scale. Participants' study habits (study time) were measured using the pre- and post-surveys asking how many total hours were spent studying during the week of the test. Participants' achievement was measured by their grades on each of two regular scheduled tests administered during the study, which occurred at a four-week interval. The grade was indicated on a 12-point scale (F=1, A=12; Kim & Keller, 2008).

During the week that participants received their grades on the second test of the semester, they responded to a pre-survey on motivation for the course, satisfaction with their grade on the

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

test, and study habit (time). The survey took about five minutes to complete via email. Kim and Keller (2008) divided participants into two groups based on their reported grade satisfaction level. Those who indicated a low level of satisfaction (extremely unsatisfied, moderately unsatisfied, or moderately satisfied) were assigned to the PMG that received MVEM with personal message (n=30). The participants who indicated a high level of satisfaction with their grades (very satisfied or extremely satisfied) were assigned to the NonPMG that received MVEM without personal messages (n=71). During the week when the participants received the grade on the final test, each group responded to a post-survey on motivation and study habit (time). The survey again took about five minutes to complete via email.

Motivation for the course was analyzed using MANOVA (Kim & Keller, 2008). The researchers identified an overall effect of message on motivation between groups. However, within group, the component of confidence decreased. Study habits were analyzed using ANOVA. No significant difference in study habit emerged between groups. Achievement was analyzed through  $2 \times 2$  repeated measures ANOVA using the grades of the two tests. A significant interaction occurred between the two factors of time and intervention methods: The mean of the NonPMG grades decreased while the mean of the PMG group increased. However, without a control group, it is hard to confirm the high causation of the effect of the message on the decrease of the initial gap of achievement between groups.

Kim and Keller's (2008) results indicated that the personal message group showed a higher level of motivation while the initial difference of the test grade between the two groups decreased significantly. This is an example of using personalized volitional feedback strategy to enhance motivation and achievement in blended settings.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Meanwhile, Tang and Byrne (2007) compared regular face-to-face instruction, web-based instruction, and blended instruction. They found that blended instruction increased facility in student assessment and feedback. Students appeared to be more satisfied with the blended mode. Russell, Elton, Swinglehurst, and Greenhalgh (2006) explored two key ways in which online learning environment enables assessment to contribute to learning: through its potential to support collaborative learning and by facilitating high-quality feedback between teachers and students.

Orrell (2006) noted that students claimed a lack of adequate, timely feedback; meanwhile, the teachers claimed that students failed to heed the advice given. Orrell studied students' instant feedback of their assignments and found that instructors' timely feedback could promote learning. Miao, Badger, and Zhen (2006) used textual, questionnaire data, video recordings, and interviews from 12 Chinese students in an English writing class to reveal that students using both teacher and peer feedback could improve their writing. However, teacher feedback was more likely to be adopted and led to better improvements in the writing.

Nguyen, Hsieh, and Allen (2006) investigated the effects of web-based assessments and practice on improving middle school students' mathematics learning attitudes. They compared web-based instruction and traditional instruction, determining that—with opportunities to practice on the computer and receive instant scores and adapted feedback—students demonstrated more interest in doing mathematics and formed a perception that they became smarter in problem-solving tasks. The web-based assessment and practice tool in this study substantially helped students build motivation and elevate the meaning of learning and doing mathematics. Konings and Brand-Gruwel (2007) reviewed a Dutch learning support system called “Second Phase” and revealed that higher interaction between teacher and students could

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

generate higher satisfaction for teachers related to web-based learning support systems while ensuring better achievement among students.

### **Current Study**

The current study focuses primarily on the impact of volitional feedback on learners' self-efficacy and satisfaction. In this study, the teaching and learning environment were restricted to two sessions: face-to-face classroom lecture sessions and web-based assignment sessions. Traditional face-to-face learning occurs in a teacher-leading environment with live synchronous person-to-person interaction. Meanwhile, computer-mediated learning emphasizes self-paced learning in an asynchronous environment. In the face-to-face classroom teaching session, students participated in the classroom teaching activities. No special feedback was requested of the learner during this session. In the web-based assignment session, students were required to log onto the college assignment system to complete their online homework and respond to the motivation questionnaire and satisfaction questionnaire. Volitional feedback was attached online together with the review of homework by instructor. In addition, this study examines whether volitional feedback strategies work in the college assignment system.



## **Chapter II. Literature Review**

The use of feedback for teaching and learning has long been examined in research, and results have varied according to the historical and paradigmatic view (Mory, 1996). As learning theory was influenced by Skinner's (1958) behaviorism and constructivism, combined with the technology evolution from the first Akens Teaching Device in 1911 (Lockee, Moore, & Burton, 2004), and affected by today's high technology and the wide use of computers and the internet, along with the different instructional design models (Mory, 1996), the importance of feedback in instructional design and technology (IDT) has never been ignored.

The definition of feedback in IDT has varied depending on different points of view. In programmed instruction, the feedback was defined as reinforcement in the 1960s (Skinner, 1958), but since the 1970s, some researchers have suggested that the feedback could be viewed as information (Anderson, Kulhavy, & Andre, 1971, 1972; Bardwell, 1981; Barringer & Gholson, 1979; Kulhavy, 1977; Kulhavy & Anderson, 1972; Roper, 1977; Tait, Hartley, & Anderson, 1973). From the constructivist perspective, feedback is treated as a natural result of interactions between the learner and his or her own constructions of knowledge (Mory, 1996).

In the current study, feedback is treated as both a mediator and a motivator. A mediator means that feedback connects the instructor and the learner, which serves the information interaction; the instructor and learner can get to know each other more quickly and accurately. A motivator implies that the proper feedback between the instructor and the learner could increase learning self-efficacy and satisfaction, which are essential factors impacting learning performance and outcomes.

### **Self-Efficacy and Feedback**

In 1977, Bandura originally proposed self-efficacy in his paper entitled “Self-efficacy: Toward a Unifying Theory of Behavioral Change” as a conceptual framework used to predict whether people will choose to participate in learning activities. If so, how much efficacy will be expended and how long will people persist in such activities? His work is treated as a milestone and a shift in psychological research for motivation.

Bandura (2003, p. 6) subsequently defined the concept of self-efficacy as “beliefs in one’s capabilities to organize and execute the courses of actions required to produce given attainments.” Mory (1996, p. 766) describes self-efficacy as the “learner’s perception of how well he or she can perform the learning tasks to achieve his or her goal.” Thus, self-efficacy is a personal perception about his or her own capabilities.

When the learner faces a learning task before implementation, according to the individual’s self-efficacy, he or she will set up the expected goals and examine the amount of efficacy that will be required to achieve the goals successfully. This process is best described by self-efficacy theory. The relationship between self-efficacy and performance is defined as follows:

1. Students with high self-efficacy generate high performance, but not always. When a task is demanding, students will immediately determine how much efficacy will be needed for optimal performance. However, if students perceive the task as being easy, those with high self-efficacy may feel that minimal efficacy is needed. As a result, their performance might be low.
2. Students with low self-efficacy can dwell on the deficiencies and inaccurately assess the difficulty of the task while paying more attention to the probability of failure. For

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

instance, in certain situations, a person who has a low level of self-efficacy is less likely to be able to exert control over the environment than someone with a high level of self-efficacy.

Thus, according to social cognition theory (Bandura, 2003), self-efficacy refers to beliefs in one's capabilities to organize and execute the courses of actions that are required to produce given attainments. Self-concept refers to the composite view of an individual formed through experience and feedback from others. However, efficacy beliefs are more complex than self-concept beliefs because self-efficacy beliefs vary (a) across domains, (b) within the same domain, and (c) at different levels with different circumstances. Self-esteem refers to the judgment of self-worth. The efficacy judgments are judgments of capability, not judgments of self-worth.

Modifying a learner's self-efficacy and expectancy is one of the most important roles of feedback in IDT. According to Hoska (1993), "learners will invest maximum levels of effort to achieve learning goals only when their goals and self-efficacy enable them to see the benefit of such effort" (p. 107). In order to do so, feedback should be designed to provide positive learning experience and change the causes learners attribute to their achievement. Providing positive learning experiences refers to continually increasing the level of learners' competence rather than offering them just the success (Hoska, 1993). Bandura (1977) suggested that instructors (a) provide external support for the learners learning a new task at the first time; (b) as the learners' level of skills increased, remove the external support gradually; and (c) when learners achieve certain level of skill, allow them to engage in self-directed learning.

Weiner (1985) postulated the causes learners attribute to their achievement as ability, effort, luck, task difficulty, and strategy used. These factors influence learners' self-efficacy with

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

reciprocal effect of the locus of control. The role of feedback, in this situation, is to modify the learners' attribute of success or failure to internal and controllable causes. According to Rotter (1966), if an individual has an internal locus of control, he or she perceives that a reward is dependent on his or her own behavior and effort. Those who have an external locus of control perceive a reward as being dependent on luck or assistance from others. For example, learners with an internal locus of control usually treat learning achievement as the effort that they expended. Contrarily, learners with an external locus of control treat a successful performance due to the ease of the task.

### **Cognitive Locus of Operation**

Bandura (1977) noted that previously discussed learning mechanisms have inherent problems as the new behavior was shaped automatically by the effect of paired stimulation. The responses were linked directly to stimuli and regulated by the immediate consequences without any cognitive involvement of responders. Compared to such a perspective, Bandura claimed that:

Cognitive process played a prominent role in the acquisition of new behavior patterns. Stimuli will influence the likelihood of a behavior's being performed, not because the stimuli are directly connected to the responses by their occurrence together. Actually, consequences affect the acquisition of new behavior through the influence of thought, beliefs about schedules of reinforcement which can exert greater influence on behavior than the reinforcement itself (Bandura, 1977, p. 192).

Bandura (1977) and Bolles (1972) further stated that motivation was concerned with engagement and persistence of behavior, which was partly derived from cognitive activities. They addressed two cognitively based sources of motivation: (a) the capacity of the thought of

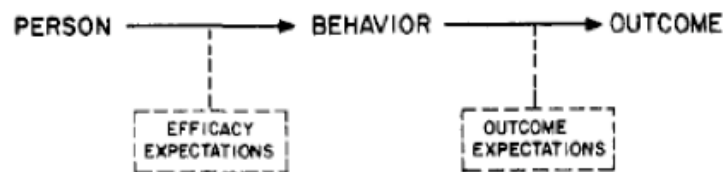
## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

future consequences and (b) the influence of goal settings and self-evaluation reactions. For the first source, reinforcement affects behavior by creating the personal expectations that performance in a certain way will produce future benefits or decrease the probability of future difficulties. For the second source, when an individual achieves a certain level of behavior and is self-rewarded, he or she creates self-inducement and persists in efforts to achieve the desired higher level of behavior. Thus, collectively, self-efficacy perspective is concerned with the affect of reinforcement on cognitive aspects and focuses on the personal perception rather than the reinforcement itself.

### **Efficacy Expectation and Outcome Expectation**

Efficacy expectation and outcome expectation are different concepts; they are distinguished based on the different aspects to which they refer (see Figure 2). Efficacy expectation refers to the belief that one can successfully perform the required behavior to produce the outcomes. However, the outcome expectation refers to the fact that the estimation of a certain behavior will lead to a certain outcome (Bandura, 1977, 2003).

**Figure 2. The Difference between Efficacy Expectation and Outcome Expectation**



*Figure 2. Adapted from “Self-Efficacy: Toward a Unifying Theory of Behavior Change,” by A. Bandura, 1977, *Psychological Review*, 84 (2), p. 193. Copyright 1977 by the author.*

Efficacy expectation focuses on the personal belief of the capability of successfully performing the behavior. The point is the capability of behavior. However, outcome expectation

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

only focuses on the outcomes caused by the behavior. For example, an individual believes that a certain behavior will produce a certain outcome, but may be uncertain about whether he or she can perform the necessary activities, which might not influence the behavior.

### Sources of Efficacy Expectation

From the social learning perspective, individuals build their sense of personal efficacy based on four main resources (Bandura, 1977, 1993, 2003): performance accomplishment, vicarious experience, verbal persuasion, and emotional arousal (see Figure 3).

Figure 3. Source of Efficacy Expectation

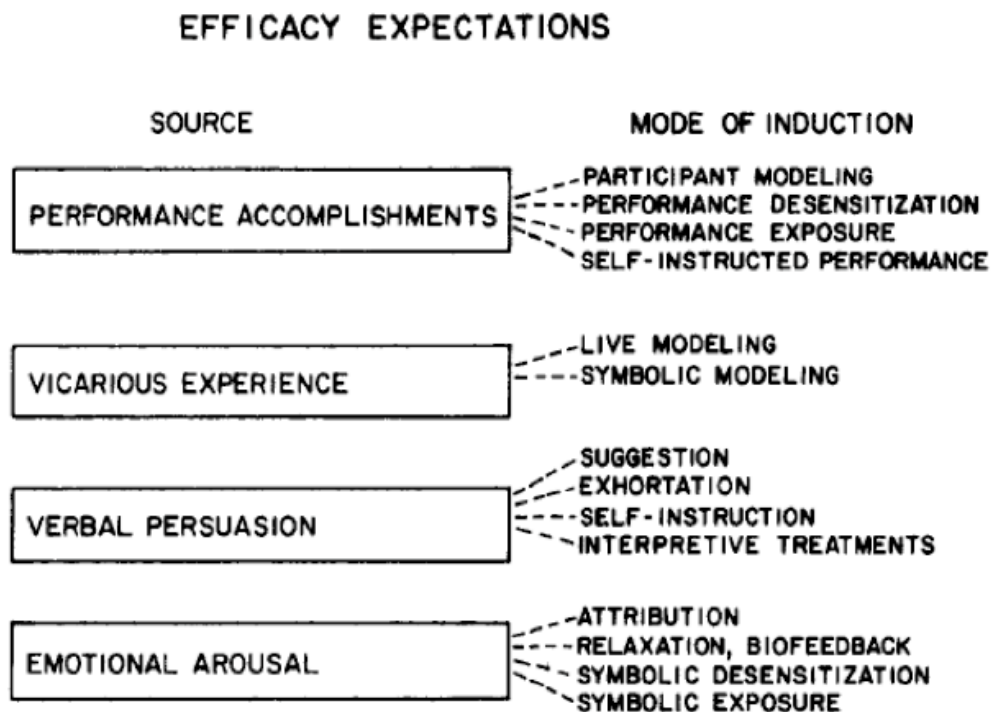


Figure 3. Adapted from "Self-Efficacy: Toward a Unifying Theory of Behavior Change," by A. Bandura, 1977, *Psychological Review*, 84 (2), p. 195. Copyright 1977 by the author.

Self-efficacy is built from an individual's prior mastery experiences. Successes increase the efficacy expectation whereas repeated failures lower them. If an individual puts a minimum

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

amount of effort and completes a task successfully, he or she has a high ability and increases the efficacy expectation. In contrast, if the individual puts a great effort into successfully completing the task, this indicates low ability and decreases the self-efficacy. In this way, the learner's personal interpretation of outcomes impacts the building of self-efficacy as well. Once self-efficacy has been established, it tends to generalize other situations in which the performance is implemented only by him- or herself.

Self-efficacy is also built from the observation of others' successes and failures. By observing others' similar tasks, individuals increase their self-efficacy through success and decrease it through failure. This kind of source depends on the inference from personal comparison, which is less dependable than the mastery experience.

In addition, verbal persuasions impact the personal sense of self-efficacy, which is widely used in teaching and instruction because it is easy and accessible. Verbal persuasions could be given by the instructors, peers, parents, computers, etc. The learners are concerned about the persuasion as the estimation of their ability to perform certain tasks. Efficacy expectation could be increased by continuous praise, even if the students start with low self-efficacy. It could also be decreased by continuous destructive criticism, even if they start with high self-efficacy.

Finally, individuals rely on emotional states (arousal) in assessing their capabilities. One treats the stress reaction strength work as a sign of the likelihood of poor activities. Positive mood enhances self-efficacy whereas negative mood diminishes it. Reducing the stressful reaction and facilitating the mood from negative to positive is a useful strategy for modifying perceived efficacy expectations, which is widely used in physically related performance, such as sports training.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Figure 4 shows the relationship among the task goal, self-efficacy, level of effort, and task expectancy. The task goal and the level of self-efficacy impact the amount of learners' effort put into the task. The selected level of effort consequently affects the learners' task expectancy; this impact further influences the selection of the amount of effort. Finally, it forms a close-loop circle.

Figure 4. Selecting Level of Effort to Invest in a Task

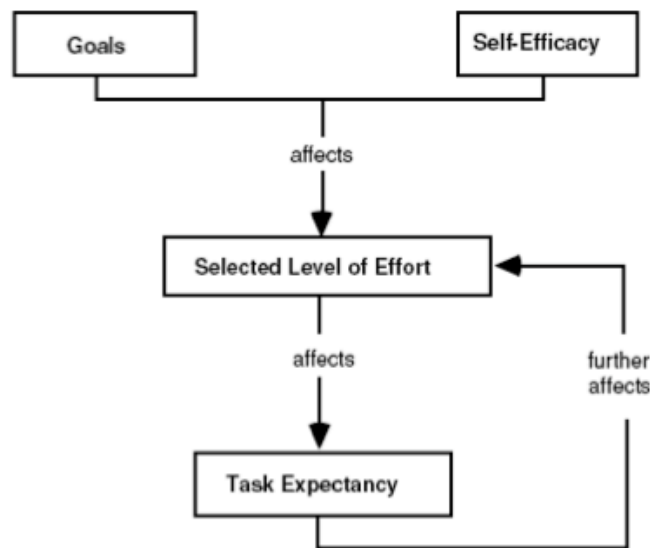


Figure 4. Adapted from “Motivating Learners through CBI Feedback: Developing a Positive Learner Perspective,” by D. M. Hoska, 1993, *Interactive Instruction and Feedback*, in J. V. Dempsey and G. C. Sales (Eds.), p. 121. Copyright 1993 by the author.

### Dimensions of Self-Efficacy

Efficacy expectation implicates performance varied on different dimensions. Bandura (1977, 2003) postulated three main dimensions of efficacy expectations. Magnitude implies that, when tasks are given in the order of difficulty (easy to difficult), individuals can build their



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

efficacy expectation at the lower performance level and raise it in the more complex and sophisticated performance. Some of the tasks in which learners are involved have a universal nature, such as driving a car or doing simple mathematical questions. If they successfully complete these kinds of tasks, learners will easily generalize the efficacy expectation to the similar tasks. However, some of the mastery experience is hard to extend. This is the second dimension of self-efficacy. Finally, self-efficacy varies in strength. Someone who has a strong mastery experience and strong efficacy expectations will more consistently demonstrate the coping effort than those with weak expectations, which are easily eliminated by facing obstacles during performance.

### **Impact of Verbal Persuasion on Learners**

Two kinds of social feedback—praise and criticism—are usually used as reinforcers to achieve the learning goal. Instructors' feedback is usually found to influence learners' responses (Cho, Schunn, & Charney, 2006). For writing classes, positive feedback is more likely to be accepted than negative feedback and could create better performance (R. Butler, 1987; Gee, 1972; Shrauger & Schoenemann, 1979).

Hancock (2002) determined that the majority of research on the use and effects of verbal praise has been conducted on populations in kindergarten through high school students. The highlight of Hancock's research effort reveals that "properly administered verbal praise can be a practical means of influencing graduate students' motivation to engage in behaviors associated with learning" (p. 90). However, even in studies involving older students, research findings have often been conflicting. As Barker (1992) noted, verbal praise had a positive impact when given to college students who successfully accomplished their work. Yet Good (1987) found that, with some of the older students, the verbal praise given after the accomplishment of easy tasks was

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

perceived as the instructor having low expectations of them. In addition, Hancock (2002) conducted experimental research and discovered that well-administered verbal praise could motivate college students to do their homework; however, unfortunately, no positive impact occurred on students' achievement on instructor-designed tests.

### **The Role of Verbal Feedback**

Verbal feedback usually refers to praise, criticism, and correction. The first two types of verbal feedback could be treated as the means of reinforcement, which are usually used to strengthen desired behavior and eliminate aversive behavior. Correction could be treated as the information, which informs the learner not only “right” or “wrong,” but also the solution or information of knowledge in order to encourage the further learning (Hoska, 1993).

Hoska (1993) summarized the effects of praise and criticism in terms of the learners' motivation. He stated that learners usually interpreted praise and criticism as the indicator of their ability and successful level. However, praise may not always result in high motivation. If high praise is given for a relatively easy task, learners may feel that the instructor thinks they have a low level of ability and insufficient skills. If minimal praise is given for a relatively high level and difficult task, learners may feel that the instructor thinks they have a high level of ability, but have made minimal effort, which will result in decreased motivation. However, criticism—especially constructive criticism—has a positive impact on correcting learners' mistakes and helping them increase their motivation.

### **Social Cues**

Learning occurs in certain instructional contexts, which means the learners involved must interact with the environment and their peers. Individuals learn to depend upon social and environment cues to guide and monitor themselves, transfer information, and shape their desired

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

behavior (Rhea, Rovai, Ponton, Derrick, & Davis, 2007). In traditional face-to-face instruction, the interaction (between the instructor and the learners) happens in the classroom, where the social cues can be seen and heard by individuals to reinforce their behavior within the classroom. In this situation, the environment allows the physical cues to create a comfortable and trustful atmosphere during the learning process (Hughes, Wickersham, Ryan-Jones, & Smith, 2002). Neuwirth, Chandook, Charney, Wojahn, and Kim (1994) conducted research into the application of technologies allowing the reviewers to give written or spoken feedback to the writers. Their results indicate that the writers felt more favorable to spoken rather than written feedback because of the mitigating language. Stevens (1973) and Taylor and Hoedt (1966) studied the students' reaction to instructors' comments and suggested that the students rated the instructors' spoken comments as "having more integrity and being likable" (Stevens, 1973, p. 1783)

In contrast, in web-based learning settings, the role of physical cues is very limited. Without these cues for reinforcement, the observation of the learning process and the role of monitoring are limited (Suler, 2004). The current study avoids the disadvantages of web-based instruction in terms of the social cues for reinforcement and information processing by maintaining the advantages of face-to-face instruction as the main learning activities take place in the classroom. Furthermore, the invisible attitude of learning will be tracked through the technology-based feedback system.

### **Interaction**

In the process of instructor-student interactions, a variety of things transpire that can create the feeling of satisfaction or dissatisfaction for either party. "One consequence of the intangible nature of teaching is the variability in perceptions of the interactions that occur with students" (Frankel & Swanson, 2002, p. 86). Instructor-learner interactions can be classified as

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

satisfying or dissatisfying (Oliver & DeSarbo, 1988; Yi, 1990). Satisfaction is a meta-cognition evaluation process. Individuals rely on their own expectations to make a judgment according to the extent of generated fulfillment associated with the level of satisfaction. “These expectations constitute standards that are compared with what the individual believes or perceives has happened during the interaction” (Frankel & Swanson, 2002, p. 87). From this point of view, the satisfaction level depends upon the personal responses and individual perceptions.

Learning happens in different contexts and in a variety of situations (face-to-face or distance, high self-confidence students or low self-confidence students) involving multiple instructor–learner interactions. Instructors are assumed to become involved in a variety of interaction situations and encounter a wide range of learners. In different situations, the learner may require the instructor to apply different approaches according to the learning objective or the knowledge level or the learners’ characteristics (Frankel & Swanson, 2002). As a result, the adjustment of the interaction is based on the feedback received from either party. It is clear that an unsuccessful interaction could hardly generate meaningful learning.

### **Research of Self-Efficacy in Education**

According to Bandura (1982, 2003), the explanatory power of self-efficacy has been validated in many areas, such as health, clinical, athletics, and organizational fields. Much research has been conducted to explore the impact of self-efficacy in different areas. The current study focuses on academic self-efficacy. In academic settings, self-efficacy differs in the various subject areas. For example, self-efficacy in physics is somewhat different than that in chemistry. Classroom self-efficacy is different from web-based self-efficacy. The current study discusses academic self-efficacy and web-based instruction self-efficacy.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

In academic areas, research on self-efficacy focuses on prior experience, role of goal setting, and feedback attribution, which is similar to what has been discussed thus far in this dissertation. Talented scholars (e.g., Bandura & Schunk, 1981; Brown, 1978; McCarthy, Meier & Rinderer, 1985; Zimmerman & Bandura, 1994; and Zimmerman & Schunk, 1989) have conducted experimental research to explore the relationship between self-efficacy and students' learning performance and achievement. The overall conclusion is that self-efficacy has a very strong relation with performance and academic achievement and serves as a powerful predictor for learning (Zimmerman, 2001).

**Self-efficacy in writing.** McCarthy, Meier, and Rinderer (1985) found a strong relationship between high self-efficacy and students' writing performance. They noted that self-efficacy was part of the result of the feedback they received from the instructor about the quality of their writing draft. Writers with high self-efficacy transferred their writing knowledge into long-term memory and freed the working memory to deal more with the content and comments to improve their writing. Students with high writing skills self-efficacy were confident in their ability to perform the mechanics of writing (e.g., spelling and punctuation) successfully.

Many journalism students use the instructors' feedback to polish and refine the second draft of their articles. Wiltse (2001) found that such constructive criticism could increase students' self-efficacy beliefs in their writing ability and motivate them to put more effort into improving their writing. In contrast, constructive criticism decreased students' self-efficacy belief and made them give up the effort to improve their writing. In journalism, the writing apprehension could be an issue related to learners' attitude to impact their writing ability. This issue could begin at a young age and may last a lifetime. The most important factors that impact learners' writing ability and attitude are writing apprehension and self-efficacy. Wiltse's study

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

adapted Straub's (1997) questionnaire to measure students' preference of instructors' comments. The Daly-Miler Writing Apprehension Test was applied to measure the level of students' writing apprehension. Writing self-efficacy was measured by Shell, Murphy, and Runing (1989) in terms of writing skill self-efficacy, writing task self-efficacy, and writing outcomes expectation.

In Wiltse's (2001) study, the independent variables were global and local feedback. Straub (1995) defined global feedback as comments upon the written compositions' content, such as the ideas and structures. Local feedback was defined as comments on mechanical writing issues. The dependent variables were the students' writing apprehension and self-efficacy level.

**Self-efficacy in puzzling.** A. L. Brown (1978) gave male college students anagrams to solve in order to explore the impact of self-efficacy on their puzzle-solving performance. A positive correlation was found between the self-efficacy level and the persistence on the task. Zimmerman and Ringle (1981) conducted a similar study to explore the relationship among children's comments, self-efficacy, and persistence. In the experiment, children observed an adult solving the puzzle. Children's self-efficacy was assessed before and after the observation. The children wrote comments about the observation, then solved the same puzzle by themselves. Students who persisted at puzzle solving while making statements of confidence had a higher level of self-efficacy than those who observed the adult solving the puzzle while making negative comments.

**Self-efficacy in educational research method.** Hancock (2000) used a quasi-experimental design to reveal that graduate students given well-administered verbal praise by their professor after homework assignments performed significantly better on an examination, spent significantly more time doing homework, and showed a higher motivation level than those students who received no verbal praise. In his study, 54 first-year graduate students majoring in

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

education enrolled in the course entitled Educational Research Method at a mid-sized public university in the southeastern United States. The manipulated variable was the number of times verbal praise was given by the instructor according to the students' "time spent on homework" log sheet. The verbal praise included comments such as "very good," "good job," and "great work." In the control group, the students just received a "thank you" from the instructor. The instrument used to measure the students' motivation was the Motivated Strategy for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1991). The highlight of this research effort reveals that "properly administered verbal praise can be a practical means of influencing students' motivation to engage in behaviors associated with learning" (Hancock, 2002, p. 83). Verbal praise has often been identified as an important independent variable in the enhancement of learning while motivation has been identified as the dependent variable. Carrotte (1999), Covington (1998), and Yair (2000) supported this finding.

**Self-efficacy in science.** Gungor and his associates (Gungor, Eryilmaz, & Fakioglu, 2007) conducted research to determine the best-fitting structural equation model between the physics achievement and effective factors. A 5-point Likert scale questionnaire was given to 890 freshmen physics students at a Turkish university. The result is interesting as it shows that self-efficacy has a slightly negative relationship with physics achievement, although it is not significant. The result supported Zimmerman's (2001) conclusion that high self-efficacy could retard learning because students with too high self-efficacy beliefs probably put less effort into learning.

Larose, Ratelle, Guay, Senecal, and Harvey (2006) conducted a study with 411 (216 female, 195 male) late adolescent students majoring in general science, technology, or biology. The authors used the Perceived Competence Scale (PCS) (Loiser, Vallerand, & Blais, 1993), to

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

determine the relationship between self-efficacy in science and academic achievement. This study lasted for three years, from the participants' last year in high school until their second year in college. The results indicated that 50% of students reported high stable self-efficacy, 20% increased it, and 30% decreased it. The increasing and high stable groups obtained higher grades in sciences and higher rates of persistence than the decreasing group. No gender difference emerged for students in general sciences in high school, but girls reported higher self-efficacy in college and obtained higher grades than boys.

Zusho and Pintrich (2003) examined college chemistry education. The participants included 458 college students enrolled in two introductory chemistry courses at a large Midwestern university in the United States. The researchers examined participants' self-efficacy beliefs three times during one semester, using self-report instruments. The findings revealed that students' ratings of their level of self-efficacy and task value at the end of the semester were better predictors of final course achievement than their SAT mathematics scores.

**Self-efficacy in online learning contexts.** Several researchers have examined self-efficacy in the online learning context. However, Multiadou and Savenye (2003) and Windschitl (1998) postulated that self-efficacy research was lacking in the context of web-based learning. Web-based and computer-based instruction both delivers instructional content via the computer, but web-based instruction accesses more educational resources and communication methods. However, due to the similarity, results from computer-based instruction could be relevant to online contexts (Hodges, 2005).

In Artino's (2007) study, 646 American service academy students participated in a self-paced online course developed by the U.S. Navy. A 7-point Likert questionnaire was administered to learners to examine the relationship between self-efficacy and achievement. The



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

result showed that students' motivational beliefs about learning tasks and instructional qualities are positively related to achievement. Students' task value, self-efficacy beliefs, and perceptions of instructional quality are positive predictors of their overall satisfaction. This study indicated that a positive relationship between self-efficacy and satisfaction is the main factor for predicting learning achievement in the context of self-paced online training.

Crippen and Earl (2007) developed an instructional strategy for web-based problem-solving instruction. Work samples and students' self-explanations were used as independent variables to predict learning self-efficacy. This three-year research found that the application of work samples produced no differences in self-efficacy, but the combination of work samples and learners' self-explanations of the problem had a positive impact on students' self-efficacy.

**Summary.** Self-efficacy is task specific, subject specific, and context specific. In some research, self-efficacy is used as the independent variable to predict learning performance and achievement. In others, self-efficacy is a dependent variable used to examine the impact of the causal factors, such as goal expectations and instructional strategies. Regardless of how self-efficacy has been used, it has been shown to be a significant predictor of learning performance and achievement in the specific subject areas and the specific learning contexts. It should be noted that the instruments applied to measure level of self-efficacy must closely match the instructional contents and contexts. According to the literature reviewed, Likert-style self-report questionnaires have commonly been used for measuring self-efficacy among students.

### **Motivation and Feedback**

Generally speaking, motivation is the impetus to act. It varies according to different people, situations, and time periods (Hoska, 1993). In IDT, motivation usually focuses on the learner's perspective, which is "the way the learner perceives both the learning task and his or her relation to the task" (Hoska, 1993). Learner perspective is based on the learner's goals, incentives, self-efficacy, and success expectancy, which are individual and task specific.

In order to keep learners motivated and involved during the learning process, Covington and Omelich (1984) confirm that learners rely on a close match between the aspiration of the goal and the expectation that the goal can be reached. If the desired goal is set too high and is attainable for the learner, he or she might have the feeling of discouragement. As a result, the performance might be low. Setting an appropriate goal could help learners successfully complete the task and achieve high motivation and a high sense of gratification.

In such a situation, feedback allows learners to test and retest knowledge gained during the learning process, encourage high performance aspiration, and increase confidence. Vance and Coella (1990) stated that two kinds of feedback are able to measure the acceptance of desired goals and learners' personal level of goal. The first one is goal discrepancy feedback, which is usually used to measure the distance between the desired level of the goal and the learner's performed level of the goal. This type of goal indicates the gap between learners' performance and achievement. The other kind of goal is called the post-performance discrepancy feedback, which indicates the learner's new goals after successfully achieving the old ones. The learner will subsequently reach the final desired goal step by step under the control of an instructor.

Dweck (1986) identified two kinds of learners in terms of goal orientation. The first one is ego-involved performing goal orientation. Learners with this kind of goal orientation focus on

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

increasing abilities toward the goal rather than their effort. Meanwhile, learners with task-involved goal orientation focus on the effort. They treat the competence as improving mastery, which is attained through effort. It has been consistently studied by other researchers (Dweck & Legget, 1988; Hoska, 1993; Nolen-Hoeksema, Seligman, & Girgus, 1986).

If learners fail to perform the goal, the results are quite different according to the different goal orientations. Task-involved learners believe in effort rather than ability. They put more effort into achieving the goal. In contrast, learners with ability goal orientation feel that the difficulties threaten them and challenge their self-worth. As a result, their motivation decreases and they lose the confidence to perform the tasks (Dweck & Legget, 1988).

However, Hoska (1993) pointed out that learners' goal orientation could be mixed and intervened over time. The impact of feedback could play an important role. The feedback could help learners understand that abilities and skills could be developed by practicing. The key point is to put more effort into increasing the ability. Mistakes made are just a part of the ability development process.

### **Goals and Feedback**

Two types of goals are involved in individuals' learning. Dweck and Legget (Dweck, 1986; Dweck & Legget, 1988) defined these as learning goals and performance goals. People with performance goals want to show a high ability and avoid poor performance; they treat the effort as merely the means to achieve the instructional goal. The sense of success is to exhibit their high abilities. On the other hand, people with learning goals focus on the acquisition of skills. They treat the success as extending the effort to improve mastery.

These two goals impact learning in the same ways as in learners successfully performing the desired behavior. However, under the failure condition, the impact of goals on the learners

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

varies a lot. People with learning goal treat failure as the challenge. They believe that effort rather than ability could solve the problem. They put more effort into finding the alternative strategies and continue doing so afterwards. According to Dweck (1986), such individuals put 50% more effort into their work than those with performance goal. Diener and Dweck (1980) and Dweck and Reppucci (1973) described the reactions of people with performance goal when facing difficulty, which included placing blame, viewing difficulties as insurmountable, and taking minimal responsibility.

In order to modify learners' goal orientation, feedback must be designed to increase learners' incentive to learn and decrease their incentive to perform. Three types of strategy may be applied (Hoska, 1993): (a) modify learner's view of intelligence; (b) design the appropriate goal structure of learning tasks; and (c) control learning rewards. In the first strategy, feedback should inform the learners that abilities are skills that can be developed through practice, effort is the key to success, and mistakes are normal and part of the process of developing the skills. Strategy two indicates that the goal structure changes from the competitive format to the cooperative one, which stresses the success as a group effort so that the learners may focus on the tasks (D. W. Johnson, Johnson, Richards, & Buckman, 1986; R. T. Johnson, Johnson, & Stanne, 1985). In strategy three, praise and blame are often applied to learners as the learning rewards, but it should be done so carefully. According to Newby and Alter (1989), a given reward can probably cause learners to select less difficult tasks to pursue success and avoid failure. It may cause the performance goal orientation. Therefore, the strategies applied should inform learners that the external reward is given because of the effort rather than the ability. Verbal persuasion is also an effective reward strategy. Koestner, Zuckerman, and Koestner (1987) as well as Meyer (1982) proposed that learners usually treat the praises or blames as the

evaluation of their abilities. To instructional designers, the design of feedback should avoid such problems. It is an effective strategy to praise the high effort and blame the low one observed.

### **Cognitive Model of Feedback**

**Five-stage model of mindfulness.** Bangert-Drowns, Kulik, Kulik, and Morgan (1991) postulated a five-stage model of mindfulness (see Figure 5) demonstrating learners' cognitive stages of text-based feedback. This model describes both behavioral and cognitive operations of learning. Dempsey, Driscoll, and Swindell (1993) described this model as "a reflective process in which the learner explores situational cues and underlying meanings relevant to the task involved" (p. 39). According to the description of this model by Mory (2004, p. 752), "to direct behavior, a learner needs to be able to monitor physical changes brought about by the behavior. Learners change cognitive operations and, consequently, activity by adapting it to new information and matching it with their own expectations about performance."

Figure 5. Five Stage model of Mindfulness

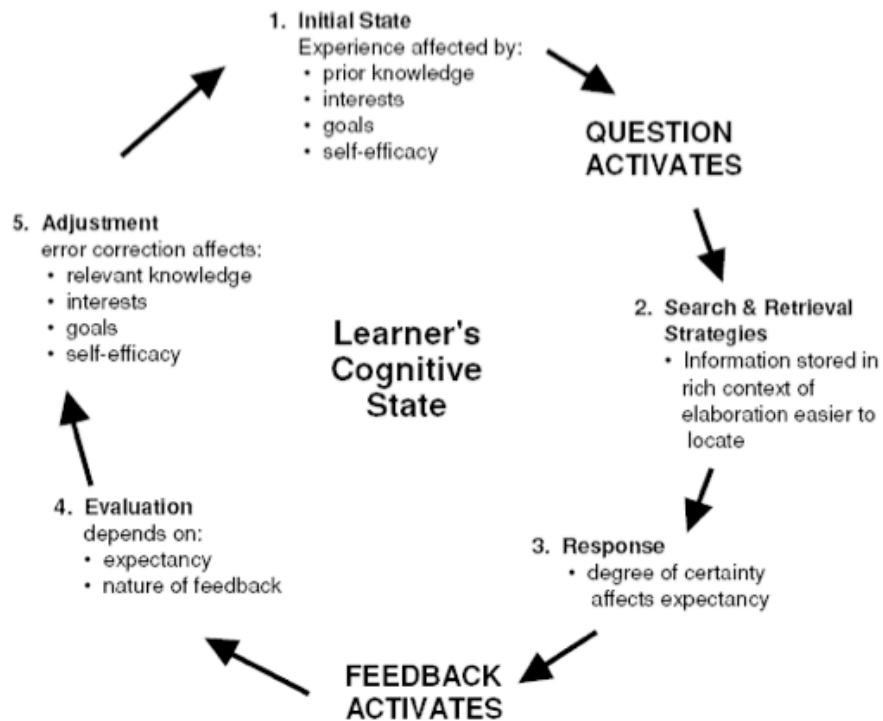


Figure 5. The state of the learner receiving mediated intentional feedback for retrieval accuracy (based on Bangert-Drowns *et al.*, 1991). Adapted from “Text-Based Feedback,” by J. V. Dempsey, M. P. Driscoll and L. K. Swindell, 1993, *Interactive Instruction and Feedback*, in J. V. Dempsey and G. C. Sales (Eds.), p. 40. Copyright 1993 by the author.

**Three-cycle certitude model.** Kulhavy and Stock (1989) postulated a three-cycle certitude model of text-based feedback (see Figure 6) depending on the effect of discrepancy. They explained that discrepancy is the main factor impacting the time and effort that learners expend in processing feedback. This model has been tested by Mory (1991) (Dempsey *et al.*, 1993). Unfortunately, it works well for verbal information learning, but does not hold for more complex learning outcome.

Figure 6. Certitude Model of Text-Based Feedback

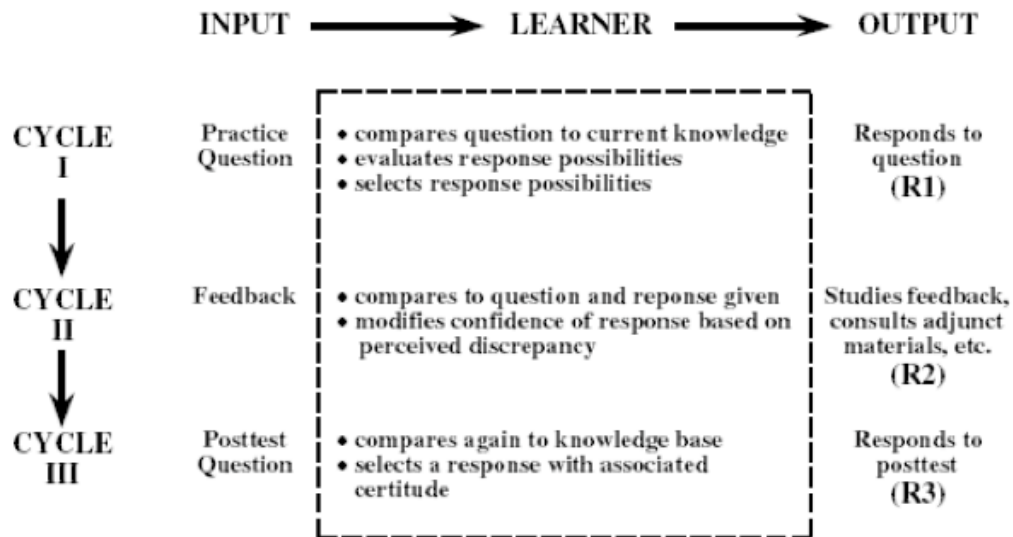


Figure 6. Cited from “Feedback in Written Instruction: The Place of Response Certitude,” by R. W. Kulhavy and W. A. Stock, 1989, *Educational Psychology Review*, 1 (4), p. 285. Copyright 1989 by the author.

In Cycle I, learners compare the demands of instructional questions to their prior knowledge and current understanding of instructional situation. If the perceived match is good, they select a response with a degree of confidence. A worse the match lowers their confidence in the response ultimately selected. In Cycle II, learners compare their answers to the correct answer, which is the process of verification. Verification is a kind of combination of initial response confidence and perceived discrepancy results (Dempsey et al., 1993).

### ARCS Model of Motivation

Developed from multiples theories of motivation and instructional design, Keller and Suzuki (1987) proposed the ARCS model, which emphasizes instructional components that serve to motivate learners. ARCS is grounded in expectancy-value theory, which assumes that students engage in learning activities depending upon their perceptions of the link between the personal needs and the positive expectancy for success. Four original categories—interest, relevance,

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

expectancy, and outcome—are involved and renamed to strengthen the feature of instructional design. The revised model focuses on attention, relevance, confidence, and satisfaction. In the most recent article, Keller (2008b) developed the principles of learning motivation. The original synthesis was expanded to include volition and self-regulation.

- Motivation to learn is promoted when learners' curiosity is aroused if they perceive the gaps of current knowledge. This principle is represented by the attention category of the ARCS model, which implies gaining attention and building curiosity. No matter how interesting a given learning task is, learners lose interest over time. Thus, it is important to change the approaches and strategies to maintain learners' level of arousal.
- Motivation to learn is promoted when knowledge is perceived to be relevant to learners' goal. The recent popular description of this principle is that learning activities should be highly relevant to a context of application as authentic learning experiences, which matches Jonassen's (1991b) context point of view.
- Motivation to learn is promoted when learners believe that they can successfully complete the learning task and master the knowledge. In confidence category, it is important to help students build positive expectancies for success and experience success under the conditions in which the students focused their efforts and uses their abilities while also avoiding their external locus of control and promoting their internal locus of control.
- Motivation to learn is promoted when learners experience satisfied outcomes to a task. It is necessary for learners to have positive feelings about their achievement and develop continual motivation to learn further. This provides the opportunities for



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

learners to apply what they have learned in order to establish intrinsic feelings of satisfaction. This also maintains the feeling of fairness, which means the amount of work assigned to learners is appropriate and can be handled according to their level of ability and effort.

- Motivation to learn is promoted and maintained by applying volitional strategies to protect their intentions. Depending upon the previous principle, this principle of volition is added. When encountering obstacles, learners normally interfere with persistence to competing goals. In order to overcome the obstacles and maintain learners' intentions, volitional strategies should be applied to help them stay on task. This principle incorporates the impacts of Zimmerman's (2001) self-regulation theory.

Kim and Keller (2008) conducted an experimental study. Customized motivational messages were sent individually to students, with their names in the salutation to maintain students' intention when the students perceived the gap between the test grades and their efforts. The result indicated that the treatment group had an overall higher level of confidence following the volitional strategies, which supported the final principle indicated above.

### **Volition and Feedback**

Psychologists defined volition precisely as the tendency to maintain focus and effort toward goals against competing distractions. People are different when protecting their intentions to complete goals from competing intentions and surrounding distractions. Some individuals make plans to accomplish goals and strictly follow them regardless of distractions. Others make a similar plan, but seem never to follow through (Corno, 1994). These differences fall into the domain of volition. Two leading views of volition exist in educational research. One is that volition works where motivation leaves off. Motivation works on and before commitment, while volition denotes follow-through (Pintrich & Schunk, 1996). The other is that volition is part of self-regulated learning. Zimmerman and Schunk (1989) stated that cognitive, motivational, and volitional factors in conceptions of self-regulated learning play an important role in students' academic achievement.

Ach (1910, as cited in Corno, 1994) raised questions about distinctions between motivation and volition, but received little attention in the United States until Lewin's (1926) early work on motivation. Kuhl and Heckhausen formulated the modern process theories of volition in 1985 (as cited in Corno, 1994). The action control theory proposed that individuals move from goal setting to the implementation of goals by crossing the dynamic point of volition—namely, the commitment. In the post-decisional phase, their goals tend to be protected by self-regulatory activities rather than reconsidered. Students probably treat feedback as another instruction, instead of a useful resource of information. Effective post-decisional processing reinforces the original decision to act.

In academic situations, Corno (1993) defined volition as “a dynamic system of psychological control processes that protect concentration and directed effort in the face of

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

personal and/or environmental distractions, and so laid learning and performance” (p. 16). In the attribution theory, effort treated as an internal characteristic of individuals exists apart from the environment (Weiner, 1985). However, in the volitional theory, effort is a function of person–environment interaction and occurs when internal and external resources combine. Effort does not exist out of the external resources; it strives to enable all available resources to accomplish goals. The available resources involve individual intellectual skills as well as support from the social-cultural environment (Corno, 1994). Internal resources include cognitive and communicative skills and capability for self-motivation through resource management, attention, and emotional control. Environmental resources include time, peers, and socio-cultural network. In the volitional process, individuals use whatever resources may be available to accomplish goals, which indicates “mindful investment of effort” (p. 233).

Most educational psychologists characterize volition as part of the self-regulation system, which includes motivation and volition. Through this system, individuals actively manage their internal and external resources, such as mental effort, time, and strategies toward the accomplishment of goals (Kanfer, 1991; Naypor, Pitchard, & Ilgen, 1980; Snow, 1989, 1992). When facing difficulties, tasks must be finished using specialized control of cognition, motivation, and emotion (Kuhl, 1985). Because motivation and volition are closely associated, Corno and Kanfer (1993) proposed an organizing framework of volition (see Figure 7), which conceptualizes motivation and volition as overlapping and interacting in reciprocal fashion. The process of motivation affects decision making and choice of goal (Weiner, 1990). Within this process, individual differences in preferences, beliefs, expectations, perceptions of outcome value, and attribution may impact decision making. In addition, individual differences in goal orientation, self-efficacy, and locus of control may affect individual choice of goal. As a result,

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

volition may be considered in three main aspects of constructs: individual differences in action control, operation of goal-related cognition, and volitional styles. Volitional styles refer to the dispositional tendencies derived from individual differences that affect the choice of goal and striving through the action control process. In this framework, action control processes are described as “knowledge and strategies used to manage cognitive and non-cognitive resources for goal attainment” (Corno & Kanfer, 1993, p. 304).

In the real academic context, goals for students may be vague and require sustained effort when facing distractions and competing goals. For example, students are supposed to work hard on homework, but they want to play with friends after school. Many such situations occur in everyday life. The concept of volition is distinguished from motivation by its post-decisional character. Volition controls and directs individual cognition, motivation, and emotion to accomplish goals when facing difficulties and distractions. Motivation refers to thinking and trying, whereas volition means striving (Corno, 1993). Furthermore, metacognition and volition are different. Metacognition controls declarative rules and procedures of cognition, but not the entire volitional domain. Volition also controls the metalevel of motivation and emotion. Volition helps accomplish goals despite motivational or emotional difficulties (Corno & Kanfer, 1993).

Figure 7. The Role of Volition in the Context of Learning and Motivation

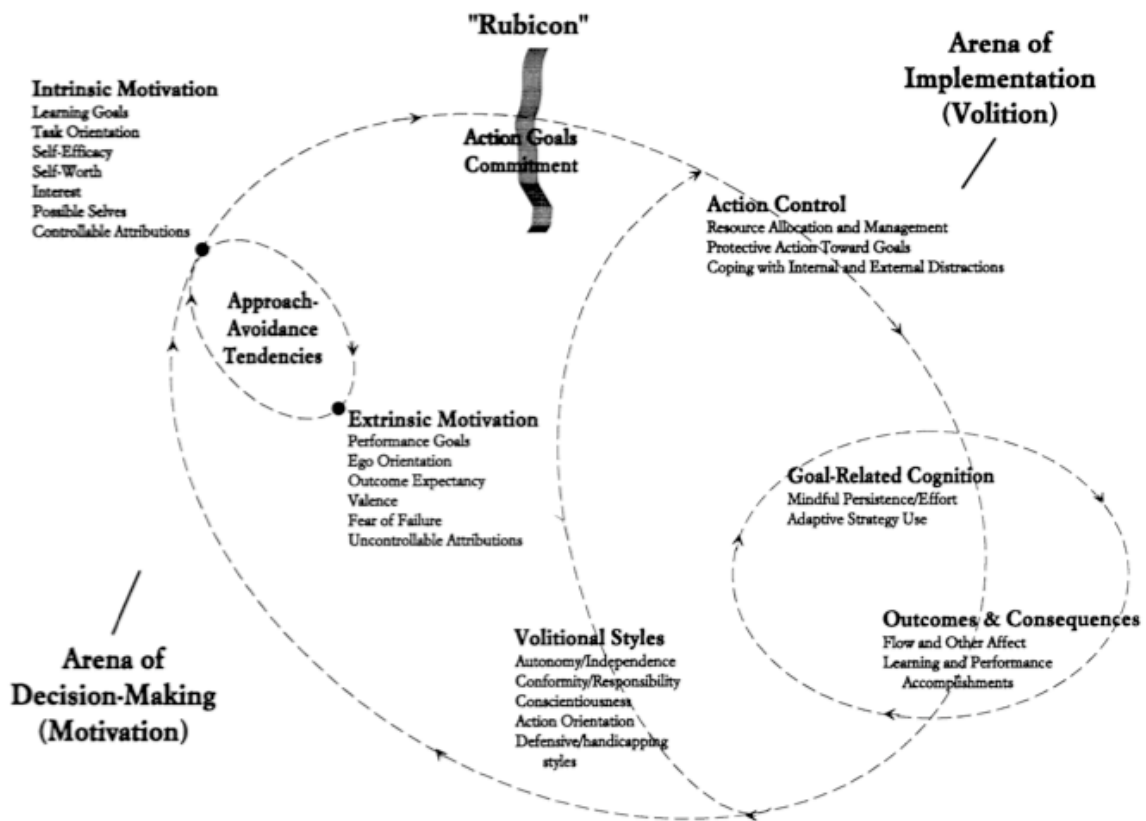


Figure 7. Dynamic spheres of conation in the academic domain. Adapted from “The Best-Laid Plans: Modern Conceptions of Volition and Educational Research,” by L. Corno, 1993, *Educational Researcher*, 22 (2), p. 18. Copyright 1993 by the author.

### Action Control Theory

The primary contribution of motivational theory is in explaining how individuals choose a particular goal or set of goals. It provides a necessary but insufficient condition for understanding what drives individuals to action and sustains their initial goal intentions (Keller, 2008b). Kuhl (1987) defined action control as “the maintenance and protection of an activated intention” (p. 286). Based upon the weakness of expectancy-value theory, which cannot explain

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

the persistence of goal-directed behavior in situations where more attractive alternative behavior emerges, action control operates in a passive or active mode.

Passive action control refers to the current action in a dominant position among those competing for action tendency. In other words, current action has the strongest action tendency and needs the least control to sustain it. The perfect example is that young children always maintain their current action plan as long as it has the most motivational power among other action tendencies. Passive action control does not require much conscious control. It happens in a natural and smoother mode than active action control (Kuhl, 1987).

Active action control helps support a subordinate action tendency. It requires the development of superordinate level of control. Kuhl (1985, 1987) postulated six action control strategies to support motivationally weak intentions:

- Active attentional selectivity (also called selective attention) protects the current intention and inhibits the information processing of competing action tendency (Keller, 2008b; Kuhl, 1987). This strategy helps individuals actively focus on relevant information and avoid noise information. Experimental findings demonstrated that children maintain their intention against action alternative by avoiding visual contact of distraction (Mischel & Mischel, 1983).
- Encoding control facilitates volition by selectively encoding the related information to current intention. It is similar to the principle of relevance of the ARCS model (Keller, 2008b; Kuhl, 1987).
- Emotion control facilitates management of emotional states that might inhibit action, such as sadness, anxiety, and other emotions tied to previous academic experiences (Corno, 1993; Keller, 2008b; Kuhl, 1987).

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Motivation control helps maintain, strengthen, and reestablish the motivational basis of intentions when the original tendency was not strong. It usually happens in self-regulated individuals, such as “I have to do it even though I don’t like it, because it is my responsibility.” When a mismatch occurs between the strength of current intention and competing tendency, motivational control works to activate the self-regulation process to complete goals. Motivation control aims to change the hierarchy of current intention strength superior to competing tendencies. In addition, thinking of negative consequences will help strengthen motivation (Corno, 1993; Keller, 2008b; Kuhl, 1987; McCann & Garcia, 1999).
- Environment control describes a strategy that chooses an environment free of distraction and makes social commitments. For example, “I will find a quiet place, and keep concentrate” or “I will tell my peers about my study plan this week and let them check my progress.” Another example is a person who wants to quit smoking and informs friends in order to create social pressure to help maintain the intention (Corno, 1993; Keller, 2008b; Kuhl, 1987; McCann & Garcia, 1999).
- Parsimony of information processing refers to knowing when to stop. Whenever individuals find that further information processing of action alternatives may undermine the execution of current intentions, the process of evaluating action alternatives will be halted in order to avoid decreasing the motivational power of current intention (Kuhl, 1985, 1987).

The effectiveness of applying the action control strategy has been tested in many studies in a variety of behavior change settings (Kuhl, 1987) and academic settings (Corno, 2001; Zimmerman, 2001). However, Keller (2008b) pointed out that the action control theory cannot

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

explain the detailed process of how individuals move from having a predominant goal to active commitment in achieving the goal. Gollwitzer's (1996) intention theory might be helpful to Kuhl's (1985) work (Keller, 2008b).

### **Research of Volition in Education**

In school settings, students meet established academic goals as a performance requirement for a course or the entire curriculum. These goals are normally set by teachers or program leaders. If conflict exists between the fixed academic goals and more desirable thoughts or behavior, students have to exercise strategies to maintain control (Corno, 1993). The important function of volition is higher-level control intellectual, motivational, emotional, and behavioral activities toward academic goals. Volition does not assume to work when the goals are perceived to be easy to accomplish. It works when individuals feel the goals are difficult to achieve. In a word, Corno (1993) described volition as a "metamotivational" process (p. 15).

Kim and Keller (2008) conducted an experimental study using motivational and volitional email messages to examine the effects on motivation, study habits, and academic achievement. Thirty students were involved in the personal message group and 71 students were involved in the non-personal message group. Results indicated that the personal motivational and volitional message group held a higher motivation than the non-personal group, especially in regard to confidence; the initial gap in test grades between the two groups significantly decreased. However, study habits (i.e., study time) showed no significant difference, which indirectly indicated that personal motivational and volitional messages increased learners' efficiency of time management.

Kanfer and Ackerman (1989, 1990) conducted series of experiments to examine the influence of volitional strategy training on complex skill learning, which supported the idea that



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

positive effects of volitional strategy training would depend on certain task demands and individual differences in cognitive ability. They suggested that the differences in the use of emotional and motivational control strategy during task implementation caused performance variations of lower and higher ability trainees under goal setting early and late in performance. Early phase performance goal assignments inhibited the performance of low ability students more than high ability students because they may have generated low ability students' anxiety and disruptive off-task thoughts. In contrast, later phase performance goal assignments increased the performance of low ability students more than high ability students because, when the skill was acquired, the goal assignments could promote continued efforts. As a result, volitional strategy is suggested to apply as follows (Corno & Kanfer, 1993): (a) give emotional control strategy early in the skill acquisition process and (b) give motivational control strategy in a later phase of skill acquisition when attention demands of the task are diminished.

In Kanfer and Ackerman's (1990) experiment, directions to use specific volitional strategies were given to 588 U.S. Air Force trainees during the learning of a simulation task. Participants were assigned to one of five conditions: (a) no goal assignments, (b) goal assignments only, (c) goal assignments with emotional control instructions, (d) goal assignments with motivational control instructions, and (e) goal assignments with emotional and motivational control instructions. The results showed that the emotional control strategy increased students' positive thoughts and reduced the frequency of negative emotions while motivational strategy increased the amount of effort during the trial. This result matched Kuhl's (1985, 1987) theoretical conceptualization.

Overall, low ability students get more help from emotional control during the early phase of complex skill learning, when they are more likely to become frustrated facing the demands of

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

complex tasks. However, high ability students are assisted by motivational control during the later phase of skill acquisition, when they want to show skillful performance (Corno, 1994).

Kuhl and Kraska (1989) developed an instrument measuring volitional strategy knowledge for elementary school children. They presented 16 scenarios about maintaining intentions in cartoon and drawing format, such as doing homework while friends are playing outside. Kids were asked to choose actors displaying effective volitional strategies, which assumed that they acknowledged such strategies themselves. Sixty German children in grades 1 to 4 and 120 Mexican children in grades 1 to 6 were involved in this study. The results showed that, in the German sample, volitional strategy knowledge scores were positively related to class attentiveness, frequency of finishing homework, and independence but negatively related to fear of failure.

In a later experiment (Kuhl & Kraska, 1989), the same 60 German kids were asked to do a simple computer activity. They were distracted during the activity by an animated smiling monkey jumping up and down on the computer screen. Results showed that one third of the students were not distracted, another third were somewhat distracted, and the last third were totally impacted by the distraction. The results indicated that children with high volitional strategy knowledge showed no difference in performance with or without distractions. However, children with low volitional strategy knowledge required as much as four times more response time when facing distractions. Thus, the individual difference in volitional strategy knowledge impacts performance and achievement (Corno, 1993; Kanfer & Ackerman, 1989; Kuhl & Kraska, 1989).

McCann and Garcia (1999) developed three versions of the Academic Volitional Strategy Inventory (AVSI) to examine self-regulatory strategies used by college students on academic

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

goal accomplishment. Three separate samples (n=378; n=463; n=246) from southwestern universities were involved in this study. For the final (third) version of AVSI, 30 items of volitional strategies were constructed in three categories: self-efficacy enhancement, stress reduction, and negative-based incentives. The validity and reliability of AVSI were tested, indicating that it is a promising research instrument to measure volitional use for college students and a reliable inventory for the design of volitional feedback strategy for instructors and instructional designers.

## **Feedback and Related Research**

### **Feedback in Programmed Instruction**

The term *feedback* refers to “any information that follows a response and allows a student to evaluate the adequacy of the response itself” (Kulhavy & Wager, 1993, p. 3). Kulhavy and Wager (1993) stated that the programmed instruction must contain instructional text, questions about the text, students’ response, and feedback on the response. If an instruction is designed following these processes, it is deemed to be programmed instruction. Such programmed instruction is lifted directly from Skinner’s (1958) teaching machine.

**Teaching machines.** Most research regarding programmed instruction is based on the use of machines to handle instructional activities. The first use of a device to teach reading was carried out by H. Chard in 1809 (Lockee et al., 2004). A hundred years later, in 1911, Herbert Akens patented a device to teach that presented materials, required students’ responses, and informed the students if they got it right or wrong. Unfortunately, it was not a student-controlled machine, but a teaching aid. Pressey subsequently invented a self-instruction device that provided immediate feedback of knowledge on student response after students read or listened to the instructional text. Pressey’s machine focused on drilling, which referred to the use of punch cards to “accelerate their coursework and make acceptable scores” (Lockee et al., 2004).

One of the most famous teaching devices was Skinner’s (1958) teaching machine. Based on the problems Skinner identified while observing his daughter’s class, he patented a machine that had the feature of “presenting a specific sequence of material in a linear, one at a time fashion, requiring an overt response and providing immediate feedback” (Lockee et al., 2004). According to Skinner (1958):

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

The machine like the private tutor, reinforces the student for every correct response, using this immediately feedback not only to shape his behavior most efficiently but to maintain it in strength in a manner which the layman would describe the as holding the students interest. (p. 82)

In sum, the teaching machine opened the gate of programmed instruction, which allowed the instructional content (text) designed in a programmed pattern (linear), involved learners' interactive activities (response), and gave immediate feedback to inform the learned whether their responses were right or wrong.

**Role of feedback.** According to Kulhavy and Wager (1993), the historical view of the role of feedback is:

1. A motivator or incentive for increasing the rate of accuracy of performance.
2. A "satisfying state of affairs," which according to E. L. Thorndike's Law of Effect, automatically "connects" response to preceding stimuli.
3. Information that learners can use to validate or change a previous response.

The motivational view of feedback indicates that feedback informs the learners of how well their learning performance is in order to offer incentive for greater effort in the future. Unfortunately, such a view cannot "resolve the confusion between rate of responding and actual learning" (Kulhavy & Wager, 1993, p. 4).

The "satisfying state of affairs" view derives from Thorndike's Law of Effect. According to Thorndike, when a response is followed by a "satisfying state of affairs", it will be more likely to be repeated again; otherwise, it will not be repeated in the future (Kulhavy & Wager, 1993). Although this learning mechanism might be not that accurate from today's point of view, it is the root of Skinner's (1958) operant process of reinforcement. For correct responses, the

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

reinforcement or reward will be given to the learner, such as the candy in Pressey's machine (Kulhavy & Wager, 1993).

However, the treatment of error response opened the gate for feedback as the unit of information. The information containing the knowledge of correct answers or why it is wrong could correct the error answers rather than the "satisfying state of affairs." From the cognitive information processing perspective, individuals change their behavior according to the information received. Simply telling the learner that he or she is right or wrong does not make sense in terms of learning (Kulhavy & Wager, 1993).

**Research on feedback in programmed instruction.** Many talented scholars (e.g., Kulhavy & Anderson, 1972; Kulhavy & Stock, 1989; Kulhavy & Wager, 1993) have conducted a significant amount of research in order to reveal the effect of the content on feedback in programmed instruction; interestingly, the results are contradictory. Some results showed that feedback containing more information could produce higher performance; however, other results indicated that an increased amount of information had no significant difference in terms of learning. Learners and instructional topics vary so greatly that it is not possible to specify a relationship between feedback content and the learning performance.

Almost all programmed instructions provide immediate feedback regardless of the type of feedback information; however, few people focus on the effect of delayed feedback. Kulhavy and Anderson (1972) finally proposed a theoretical framework for the delayed retention effect (DRE). When the feedback is delayed, students have more time to study the question, and erroneous answers are less well remembered. This positive effect of delayed feedback matched the cognitive principle of working memory related to interference-perseveration. In the programmed instructional stage, the timing of feedback is not yet clear.

### **Computer-Based Feedback in CIP Perspective**

Computer-based instruction (including web-based instruction) has been widely used in current IDT. Computers can present the learning task, provide the strategy instructions, control the flow of activities, monitor learning activities, provide reinforcing messages, keep track of students responses for further analysis, track the learning activities toward a learning goal, administer tests, provide expert content, and support different types of interaction (human–computer, human–human).

**Text-based feedback.** After the programmed instruction movement, the focus of learning theory changed from simple reinforcement (behaviorism) to information processing (cognitive information processing). Research on feedback naturally moved forward as well. Kulhavy (1977, p. 211) defined feedback as “used in a generic sense to describe any of the numerous procedures that are used to tell a learner if an instructional response is right or wrong.” Using this perspective, the effect of the feedback as information on learning will be discussed.

**Timing.** Dempsey and Wager (1988) proposed definitions for immediate and delayed feedback. Immediate feedback is the “informative feedback given to a learner as quickly as the computer’s hardware or software will allow during instruction or testing” (p. 22). Delayed feedback refers to “informative feedback given to a learner after a specified programming delay interval during instruction or testing” (p. 22). Delayed feedback could be less than one hour, less than 24 hours, or extended until the next instruction. The conflict of immediate and delayed feedback led to Kulhavy and Anderson’s (1972) famous DRE hypothesis, which asserted that correct information immediately given to the learner interferes with the learner’s initial error response. As such, DRE implied that delayed feedback is better than immediate feedback. Kulik and Kulik (1988) concluded that in real classroom settings, immediate feedback is better than

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

delayed feedback, although delayed feedback is effective in specific experimental situations.

Dempsey et al. (1993) suggested that, “in most real instructional settings employing text-based feedback, immediately feedback should be prescribed unless the feedback is delayed systematically and for a specialized purpose” (p. 24).

**Complexity.** Complexity of feedback implies how much and what information should be contained in the feedback. Dempsey et al. (1993) proposed five main types of feedback: (a) no feedback; (b) simple verification feedback (KR), which means that feedback only informs the learner about whether the response is right or wrong; (c) knowledge of correct response (KCR), which means the feedback informs the learner about the knowledge of the correct answer; (d) elaborated feedback, which explains why the answer is right or wrong in order to let the learner review the course content and provide the correct answer later; and (e) try-again feedback, which happens when the response is wrong to let the learner try to provide the correct answer one more time.

Gilman (1969) concluded that, in traditional classroom settings, KCR groups performed significantly better than other feedback groups and spent less time reaching the criterion than other feedback groups. Clariana, Ross, and Morrison (1991), Guthrie (1971), Roper (1977), and Waldrop, Justin, and Adams (1986) conducted similar experiments in computer-based instruction and concluded that the KCR group and elaborated group were significantly better than KR group and no feedback group.

**Error and learner perspective.** Regardless of what kind of feedback is applied in the instruction, Keller and Suzuki (1987) stated that learners assess their outcomes according to their expectations. Thus, feedback should be personally relevant to the learner based on their expectancy of learning outcomes (Dempsey et al., 1993). In Kulhavy’s (1977) experiment,



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

learners rated their confidence about the correctness of the answer given; high confidence correct answers yield the shortest study time, high confidence errors yielded the longest study time, and low confidence errors fell in between. For a high confidence but wrong answer, the learner put more effort into seeking why it was wrong. For those learners with a high rating of their answer confidence, they had no problem comprehending the instructional content. Feedback study time is a positive predictor of learners' engagement. Dempsey et al. (1993) found that feedback study time was inversely correlated with confidence of response.

Another feature of computer-based instruction is personal goal-based performance feedback. Malone (1981) suggested that performance feedback should tell learners whether their performance achieved the goal. This kind of feedback should be personally meaningful to the learners.

### **Constructivist View of Feedback**

In previous paragraphs, feedback has been examined under behaviorism and cognitive information processing paradigms, which fall under the objectivist philosophy domain. Objectivists hypothesize that the world is the real world and knowledge actually exists (Jonassen, 1991b). Teachers' role is trying to teach real knowledge to learners and determining whether they master the knowledge. The role of feedback should serve to correct the wrong information regarding the external reality (Mory, 2004). As previously discussed, feedback can be treated as reinforcement or as information correction. According to situated cognition theory and constructivism perspective (J. S. Brown, Collins, & Duguid, 1989; Jonassen, 1991a), no external objective knowledge exists for students. Through interaction within the context, students construct their own thinking of the knowledge based upon their prior knowledge, experiences,

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

mental capability, and personal belief of the world. Knowledge is unique and personally constructed. As a result, feedback plays a different role.

If context is everything (Jonassen, 1991a), feedback is presented as part of the context in which learners try to solve a problem by interacting within the context. According to Mory (2004), when students try to learn to play a musical instrument, they continually receive feedback from hearing the sound that they make and then changing their performance. From a new point of view, feedback happens naturally as the result of interaction between the learners and the construction of their own knowledge within the authentic learning context. Jonassen (1991b) postulated the potential use of feedback under constructivism. He stated that feedback should guide and facilitate learners' own knowledge construction. Feedback should aid learners in building symbols. The meaning of feedback is determined by learners' internal understanding. Feedback happens in the human experience context and serves as generative mental constructional tool (see Table 1). While interacting with the real-world problem, students use the feedback as a coaching mechanism to analyze the problem-solving strategies rather than passively receiving the predetermined instructional sequence. Feedback serves as more of a self-analysis tool (Jonassen, 1991a) and helps establish, monitor, and maintain learners' goal setting and goal monitoring (Rieber, 1992).

# IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Table 1

*Assumptions of Constructivism and Suggested Use of Feedback*

Constructivism	
Assumption	Feedback
Reality is determined by knower	Feedback is to guide learner toward internal reality; facilitates knowledge construction
Mind acts as builder of symbols	Feedback aids learner in building symbols
Thought grows out of human experience	Feedback in context of human experience
Meaning does not rely on correspondence to world; determined by understander	Meaning within feedback information determined by internal understanding
Symbols are tools for constructing an internal reality	Feedback provides generative, mental construction "tool kits"

*Note.* Adapted from "Objectivism Versus Constructivism: Do We Need a New Philosophical Paradigm?" by D. H. Jonassen, 1991, *Educational Technology Research and Development*, 39 (3), p. 9. Copyright 1991 by the author.

## **Feedback and Self-Regulated Learning**

D. L. Butler and Winne (1995) postulated a self-regulated learning model that described how learners generate and use internal feedback to monitor their engagement in learning tasks.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

According to the literature review of self-regulation theory and feedback mechanisms, Butler and Winne stressed that “most effective learners are self-regulating” (1995, p. 245). When students implement a learning task, self-regulation is an engagement style that involves serial skills: setting goals, selecting strategy to balance progress toward goals against unexpected costs, and monitoring the improvement of their engagement. When facing obstacles, self-regulating learners will adjust or simply abandon the initial goals and change their strategy to seek progress. This process is defined as monitoring, which is determined by self-regulated students’ awareness of their knowledge, beliefs, motivation, and cognitive processing.

Feedback plays an “inherent catalyst” role during self-regulated activities (D. L. Butler & Winne, 1995, p. 246). Butler and Winne described the mechanism of internal feedback. Internal feedback is generated by the monitoring process and describes the learning outcomes and the quality of the cognitive processing. When a goal discrepancy exists, self-regulated learners will first seek external feedback, such as peers’ contribution, teachers’ remarks, or the correct answers in the textbook, then modify their engagement by setting new goals or adjusting the current one. They will reexamine their strategy, combine available skills, and then apply a productive approach. According to confirmed external feedback, learners will conflict with their prior understanding of the task and the path to complete the task. Knowledge and beliefs will probably be changed afterwards. As the result, they will influence self-regulation (p. 248). Positive affect results when learners achieve the goal faster than predicted; negative affect results when an achieved goal is slower. The model depicted in Figure 8 demonstrates this self-regulation mechanism.

According to Balzer, Doherty, and O’Connor (1989), both the nature of the task and students’ progress on the task described depend upon a set of the features of the cues, which can

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

be used to predict the final performance. The cues' validity demonstrates the relationship between the cues value and the assessment of the final performance. In addition, the cues need to make sense to the student. If the learners do not perceive the value of the cues, the cues have no meaning to them and will consequently not affect their self-regulation. When a learner perceives the link between the cues and the selected strategies, and as the result, if the perception successfully directs the performance, the learner is well calibrated (Nelson & Narens, 1990). The final performance or achievement is the product of continuous adjustment between the cues and the approaches. In order to enhance the calibration, three types of cognitive feedback are involved.

Figure 8. A Model of Self-Regulated Learning

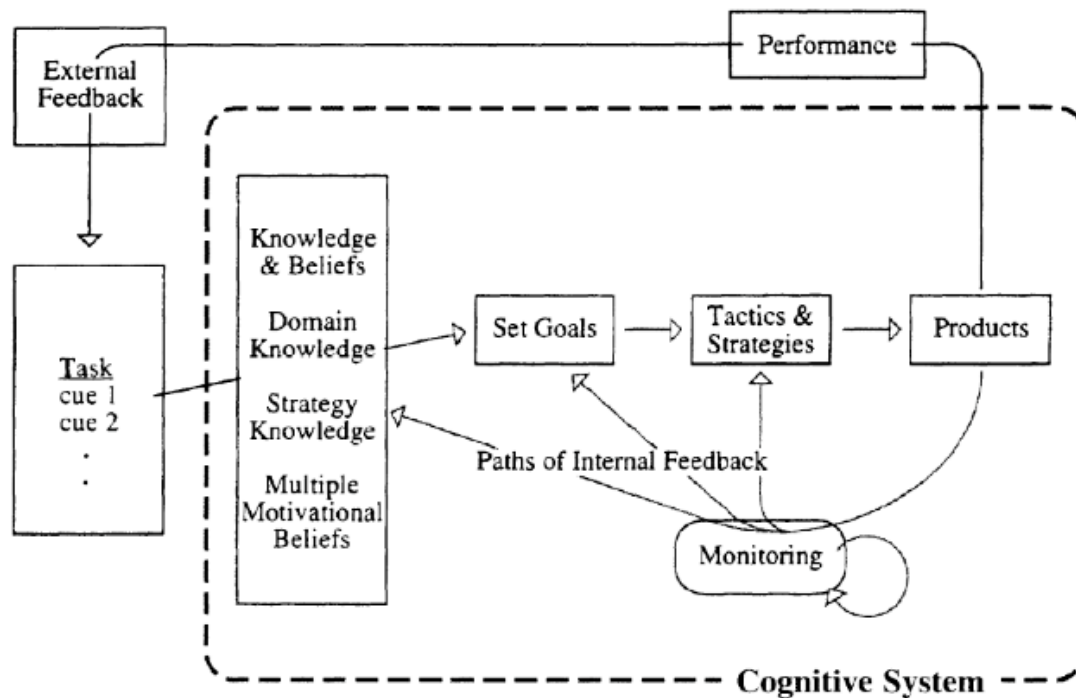


Figure 8. Adapted from "Feedback and Self-Regulated Learning: A Theoretical Synthesis," by D. L. Butler and P. H. Winne, 1995, *Review of Educational Research*, 65 (3), p. 248. Copyright 1995 by the author.

IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Table 2

*The Role of Feedback during Monitoring Process*

Reasons for difficulty in ...		Feedback's potential roles	
Implementing strategies	Monitoring	Knowledge needing development	Processes needing improvement
Fails to recognize task conditions that should cue strategy use		Add to or tune knowledge about tasks	Analyzing tasks, setting goals
Misperceives task conditions (cues), thereby selecting the wrong strategies	Misperceives task conditions (cues), thereby setting inappropriate criteria for judging performance	Overwrite, tune, or restructure knowledge about tasks; tune knowledge about strategies	Analyzing tasks, setting goals, selecting strategies, monitoring
	Perceives task cues but fails to recognize relationships between cues and performance (e.g., the learner isn't calibrated)	Add to, tune, or restructure knowledge about tasks; add to, tune, or restructure knowledge about strategies	Analyzing tasks, setting goals, monitoring
Experiences problems executing selected strategies	Overly challenged by cognitive demands while monitoring	Tune knowledge about tasks (assembling or chunking); tune and automate knowledge about strategies	Selecting and implementing strategies, monitoring
Skimps on effort to deploy strategies	Lacks motivation to monitor and adjust performance	Add to, overwrite, tune, or restructure knowledge about action control strategies; add to, overwrite, tune, or restructure epistemological beliefs	Selecting and implementing action control strategies, monitoring

*Note.* Adapted from “Feedback and Self-Regulated Learning: A Theoretical Synthesis,” by D. L. Butler and P. H. Winne, 1995, *Review of Educational Research*, 65 (3), p. 267. Copyright 1995 by the author.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Task validity feedback refers to the observer's (teacher's or evaluator's) perception of the relationship between the cues and the achievement. This kind of feedback will hook the student's attention to the relationship between the cues and the probability of the future successful performance (Winne, 1992). Cognitive validity feedback refers to learner's perception about the relationship between the cues and the final achievement. This kind of feedback conveys the extent to which the learner perceives cues and the judgment of his or her performance (D. L. Butler & Winne, 1995). Functional validity feedback refers to the relationship between the learners' estimated performance and their actual performance (D. L. Butler & Winne, 1995). Tables 2 summarize the role of feedback during the monitoring process.

### **Peer Interaction**

Some computer-based and web-based instructions as well as some learning-assistant systems support different dimensions of interaction, such as learner-computer interaction, learner-instructor interaction, and learner-learner interaction. However, the most powerful and effective source of feedback is interpersonal, which enhances learning primarily within a cooperative context (D. W. Johnson & Johnson, 1993). Webb (1982) stated that, when a student gives a wrong answer, peers could provide sustained interactions, such as supportively probing the problem, offering cues to the right answer, repeating and rephrasing the question, and allowing more time for the student to answer—all of which are important for learning achievement.

Cooperation refers to working together to accomplish shared goals. In this situation, students pursue the desired outcomes that are beneficial to themselves and to all the group members as well (D. W. Johnson & Johnson, 1993). The learners have a shared goal.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Cooperative learning is not simply putting the students into a group to work individually. Five elements must be met.

- Positive interdependence: Each one in the group believes that one cannot succeed unless other group members succeed. Each of them has a relatively independent role to pursue the goal.
- Face-to-face promotive interaction: The group members support others by explaining the learning task, reviewing the knowledge, specifying the strategies, and encouraging more effort.
- Individual accountability: The group assesses its performance, identifies gaps to the final goal, and assigns further assignments to members.
- Social skills: In a cooperative learning situation, students need to use several social skills to reach the shared goal. The skills involve leading, communication, decision making, trust building, and conflict management.
- Group process: The evaluator (usually the teacher) must evaluate the group's achievement and the individual's contribution to the group, giving feedback to each to maintain effective working relationships among members.

In this cooperative learning context, feedback plays a very important role. D. W. Johnson and Johnson (1993) stated that:

The more students believe that they have a stake in each other's success, the more open they will be to feedback from peers and the teacher. The more students get involved in helping and assisting each other's learning, the more precise and accurate their feedback to each other can be. The more accountable students are to do their fair share of the work, the more they will seek out feedback on how their



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

performance can improve. The more social skilled students are, the better able they are to phrase and time feedback to maximize its impacts. And group processing institutionalizes feedback into the life of the learning group (p. 17).

Sitthiworachart and Joy (2007) conducted a study about peer assessment in a computer-based coding training instruction. The study included 213 first-year undergraduate participants. Both instructors' and peers' feedback of the assignment was given, but only peers' feedback could be seen by learners during the experiment. The web-based learning system had the function of automating test results, marking guidance, and serving as an anonymous communication tool. The results indicated that the quantity of average feedback given by peers was higher than the average feedback given by instructors. The quality had no significant difference, and the satisfaction toward peer assessment and instructor assessment had no significant difference. The authors also suggested that peer assessment was an accurate assessment method for a programming course. Most students were actively involved in the learning process, were satisfied with feedback given by their peers, and accepted the comments from peers as useful.

### **Advantages of Web-Based Feedback and Interaction**

Advantages in web-based instruction have changed the mechanism of feedback being used by students. Web-based instruction has the potential to apply a learner-centered constructivism approach, which involves multiple dimensions of interactions and timely feedback (Mory, 2004). Web-based learning support systems such as Blackboard can provide immediate feedback that allows instructors to adjust the instruction to address students' concerns. The feedback can also be used to promote interaction among students. Furthermore,

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

instructors can store the feedback in an electronic file, which will be easy access for future reference.

Seal and Przasnyski (2003) observed an in-classroom management science course combined with a web-based support system and suggested strategies for web-based feedback used in instruction. First, keep the form of feedback simple and consistent so that students will be familiar with the structure and will fill out the forms quickly. Over time, students' questions and concerns became more focused, which helped the instructor identify the problem of the instruction and make an appropriate adjustment. Second, use a classroom in which each student has a web-accessed computer in order to obtain feedback during the class immediately after finishing a topic. Students seldom give feedback on their own voluntarily, even if the feedback requests are given. In the same study, Seal and Przasnyski offered suggestions about the application of web-based peer discussion forums: (a) encourage students repeatedly to access the discussion boards to seek answers to their questions from peers in order to create more peer interactions; (b) encourage students to try to answer other's questions, assuring them that the instructor watches and moderates the discussions; (c) monitor discussions constantly to prevent the propagation of incorrect ideas and to discover what ideas require further explanations; over the long term, discussions can form an archive for use in evaluation; and (d) motivate students by making participation count toward their grades and rethink the design of course modules to provide them with incentives to participate.

### **Summary**

The research of feedback has been combined with the development of learning theory and the philosophy paradigms. New technology is growing rapidly, and many new media attributions could be involved in instruction and impact the feedback mechanism. However, this

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

paper focuses exclusively on human learning and cognition. The revolutionary stage affecting in IDT depends upon a change in learning philosophy. It is not surprising that feedback has different functions according to certain learning environments, as has been examined according to particular paradigms.

### **Purpose Statement**

The purpose of this experimental study is to investigate whether standard volitional feedback messages can effectively promote students' self-efficacy and course satisfaction among Chinese college students in a blended instructional setting. By controlling the independent variable of feedback strategy, its impact on students' self-efficacy and course satisfaction (dependent variables) will be tested.

### **Research Hypotheses**

1. A positive correlation exists between learning self-efficacy and course satisfaction.
2. Different feedback strategies increase students' self-efficacy in different ways. The knowledge of correct response plus volitional messages (KCR + V) group will have the highest self-efficacy. The knowledge of results plus volitional messages (KR + V) group will rank second. The knowledge of correct response (KCR) group will rank third, while the knowledge of results (KR) group will rank lowest.
3. Different feedback groups indicate different levels of course satisfaction. The knowledge of correct response plus volitional messages (KCR + V) group will have the highest satisfaction. The knowledge of results plus volitional messages (KR + V) group will rank second. The knowledge of correct response (KCR) group will rank third, while the knowledge of results (KR) group will rank last.

### **Chapter III. Methodology**

#### **Participants**

The participants include 114 freshmen enrolled in the course Foundations of Computer Applications in the School of Business and the School of Environmental Engineering at Beijing Institute of Fashion Technology. This institute is a traditional fashion arts institute and contains 7,000 undergraduate and graduate students total. The students used the blended learning system frequently and effectively. According to the syllabus, they had more than 10 online assignments and activities for the course during the semester. Their instructor had a positive attitude about using the blended learning system for everyday teaching activities. The participants were recruited after signing a paper-based consent form in class. No extra credit was offered for participating in this study.

#### **Research Design**

This investigation was an experimental design. It focused on the cumulative effects of feedback strategies in accordance with different types of feedback and the volitional change strategies. In order to test hypotheses, participants were randomly assigned into one of the three treatment groups and one control group. The analysis included two independent variables and two dependent variables. All variables are discussed in detail in this chapter.

#### **Independent Variables**

Two independent variables are examined in this study: the type of knowledge and the volitional change strategy. The first independent variable, type of knowledge, was implemented at two levels: (1) the knowledge of results (KR) and (2) the knowledge of correct response (KCR). The second independent variable, volitional change strategy, was implemented at two levels: (1) generalized volitional messages and (2) no volitional message. As a result, four

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

conditions were assigned based on the combinations of the independent variables. The fourth condition (i.e., KR) was considered the control condition because this kind of feedback pattern was normally used for college courses. Feedback messages were sent to students via a web-based learning support system. Four types of feedback messages were included: KCR, KCR plus volitional message (V), KR plus V, and KR (the control group).

### **Types of Feedback**

**Knowledge of results.** The first level of the type of knowledge was the knowledge of results. KR refers to the verification feedback, which tells the students if their responses are correct or incorrect, such as “you got the right answer” or “you are wrong.” KR was constructed by the course instructor according to students’ responses. An example of KR is shown in Figure 9. KR was published on the web-based learning support system. Students could access and review it after logging on to the system.

**Knowledge of Correct Response.** The second level of the type of knowledge was the knowledge of the correct response (KCR), informs the students about whether they are right or wrong and provides information on the correct answer, which significantly improves students’ academic performance. This conclusion has been tested under different learning contexts, such as the traditional classroom, the computer-based instruction, and the web-based instruction (Clariana et al., 1991; Gilman, 1969; Guthrie, 1971; Roper, 1977; Waldrop et al., 1986; Wang & Wu, 2008). Bangert-Drowns et al. (1991) indicated that students are more interested in the content of the correct answer than the detailed explanation of the reason why it is correct. KCR was constructed by the course instructor. An example of KCR is shown in Figure 10. KCR was published on the web-based learning support system as well.

# IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Figure 9. An Example of the Knowledge of Results

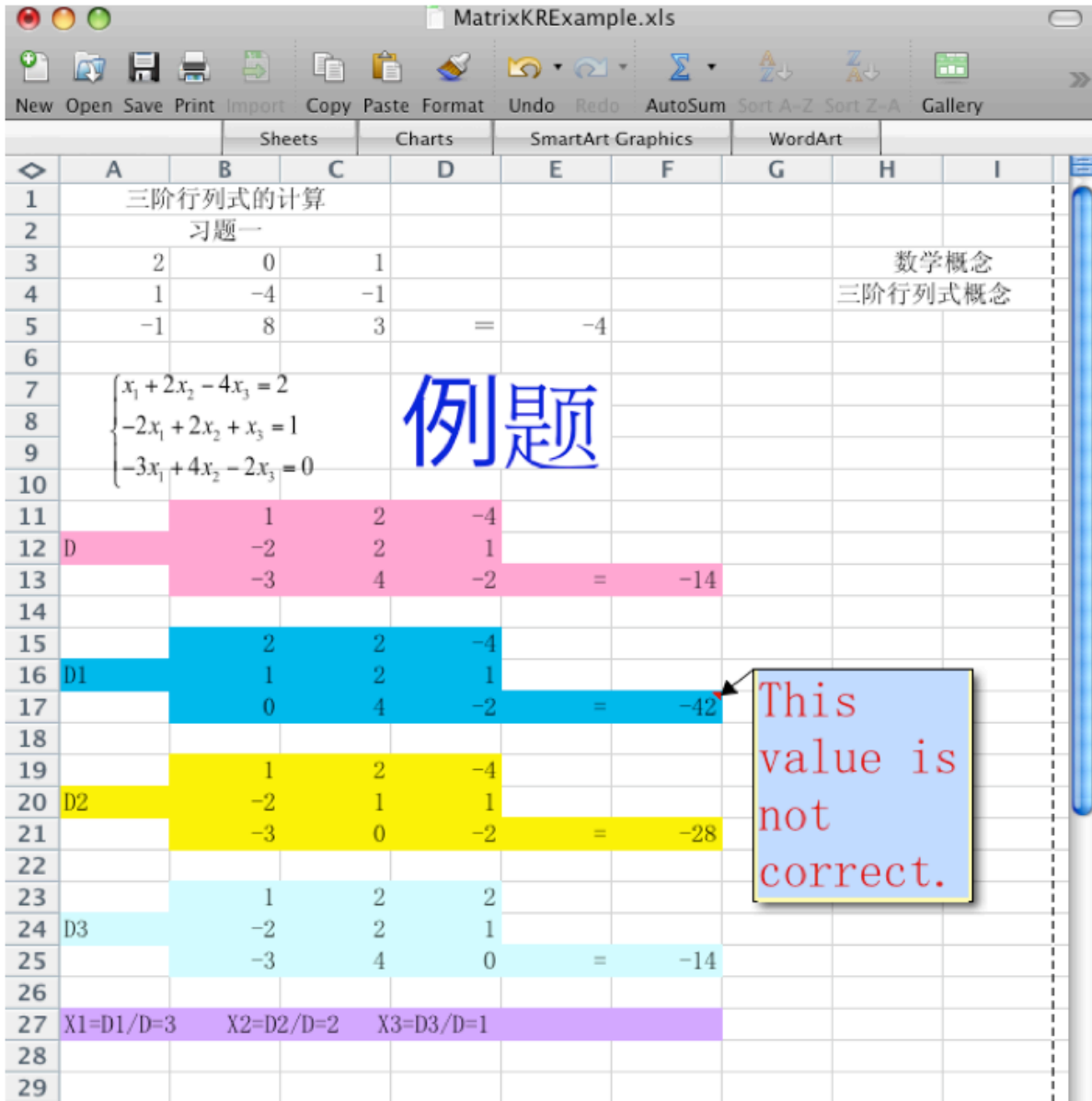
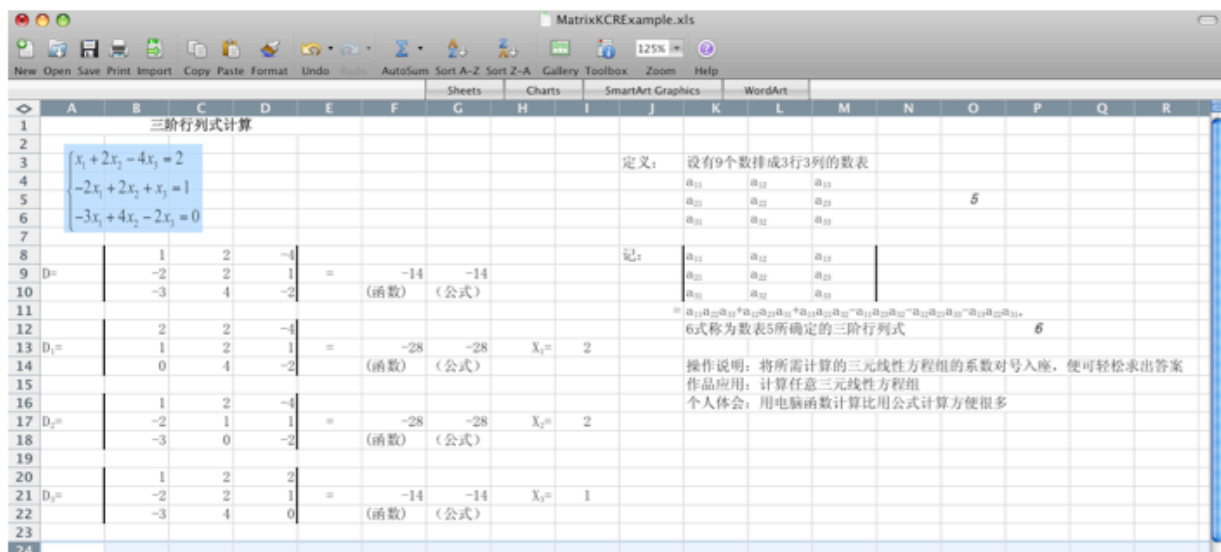


Figure 10. An Example of the Knowledge of Correct Response



### Volitional Change Strategy

After being motivated to achieve a learning goal, students will persist in their efforts to achieve it. This is the focus of volition. Various kinds of obstacles interfere with students' persistence during the implementation of the learning tasks. When faced with obstacles, students who correctly use the volitional (self-regulatory) strategies will maintain their intentions and keep on tasks (Keller, 2008b). Kuhl (1987) defined volition (intention) as a dynamic to maintain a positive emotional state. When solving complex problems, the ability to maintain a positive emotional state "enables an individual to become 'immersed' in the problem without being distracted by irrelevant concerns, anxieties, future goals" (p. 285).

Keller and his doctoral students (Keller, 2008a, 2008b; Keller & Suzuki, 1987; Kim & Keller, 2008) conducted several studies to explore the impact of the personalized volitional feedback on learning motivation and achievement. The results support the idea that expert constructed volitional messages increase students' level of motivation. However, Kim and Keller

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

(2008) pointed out that the personalized feedback strategies had a limitation in terms of the instructor's capability. As such, it restricts broad application in big classroom. They suggested that further research could reveal if standard or computer-generated feedback had the same power to enhance motivation.

In this study, the volitional change strategy refers to the volitional messages sent to the students. The volitional messages were constructed based on the Academic Volitional Strategy Inventory (McCann & Garcia, 1999). The original AVSI is a promising research instrument used to measure volitional strategies used by college students, which contains two factors: motivation regulation and emotion regulation. The volitional messages were modified according to the instructor's suggestion pattern based on AVSI; 29 volitional messages are shown in the two categories (i.e., motivation regulation and emotion regulation). The volitional messages were published on the web-based learning support system; students could review them together with KR or KCR.

### **Factor 1: Motivation regulation (18 items)**

1. Remind yourself that you usually do fine on exams and/or other course assignments when you stay on track with your studying.
2. Think about how disappointed others (family/friends) will be if you do poorly.
3. Think about why you are going to college (e.g., about your future plans).
4. Tell yourself, "I can do this!"
5. Think about your other coursework and that if you don't get going or continue this study session you'll fall behind in the assignments for the rest of your courses.
6. Think about the mistakes that you have made on past assignments and exams when you've procrastinated in studying.



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

7. Exercise for about a half hour before you begin studying to clear your head and help you get relaxed.
8. Tell yourself that you have gotten your best grades when you stuck to a study schedule.
9. Think about how great (how relieved) you'll feel when you get this finished.
10. Tell yourself "Get to it and concentrate, this is an important exam/paper/assignment."
11. Think about the sacrifices that you have made or that your parents are making to put you through school.
12. Tell yourself that you will have enough time to talk to your professor, teacher's assistant, or classmates for help if needed if you just get down (or back) to your studying.
13. Think about the goals you have set for yourself (how what you do now may affect your future).
14. Think about the possible negative consequences of doing poorly in the class.
15. Take a 5- to 10-minute break to clear your head when you want to quit studying but know you should stay with it.
16. Think about your strengths and the resources that you can draw upon to help you with difficult assignments or test information.
17. Think about things that make you feel good whenever you are feeling frustrated about what you need to get done for this class.
18. Talk aloud to yourself about the material you're studying to keep you from getting distracted by other thoughts or activities.

### **Factor 2: Emotion regulation (11 items)**

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

1. Promise yourself something you want when you complete a specific amount of studying (e.g., going to a movie, getting together with friends, favorite CD).
2. When can't get down to studying or get if you get frustrated or interrupted during studying, count to 10 to help you get on track with it.
3. Tell yourself that you will be able to understand and remember this course material.
4. Call a friend from class and discuss the assignment or material with him or her.
5. Put on background music (e.g., classical, soft, instrumentals) to relax.
6. Concentrate on your breathing, taking deep, steady, slow breaths to help you focus before beginning your studying or to help you resume your studying if you get distracted, frustrated, or bored while studying.
7. Imagine yourself moving through the assignment or answering the test questions without much difficulty.
8. Think about the amount of time your classmates probably study for this class and that they will get a better grade than you.
9. Think of interesting or different ways to make studying more fun or challenging for you.
10. Meditate or use some form of relaxation technique so you are better able to concentrate on your studies.
11. Schedule regular study hours with a friend from class so that you don't fall behind in your class assignments and feel bad/stressed/guilty for putting off studying.

### **Sequence of Volitional Messages Delivery**

Kanfer and Ackerman (1989, 1990) suggest applying the volitional strategy as Corno and Kanfer (1993) did: (a) give the emotional control strategies early in the skill acquisition process

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

and (b) give the motivational control strategies in the later phase of the skill acquisition when students' attentional demands of task are diminished. In the current study, the scheduled volitional change messages were given to the students with the instructor's feedback on their assignments. Assignment feedback occurred four times during the study, which means volitional messages were given to the students four times. The sequence was (1) emotion regulation, (2) motivation regulation, (3) emotion regulation, and (4) motivation regulation. The sample of the emotion regulation messages is shown in Figure 11, and the sample of the motivation regulation messages is shown in Figure 12. The interface of the web-based learning support system is shown in Figure 13.

Referring to the interface, the KR and KCR files were uploaded by the instructor. The scores of the assignments were given in the "Score" section. Volitional messages were published in the "Remarks" section. After logging into the system, the students could do the following tasks in one web page: 1) check the assignments questions, 2) upload the answer files, 3) check the score, 4) review instructor's corrections, 5) review their knowledge of the correct response, and 6) review the instructor's suggestions (volitional change messages).

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Figure 11. The Sample of Emotion Regulation Message

Hi Wei:

Do you remember the questionnaire you responded in the middle of the semester? After carefully reviewing and analyzing your responses, I am happy to say that you are doing well on your learning motivation and strategies. You are on the right track of studying this course. In here, I am trying to give you some suggestions rather than critiques, in order to help you save time and learn more effectively:

Promise yourself something you want when you complete a specific amount of studying (e.g., going to a movie, getting together with friends, favorite CD, etc.).

When can't get down to studying or get if you get frustrated or interrupted during studying, count to 10 to help you get on track with it.

Tell yourself that you will be able to understand and remember this course material.

Call a friend from class and discuss the assignment or material with her.

Put on background music (e.g., classical, soft, instrumentals) to relax.

Concentrate on your breathing, taking deep, steady, slow breaths to help you focus before beginning your studying, or to help you resume your studying if get distracted, frustrated, or bored while studying.

Imagine you moving through the assignment or answering the test questions without much difficulty.

Think about the amount of time your classmates probably study for this class, and that they will get a better grade than you.

Think of interesting or different ways to make studying more fun or challenging for you.

Usually meditate or use some form of relaxation technique so you are better able to concentrate on your studies.

Schedule regular study hours with a friend from class so that you won't fall behind in your class assignments and feel bad/stressed/guilty for putting off studying.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Figure 12. The Sample of Motivation Regulation Message

Hi Wei:

Do you remember the questionnaire you responded in the middle of the semester? After carefully reviewing and analyzing your responses, I am happy to say that you are doing well on your learning motivation and strategies. You are on the right track of studying this course. In here, I am trying to give you some suggestions rather than critiques, in order to help you save time and learn more effectively:

Remind yourself that you usually do fine on exams and/or other course assignments when you stay on track with my studying.

Think about how disappointed others (family/friends) will be if you do poorly.

Think about why you are going to college (e.g., about your future plans).

Tell yourself, "I can do this!"

Think about your other coursework and that if you don't get going or continue this study session you'll fall behind in the assignments for the rest of my courses.

Think about the mistakes that you have made on past assignments and exams when you've procrastinated in studying.

Exercise for about a half hour before you begin studying to clear the head and help you get relaxed.

Think about the kinds of jobs/career you may end up with if you flunk out of college.

Tell yourself that you have gotten your best grades when you stuck to a study schedule.

Think about how great (how relieved) you'll feel when you get this finished.

Tell yourself "Get to it and concentrate, this is an important exam/paper/assignment."

Think about the sacrifices that you have made, or that your parents are making to put you through school.

Tell yourself that you will have enough time to talk to your professor, teacher's assistant, or classmates for help if needed, if you just get down (or back) to your studying.

Think about the goals you have set for yourself (how what you do now may affect your future).

Think about the possible negative consequences of doing poorly in the class.

Take a 5- to 10-minute break to clear your head when you want to quit studying but know you should stay with it.

Think about your strengths and the resources that you can draw upon to help you with difficult assignments or test information.

Think about things that make you feel good whenever you are feeling frustrated about what you need to get done for this class.

Talk aloud to yourself about the material you're studying to keep you from getting distracted by other thoughts or activities.

---

Figure 13. The Interface of the Online Assignment System



### Dependent Variables

Two dependent variables were used in this study: self-efficacy and course satisfaction.

**Self-efficacy.** Participants' reported self-efficacy beliefs were measured using pre- and post-test of the MSLQ (Pintrich et al., 1991). Eight items from the MSLQ related to self-efficacy measurement were selected for the current study. Responses to the items were indicated using a 6-point Likert scale. The author translated the Chinese version of the instrument; a pilot test of the instrument was conducted in a small population of seven Chinese college students and three faculty members (all of whom are in the IDT program at Tsinghua University, Beijing). The average response time was less than five minutes. The instrument included the following items:

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

1. I believe I will receive an excellent grade in this class.
2. I'm certain I can understand the most difficult material presented in the readings for this course.
3. I'm confident I can understand the basic concepts taught in this course.
4. I'm confident I can understand the most complex material presented by the instructor in this course.
5. I'm confident I can do an excellent job on the assignments and tests in this course.
6. I'm certain I can master the skills being taught in this class.
7. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.

**Course satisfaction.** Learning satisfaction is defined as the fulfillment of the learner's wishes, expectations, or needs by the instruction. As such, it is an important outcome of learning. Learning satisfaction can predict drop-out rates and intentions for future enrollment (Chiu, Sun, Sun, & Ju, 2007). Satisfaction may influence the learner's subsequent efforts to learn (Zimmerman & Tsikalas, 2005). Students' satisfaction is also a key factor in continued learning (Bolliger & Wasilik, 2009).

Participants' satisfaction was measured using a post-test questionnaire at the end of the semester. The questionnaire was modified according to the work of Artino (2007, 2009), which included three items:

1. I look forward to taking more blended courses in the future.
2. This course met my needs as a learner.
3. Overall, I was satisfied with my blended learning experience.

Responses to the items were recorded on a 6-point Likert scale. The Chinese version was translated, and a pilot test conducted.

Figure 14. The Education Online of Beijing Institute of Fashion Technology



### Instructional Settings

Blended learning contexts were used in this study. Technology-based delivery systems, combined with traditional classroom lectures, offer opportunities to integrate motivational support strategies in novel ways (Keller, 2008a). Studies have demonstrated that appropriate teaching strategies promote learning in blended settings (Keller, 2008a; Kim & Keller, 2008; Visser & Keller, 1990). The web-based learning support system used in this study is Tsinghua Education Online (see Figure 14), which was designed and developed by the IDT team at



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Tsinghua University. It is the dominant online educational system in China. More than 200 universities are using it for teaching and learning, and 25,000 courses are offered on it every day.

### **Procedure**

The procedure for this study consisted of three stages. The process of assigning participants was conducted in stage one. Participants were asked to sign the paper-based consent form in class and respond to the pre-treatment survey online. All participants were randomly assigned to one of the treatment groups or the control group, resulting in four groups: KCR, KCR +V, KR + V, and KR as the control group. Students' perceived self-efficacy was measured by the pre-treatment questionnaire. The questionnaires were posted on the learning support system, and each participant was asked to complete and submit it online.

During stage two, after every online assignment (a total of four online assignments), each of the participants received the reviewed assignment with the feedback messages. Feedback messages were standard and designed according to the specific kind of treatment. For example, the KCR + V group received the knowledge of correct response (or a perfect example) and the volitional messages. However, the KR group was only informed as to whether they were correct or wrong.

At the end of the semester, students' perceived self-efficacy was once again measured using the post-treatment questionnaire. The pre- and post-measurement of self-efficacy used the same questionnaire. The questionnaire was posted on the learning support system, and each participant was required to complete and submit it online. The course satisfaction questionnaire was posted, combined with the post-treatment self-efficacy measurement questionnaire in the

# IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

16<sup>th</sup> week (after the final exam). Students responded to it online as well. The data were collected by the learning support system. Tables 3 show an overview of the procedure.

Table 3

## *Procedure*

---

### **Stage 1. Recruit**

---

#### Week 7

- Collect consent form signed.
- Conduct a pre-treatment measurement.

#### Week 8

- Randomly assign the participants into four groups.
  - Post the 1st online assignment by the instructor.
- 

### **STAGE 2. Feedback treatment**

---

#### Week 9

- Post the 1st feedback to certain group.
- The volitional message groups receive Emotion Regulation messages.

#### Week 10

- Post the 2nd online assignment by instructor.

#### Week 11

- Post the 2nd feedback to certain group.
- The volitional message groups receive Motivation Regulation messages.

#### Week 12

- Post the 3rd online homework by instructor.
- Report the pre-treatment measurement results to the students.

#### Week 13

- Post the 3rd feedback to certain group.
- The volitional message groups receive Emotion Regulation messages.

#### Week 14

- Post the 4th online homework by instructor.

#### Week 15

- Post the 4th feedback to certain group.
  - The volitional message groups receive Motivation Regulation messages.
- 

### **STAGE 3. Post-Treatment Survey**

---

#### Week 16

- Conduct a post-treatment survey.
-

**Stage 1: Consent form, pre-treatment measurement, and group assignment.** In the seventh week of the semester, the instructor informed the students about the purpose of the research and recruited participants in the classroom. Students who agreed to participate in the research signed the consent form. After class, the participants went online to complete the pre-treatment questionnaire, which took approximately five minutes. The questionnaire included eight items of self-efficacy measurement, as previously discussed (see Dependent Variable).

In the eighth week, the researcher randomly assigned the participants into one of the three treatment groups or the control group. The instructor would check the assignment and knowledge of correct response of the KCR group. The instructor would check the assignment, knowledge of correct response, and standard volitional messages of the KCR + V group. The instructor would check the assignment and standard volitional messages of the KR + V group. Finally, in the control group (KR), the instructor would check their assignment only. The feedback messages were posted online. Students could review them after logging onto the online learning support system.

**Stage 2: Treatment.** During the eighth week of the course, the instructor posted the first course assignment online. The students were required to complete and submit it online within a week. In the ninth week, the researcher constructed the standard volitional messages in terms of emotion regulation. The instructor corrected students' first assignment and constructed the knowledge of correct response. The instructor then combined several parts of the message components and published four types of feedback messages to the different groups.

During the 10<sup>th</sup> week, the instructor posted the second course assignment online. The students were required to complete and submit it online within a week. During the 11<sup>th</sup> week, the

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

researcher constructed the standard volitional messages in terms of the motivation regulation. The instructor corrected the students' second assignment and constructed the knowledge of the correct response. The instructor then combined several parts of the message components and published four types of feedback messages to the different groups.

During the 12<sup>th</sup> week, the instructor posted the third course assignment online. The students were required to complete and submit it online within a week. During the 13<sup>th</sup> week, the researcher constructed the standard volitional messages in terms of the emotion regulation. The instructor corrected the students' third assignment and constructed the knowledge of correct response. The instructor then combined several parts of the message components and published four types of feedback messages to the different groups.

During the 14<sup>th</sup> week, the instructor posted the fourth course assignment online. The students were required to complete and submit it online within a week. During the 15<sup>th</sup> week, the researcher constructed the standard volitional messages in terms of the motivation regulation. The instructor corrected the students' fourth assignment and constructed the knowledge of correct response. The instructor then combined several parts of the message components and published four types of feedback messages to the different groups.

**Stage 3: Post-treatment measurement.** During the 16<sup>th</sup> week of the course and before the final exam, the participants completed the post-treatment questionnaire online, which took about 5 minutes. This questionnaire consisted of the self-efficacy measurement and the satisfaction measurement (as discusses in the Dependent Variable section).

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Table 4

*Pilot Data Pre-Test Self-Efficacy*

Score	Frequency	Percent	Cumulative percent
2	1	1.2	1.2
2.88	1	1.2	2.5
3	1	1.2	3.7
3.13	1	1.2	4.9
3.25	1	1.2	6.2
3.5	3	3.7	9.9
3.63	2	2.5	12.3
3.75	3	3.7	16
3.88	4	4.9	21
4	3	3.7	24.7
4.13	4	4.9	29.6
4.25	2	2.5	32.1
4.38	3	3.7	35.8
4.5	6	7.4	43.2
4.63	2	2.5	45.7
4.75	10	12.3	58
4.88	6	7.4	65.4
5	6	7.4	72.8
5.13	2	2.5	75.3
5.25	1	1.2	76.5

IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Table 5

*Pilot Data Pre-Test Self-Efficacy Continued*

Score	Frequency	Percent	Cumulative percent
5.38	1	1.2	77.8
5.5	1	1.2	79
5.63	2	2.5	81.5
5.75	1	1.2	82.7
5.88	3	3.7	86.4
6	2	2.5	88.9
6.13	2	2.5	91.4
6.25	3	3.7	95.1
6.5	1	1.2	96.3
6.63	1	1.2	97.5
6.75	1	1.2	98.8
6.88	1	1.2	100
Total	81	100	

**Pilot Study**

The pilot pre-measurement of self-efficacy was conducted in one class of 83 Chinese college students at the same university; 81 sets of the data were valid. Participants' reported self-efficacy beliefs were measured using the MSLQ (Pintrich et al., 1991). Eight items of the self-efficacy measurement were selected to apply in this study. Responses to the items were indicated on a 7-point Likert scale. The author translated the Chinese version of the instrument. According to the descriptive statistical analysis, 24.7% of students felt that they were not self-efficacious or were neutral about their self-efficacy; 72.8% felt that they were a little bit self-efficacious,

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

natural, or not self-efficacious. Only the upper 10% of students felt they were self-efficacious or very self-efficacious (see Tables 4 and 5).

Based on the pilot data and the attribute of the volitional message, students were randomly divided into four groups. Participants in the volitional feedback groups received the volition messages rather than only the lower self-efficacious students receiving the messages. This approach was deemed appropriate for two reasons. First, 10% of the participants were a relatively small population. If they were separated, it would be hard to compare them with other groups in an equal manner. Second, by reviewing the volitional messages, it might be valuable to help students learn more effectively. It might work for all the students regardless of whether they held high or low self-efficacy. It is hypothesized that low self-efficacious students will raise their efficacy level by receiving the volitional messages. In addition, it is still expected that high self-efficacious students will maintain their high level of self-efficacy.

### **Validity**

In this experimental study, all participants were randomly assigned to groups and received the same classroom lecture from the same instructor using the same course materials; they also completed the same assignments and took the same exams. The only difference was the feedback strategies that they received. As such, no factor other than the treatment (feedback strategies) caused the outcome (self-efficacy and satisfaction).

The validity of the MSLQ instrument was determined by its original authors (Pintrich et al., 1991). The items can be used entirely or partly. The instrument of measuring satisfaction was tested by the original author (Artino, 2007, 2009).

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

In terms of the external validity, the participants and the related instructional conditions in this study are very normal for most colleges in China. As a result, the research findings can be extended to similar situations in China.



## Chapter IV. Results

The purpose of this experimental study was to investigate whether standard volitional feedback messages could effectively promote students' self-efficacy and course satisfaction among Chinese undergraduates in a blended instructional setting. In order to test the hypotheses formulated in Chapter II (pp. 58), the treatment effects were examined using Pearson product-moment correlation, one-way ANOVA, and ANCOVA. The effects between groups were compared using the Tukey HSD and LSD test. The alpha level was set to .05 for all analyses in this study. SPSS trial version 19 was used to conduct statistical analyses. This chapter consists of three sections, reporting on 1) the results of preliminary data analyses prior to statistical analysis of the dependent measures; 2) descriptive statistics for dependent measures; and 3) the results of the hypothesis testing.

### Preliminary Data Analysis

Two types of preliminary analysis were conducted: (a) a group equivalence test and (b) a detection of violations of assumptions.

**Group equivalence test.** This investigation was an exploratory study with a pure-experimental design. Participants were randomly assigned from the entire population of undergraduates enrolled in the Foundation of Computer Application course. In order to verify the group equivalence statistically, participants' perceptions of self-efficacy toward learning were surveyed during the 8<sup>th</sup> week of the 18-week semester. The data were collected using selected items from the MSLQ (Pintrich et al., 1991). The selected questionnaire contained eight items. Responses to the items were in the form of a 6-point Likert scale. Based on the Cronbach's alpha test, the total scale has a reliability of .87 after the deletion of item six (i.e., "I expect to do well in this class"; the questionnaire is included in Chapter III). One-way ANOVA results revealed

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

that no significant differences occurred in pre-test of self-efficacy toward learning across the four groups ( $F=.58$ ,  $p=.62$ ), indicating that the group equivalence for pre-test self-efficacy was statistically verified.

**Tests for ANOVA assumptions.** For learners' self-efficacy toward learning, one-way ANOVA tests were conducted. Three assumptions necessary for ANOVA procedures were tested or observed. Assumption 1 focused on the independence of observation. As described in the methods section, all observations were independent within and across groups; no interaction occurred among students. Therefore, this assumption was satisfied. Assumption 2 focused on the normal distribution. The assumption of normal distribution refers to the requirement that observations are taken from normally distributed populations. Shapiro-Wilk's normality test was conducted and confirmed. Assumption 3 focused on homogeneity of variance. The assumption of homogeneity of variance is that samples are taken from the populations with equal variances. This assumption was tested with  $p=.94$ .

### **Descriptive Data**

At the beginning of the descriptive data analysis, a reliability analysis and a factor analysis were conducted. As demonstrated in Tables 6, self-efficacy measure item six could be deleted because the item does not correlate well with the whole and its removal would create a more reliable measure. For the self-efficacy pre-test, the reliability Cronbach's alpha value was .85 and .87 before and after the deletion, respectively. For the self-efficacy post-test, the reliability Cronbach's alpha value was .87 and .88, before and after the deletion, respectively. The reliability Cronbach's alpha value of the course satisfaction instrument was .70.

IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Table 6

*Item and Descriptive Statistics for Scales*

<b>Scale and item</b>	<b>M</b>	<b>SD</b>	<b>Cronbach's <math>\alpha</math></b>
<i>Pre-test self-efficacy</i>	4.48	.75	.87
I believe I will receive an excellent grade in this class.	4.78	.92	
I'm certain I can understand the most difficult material presented in the readings for this course.	4.16	1.04	
I'm confident I can understand the basic concepts taught in this course.	4.88	.99	
I'm confident I can understand the most complex material presented by the instructor in this course.	4.13	1.11	
I'm confident I can do an excellent job on the assignments and tests in this course.	4.43	.94	
I'm certain I can master the skills being taught in this class.	4.55	1.05	
Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	4.42	.92	
<i>Post-test self-efficacy</i>	4.34	.78	.88
Item 1 as in pre-test	4.60	1.00	
Item 2 as in pre-test	3.94	1.14	
Item 3 as in pre-test	4.60	.95	
Item 4 as in pre-test	4.16	1.14	
Item 5 as in pre-test	4.33	.98	
Item 6 as in pre-test	4.45	.94	
Item 7 as in pre-test	4.33	1.04	
<i>Course satisfaction</i>	4.90	.78	.70
I look forward to take more blended course in the future.	5.03	1.04	
This course met my needs as a learner.	4.78	1.08	
Overall, I was satisfied with my blended learning experience.	4.88	.81	

IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Table 7

*Descriptive Statistics by Groups*

Group	N	Pre-test		Post-test		Course	
		self-efficacy		self-efficacy		Satisfaction	
		M	SD	M	SD	M	SD
Knowledge of result (KR)	18	4.44	.80	4.54	.72	4.63	.77
Knowledge of correct response (KCR)	18	4.34	.76	4.13	.86	4.83	1.01
Knowledge of result plus volitional messages (KR+V)	16	4.48	.69	4.23	.59	4.94	.55
Knowledge of correct response plus volitional messages (KCR+V)	15	4.69	.76	4.48	.93	5.24	.58
Total	67	4.48	.75	4.34	.78	4.90	.78

**Self-efficacy toward learning.** Descriptive statistics for self-efficacy are shown in Tables 7. The total scores were 4.48 (SD=.80) for the pre-test and 4.34 (SD =.78) for the post-test. The mean score for the knowledge of correct response plus volitional messages group pre-test was highest (4.69), and the mean score for the knowledge of correct response group post-test was lowest (4.34) before the treatment. The mean score for the knowledge of results (KR) group pre-test was highest (4.54), and the mean score for the knowledge of correct response (KCR) group post-test was lowest (4.13) after the treatment. The possible range for this measure was 1 to 6.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

**Course satisfaction.** Course satisfaction was measured after the semester ended.

Descriptive statistics for the course satisfaction are shown in Tables 7. The total mean score for the whole population was 4.90 (SD=.78). The mean score for the knowledge of correct response plus volitional messages (KCR + V) group was highest at 5.24 (SD=.58), and the mean score for the knowledge of results (KR) group was lowest at 4.63 (SD=.77).

### Examination of Hypotheses

**Hypothesis 1.** The first hypothesis was that a positive correlation would exist between learning self-efficacy and course satisfaction. It was expected that the participants who had higher self-efficacy would show higher course satisfaction. The correlation between self-efficacy and course satisfaction was analyzed using the Pearson product-moment correlation between post-test self-efficacy scores and course satisfaction scores. The results revealed a significantly positive correlation between learning self-efficacy and course satisfaction ( $r(67)=.21, p<.05$ ). Thus, Hypothesis 1 was supported.

**Hypothesis 2.** The second major hypothesis was that different feedback strategies would differentially increase students' self-efficacy. Specifically, it was expected that the participants who received KCR + V messages would have the highest self-efficacy, followed by KR + V and KCR. Those in the control group (KR) were predicted to have the least level of self-efficacy.

The change of attitudes was analyzed using a one-way ANOVA on the scores of post-test self-efficacy. The results revealed that no significant difference occurred among the four groups ( $F(3, 63)=1.05, p=.38$ ) (see Table 8). Thus, Hypothesis 2 was not supported.

IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

Table 8

*One-Way ANOVA: Post-Test Self-Efficacy*

	Sum of squares	df	Mean square	F
Between groups	1.94	3	.65	1.05
Within groups	38.64	63	.61	
Total	40.57	66		

**Hypothesis 3.** The third major hypothesis was that different feedback groups would show a different course satisfaction. Specifically, it was expected that the participants who received KCR + V messages would show the highest satisfaction, followed by KR + V and KCR. Those in the control group (KR) would show the least satisfaction.

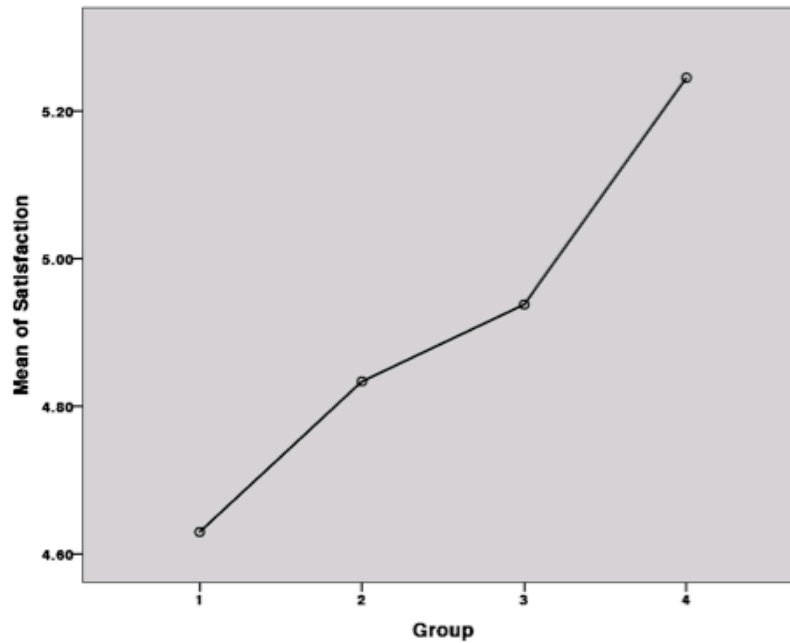
Table 9

*One-Way ANOVA: Course Satisfaction*

	Sum of squares	df	Mean square	F
Between groups	3.2	3	1.07	1.82
Within groups	36.85	63	.59	
Total	40.05	66		

Course satisfaction was analyzed using an ANCOVA test. LSD post-hoc analysis testing indicated that the KCR + V group had significantly higher satisfaction than the KR (control) group ( $p=.02$ ) (see Figure 15). However, no significant difference occurred among the other groups. Thus, Hypothesis 3 was partially supported.

Figure 15. Course Satisfaction by Groups



*Figure 15.* Group 1 is the knowledge of results (KR) group (control). Group 2 is the knowledge of correct response (KCR) group. Group 3 is the knowledge of results plus volitional messages (KR+V) group. Group 4 is the knowledge of correct response plus volitional messages (KCR+V) group. Group 4 (KCR+V) had significantly higher course satisfaction than group 1. Other groups were no significant difference.

## Chapter V. Discussion and Conclusion

### Overview

The purpose of this study was to investigate the effects of volitional feedback strategies on students' self-efficacy and course satisfaction, implemented in a blended instructional context in China. The participants were first-year undergraduates from the School of Business and the School of Environmental Engineering at a public university in Beijing. The participants were enrolled in a required course called Foundations of Computer Applications. Specifically, this study focused on the cumulative effects of volitional messages combined with regular feedback contents (KR or KCR) constructed in accordance with the underlying theoretical models for motivation and volition.

The study involved four groups receiving one of the following treatments: 1) knowledge of the results (KR) (control), 2) knowledge of the correct response (KCR), 3) knowledge of the results combined with the volitional messages (KR + V), and 4) knowledge of the correct response combined with the volitional messages (KCR + V). Sixty-seven participants were randomly distributed among the four treatment groups and received feedback messages over a period of eight weeks. Their self-efficacy toward learning was measured using pre- and post-tests based on MSLQ (Pintrich et al., 1991). The course satisfaction was measured using a post-test based on Artino's (2007, 2009) satisfaction questionnaire.

The treatment effects on the dependent variables of self-efficacy and course satisfaction were examined using Pearson product-moment correlation, one-way ANOVA, and ANCOVA. In addition, post-hoc analyses compared each group with the others using the Tukey LSD test. Graphs showing changes in the variables were also analyzed.



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

In this chapter, the findings are discussed by hypothesis and in relation to the framework of this study based on the theoretical and empirical foundations. Limitations of this study and possibilities for future studies are described.

### **Findings**

**Self-efficacy and course satisfaction.** The first hypothesis predicted that participants with higher self-efficacy would show higher course satisfaction. Zimmerman and Bandura (1994) argued that adaption of standards of achievement might create self-evaluation involvement in the learning activity that, in turn, served motivational functions. In other words, anticipated self-satisfaction acquired from fulfilling valued standards of achievement provides one source of personal learning motivation while dissatisfaction with substandard performance serves as another motivator for enhanced effort. Those students who are satisfied with only superior achievements exert greater effort in learning activities than those who satisfied with lesser achievement (Simon, 1979). Learning goals operate through self-processes (Locke & Latham, 1990). Both self-efficacy and self-evaluative standards affect goal setting; the higher perceived self-efficacy, the higher goals set and the firmer commitments to the students are (Bandura, 1991). High self-evaluative standards promote high learning goal setting. Students are motivated by satisfaction from fulfilling the valued standards and are pushed to exert efforts in those areas in which they are unnot satisfied with insufficient performance. Students with a low perceived self-efficacy are easily dissuaded by failures or difficulties. Students who are assured of their capabilities put more effort into the task when they fail to reach the goal and keep working on it until it is successfully mastered (Zimmerman & Bandura, 1994).

The study conducted by Zimmerman and Bandura (1994) supported the notion that self-efficacy plays a key role in learning achievement in a college writing course. The increased level

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

of self-efficacy raised the learning goals that students set and the quality of achievement with which they would be satisfied. In the area of professional training, Judge and Bono (2001) and Judge, Locke, and Durham (1997) conducted several studies and found similar results. They argued that self-efficacy affected job satisfaction through its association with successful performance on the job. Individuals with high self-efficacy deal more effectively with obstacles and persist on the task when faced with failures. They are more likely to achieve valued outcomes and thus derive satisfaction from their job performances. Self-efficacy is a significant predictor of both job satisfaction and job performance. Similar results were found in DeWitz and Walsh's (2002) study. For college students in an introduction psychology course, their self-efficacy was significantly related to college satisfaction in a positive direction. Self-efficacy was the effective predictive of college satisfaction. Artino (2009) pointed out that self-efficacy beliefs were moderately strong positive predictors of military students' course satisfaction and continuing motivation.

**Self-efficacy toward learning.** The second hypothesis predicted that participants who received the knowledge of correct response plus volitional messages (KCR + V) would have the highest self-efficacy. Those in the knowledge of results plus volitional messages group (KR + V) would be the next. The knowledge of correct response (KCR) group followed. Finally, those in the control group (knowledge of results) would show the least level of self-efficacy. Hypothesis 2 was not supported. In fact, the treatment groups' level of self-efficacy decreased, and the control group's self-efficacy increased. This finding contradicts Hypothesis 2 to a certain extent.

Several reasons may explain these findings. First, the course in which participants enrolled was the Foundations of Computer Applications. According to the syllabus, Microsoft Office, Photoshop, and some other "every-day use" software would be taught in the course. The

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

participants might have felt that it would be easy to master the learning tasks because they were using these software programs before attending the course. However, this course was not as easy as participants expected. The average course final score was 70.5 out of 100. Students' self-efficacy changed in a negative way, which might have resulted from their misperception of the general difficulty of the course. This finding seems to be consistent with the findings from previous studies (Gungor et al., 2007; Keller, 2008a; Kim & Keller, 2008). First-year college students in a physics course who held high self-efficacy at the beginning of the semester decreased their self-efficacy beliefs by the end of the course. Those who held low self-efficacy increased their self-efficacy after a semester. In addition, students with too high self-efficacy achieved lower course grades than others (Gungor et al., 2007). Zimmerman (2001) explained that high self-efficacy could retard learning because—if students have self-efficacy beliefs that are too high—they would probably put less effort into learning. Kim and Keller (Keller, 2008a; Kim & Keller, 2008) conducted research on the integration of motivational and volitional strategies to improve learner motivation and achievement. The results indicated that students' motivation, in terms of their confidence, decreased after the treatment. Such a strategy could help low performers, but not high performers.

Second, the participants in the control group (KR) received no knowledge of correct response and no volitional messages. They did not get any additional help from the instructor. They probably had to motivate themselves to put more effort into mastering the learning tasks. This mastery experience might have helped them increase their self-efficacy beliefs, which seems to be consistent with the first source of building self-efficacy belief. Bandura (1997) argued that self-efficacy was built from individuals' prior mastery experiences. Successes raise the efficacy expectation while repeated failures lower them. If an individual puts a minimum

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

amount of effort and completes a task successfully, he or she has high ability and increases the efficacy expectation. In contrast, if the individual puts a great effort into successfully completing the task, this indicates low ability and decreases the self-efficacy. In this way, the learner's personal interpretation of outcomes impacts the building of self-efficacy.

**Course Satisfaction.** The third major hypothesis was that different feedback groups would indicate different course satisfaction. Specifically, it was expected that participants who received KCR + V messages would show the highest satisfaction, followed by those in the KR + V messages group and the KCR group. Those in the control group (KR) would show the least satisfaction.

As an important outcome of learning, learning satisfaction is defined as the fulfillment of the learner's wishes, expectations, or needs by the instruction. Learning satisfaction may predict the drop-out rates and the intentions for future enrollment (Chiu et al., 2007). Satisfaction may influence a learner's subsequent efforts to learn (Zimmerman & Tsikalas, 2005). Students' satisfaction is also a key factor in continued learning (Bolliger & Wasilik, 2009).

From a motivational and self-regulated learning perspective, satisfaction is important because this type of self-reflective reaction to learning situations may influence learners' effort to learn (Zimmerman & Tsikalas, 2005). Other scholars have defined course satisfaction as an important outcome in online settings (Chiu et al., 2007; Chyung, 2001; Roca, Chiu, & Martinez, 2006). Findings from this study generally support this view. Participants' course satisfaction differed according to their treatment group. Although no significant difference occurred among the four groups, the KCR + V group showed a significant difference from the KR (control) group. In addition, the trends of satisfaction associated with the treatment were clear. The KCR + V group showed the highest satisfaction, followed by the KR + V group, the KCR group, and the

KR group. The positive correlation between self-efficacy and course satisfaction was also validated. This finding seems to be consistent with other studies (Artino, 2007, 2009; Judge & Bono, 2001). Self-efficacy was a significant positive predictor of satisfaction.

In conclusion, the findings of this study build on those of Kim and Keller (Keller, 2008a; Kim & Keller, 2008) by expanding the concept of volitional change and the clinical use of standard volitional feedback messages by extending the process to a large Chinese undergraduate course. Furthermore, this study incorporated volitional feedback messages with traditional forms of feedback content (KR, KCR) for college assignment in a blended learning context. Positive results were obtained for course satisfaction, but not learning self-efficacy. This study provides a basis for continued investigation of this kind of feedback strategy for college assignment.

### **Limitations and Future Directions**

Several important limitations should be considered when interpreting the current results. Sixty-seven participants' data were collected in this study. The response rate for this study was 58.8%, which is good but not ideal. Nulty (2008) argued that, in the situation of 100 students in a course, an 87% response rate would have a 3% sampling error and a 95% confidence level. He further argued that, although the participants were randomly selected, random sampling was still not achieved in practice as those who responded were not a random selection.

Second, the volitional messages were constructed based on a volitional strategies measurement instrument—namely, the Academic Volitional Strategy Inventory (AVSI) (McCann & Garcia, 1999). In this study, the AVSI measurement items were modified, and new items were constructed using the instructor's suggestions. Although pilot test was conducted among a group of eight Chinese IDT professors and doctoral students, the validity of the

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

feedback messages still needed to be confirmed through both quantitative and qualitative data from Chinese undergraduates in a broader range.

Finally, the accuracy of the translations is a possible limitation. All instruments and feedback messages were originally developed in English. The researcher translated them and conducted the pilot test in a small group. The validity of the instruments and feedback messages needs to be tested in a broader range in the future.

**References**

- Anderson, R. C., Kulhavy, R. W., & Andre, T. (1971). Feedback procedures in programmed instruction. *Journal of Educational Psychology, 62*, 148-156.
- Anderson, R. C., Kulhavy, R. W., & Andre, T. (1972). Conditions under which feedback facilitates learning from programmed lessons. *Journal of Educational Psychology, 63*, 186-188.
- Artino, A. R. (2007). Motivational beliefs and perceptions of instructional quality: Predicting satisfaction with online training. *Journal of Computer Assisted Learning, 24*, 260-270.
- Artino, A. R. (2009). Think, feel, act: Motivational and emotional influences on military students' online academic success. *Journal of Computing in Higher Education, 21*, 146.
- Balzer, W. K., Doherty, M. E., & O'Connor, R. (1989). Effects of cognitive feedback on performance. *Psychological Bulletin, 106*, 410-433.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavior change. *Psychological Review, 84*(2), 191-215.
- Bandura, A. (1982). Self-efficacy mechanism in human aging. *American Psychologist, 37*(2), 122-147.
- Bandura, A. (1991). Self-regulation of motivation through anticipatory and self-regulatory mechanisms. In R. A. Dienstbier (Ed.), *Perspectives on motivation: Nebraska symposium on motivation* (Vol. 38, pp. 69-164). Lincoln, NE: University of Nebraska Press.
- Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*, 117-148.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman and Company.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Bandura, A. (2003). *Self-efficacy: The exercise of control*. New York: W. H. Freeman and Company.
- Bandura, A., & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology*, *41*, 586.
- Bangert-Drowns, R. L., Kulik, C. C., Kulik, J. A., & Morgan, M. T. (1991). The instructional effect of feedback in test-like events. *Review of Educational Research*, *61*(2), 218.
- Bardwell, R. (1981). Feedback: How does it function? *Journal of Experimental Education*, *50*, 4-9.
- Barker, K. (1992). Workshop summary: The many faces of motivation in the learning process. *Aspects of Educational and Training Technology Series*, *25*(1), 39-41.
- Barringer, C., & Gholson, B. (1979). Effects of type and combination of feedback upon conceptual learning by children: Implications for research in academic learning. *Review of Educational Research*, *49*(3), 459-478.
- Bolles, R. C. (1972). Reinforcement, expectancy, and learning. *Psychological Review*, *79*(5), 394-409.
- Bolliger, D. U., & Wasilik, O. (2009). Factors influencing faculty satisfaction with online teaching and learning in higher education. *Distance Education*, *30*(1), 103.
- Brown, A. L. (1978). Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), *Advances in instructional psychology* (Vol. 1, pp. 1-152). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, *18*(1), 32-42.



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Butler, D. L., & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Review of Educational Research, 65*(3), 245-281.
- Butler, R. (1987). Task-involving and ego-involving properties of evaluation: Effects of different feedback conditions on motivational perceptions, interest, and performance. *Journal of Educational Psychology, 79*(4), 474.
- Carrotte, P. (1999). Turning academics into teachers. *Teaching in Higher Education, 4*(3), 411.
- Chiu, C., Sun, S., Sun, P., & Ju, T. L. (2007). An empirical analysis of the antecedents of web-based learning continuance. *Computer and Education, 49*, 1224.
- Cho, K., Schunn, C. D., & Charney, D. (2006). Commenting on writing: Typology and perceived helpfulness of comments from novice peer reviewers and subject matter experts. *Written Communication, 23*(3), 260.
- Chyung, S. Y. (2001). Systematic and systemic approaches to reducing attrition rates in online higher education. *American Journal of Distance Education, 15*, 36-49.
- Clariana, R. B., Ross, S. M., & Morrison, G. R. (1991). The effects of different feedback strategies using computer-administered multiple-choice questions as instruction. *Educational Technology Research and Development, 39*(2), 5.
- Corno, L. (1993). The best-laid plans: Modern conceptions of volition and educational research. *Educational Researcher, 22*(2), 14.
- Corno, L. (1994). Student volition and education: Outcomes, influences, and practices. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance: issues and educational applications* (pp. 229-251). Hillsdale, NJ: Lawrence Erlbaum Associates.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Corno, L. (2001). Volitional aspects of self-regulated learning. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (2<sup>nd</sup> ed., pp. 179-212). Mahwah, NJ: Erlbaum.
- Corno, L., & Kanfer, R. (1993). The role of volition in learning and performance. *Review of Research in Education, 19*, 301-341.
- Covington, M. V. (1998). *The will to learn: A guide for motivating young people*. New York: Cambridge University Press.
- Covington, M. V., & Omelich, C. L. (1984). Task-oriented versus competitive learning structures: Motivational and performance consequences. *Journal of Educational Psychology, 76*(6), 1038-1050.
- Crippen, K. J., & Earl, B. L. (2007). The impact of web-based worked examples and self-explanation on performance, problem solving, and self-efficacy. *Computer and Education, 49*, 809-821.
- Dempsey, J. V., Driscoll, M. P., & Swindell, L. K. (1993). Text-based feedback. In J. V. Dempsey & G. C. Sales (Eds.), *Interactive instruction and feedback* (pp. 21-54). Englewood Cliffs, NJ: Educational Technology Publications.
- Dempsey, J. V., & Wager, S. U. (1988). A taxonomy for the timing of feedback in computer-based instruction. *Educational Technology, 28*(10), 20-25.
- DeWitz, S. J., & Walsh, W. B. (2002, August). Self-efficacy and college student satisfaction. *Journal of Career Assessment, 10*(3), 315-326.
- Diener, C. I., & Dweck, C. S. (1980). An analysis of learned helplessness: II. The processing of success. *Journal of Personality and Social Psychology, 35*(5), 940-952.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, 41*(10), 1040-1048.
- Dweck, C. S., & Legget, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256-273.
- Dweck, C. S., & Reppucci, N. D. (1973). Learning helplessness and reinforcement responsibility in children. *Journal of Personality and Social Psychology, 25*(1), 109-116.
- Frankel, R., & Swanson, S. R. (2002). The impact of faculty–student interactions on teaching behavior: An investigation of perceived student encounter orientation, interactive confidence, and interactive practice. *Journal of Education for Business, 78*(2), 85.
- Gee, T. (1972). Students' responses to teachers' comments. *Research in the Teaching of English, 6*(2), 212-221.
- Gilman, D. A. (1969). Comparison of several feedback methods for correcting errors by computer-assisted instruction. *Journal of Educational Psychology, 60*, 503.
- Gollwitzer, P. M. (1996). The volitional benefits of planning. In P. M. Gollwitzer & J. A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp. 287-312). New York: Guilford Press.
- Good, T. (1987). Two decades of research on teacher expectations: Findings and future directions. *Journal of Teacher Education, 37*(4), 32-47.
- Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *The handbook of blended learning: Global perspectives, local design* (1<sup>st</sup> ed., pp. 3-21). San Francisco, CA: Pfeiffer.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Gungor, A., Eryilmaz, A., & Fakioglu, T. (2007). The relationship of freshmen's physics achievement and their related affective characteristics. *Journal of Research in Science Teaching, 44*(8), 1036-1056.
- Guthrie, J. T. (1971). Feedback and sentence learning. *Journal of Verbal Learning and Verbal Behavior, 10*, 23.
- Hancock, D. R. (2000). The impact of verbal praise on college students' time spent on homework. *Journal of Educational Research, 93*(6), 384.
- Hancock, D. R. (2002). Influencing graduate students' classroom achievement, homework habits and motivation to learn with verbal praise. *Educational Research, 44*(1), 83.
- Hodges, C. B. (2005). Self-efficacy, motivational email, and achievement in an asynchronous mathematics course. (Unpublished doctoral dissertation). Virginia Polytechnic Institute and State University, Blacksburg, VA.
- Hoska, D. M. (1993). Motivating learners through CBI feedback: Developing a positive learner perspective. In J. V. Dempsey & G. C. Sales (Eds.), *Interactive instruction and feedback* (pp. 105-132). Englewood Cliffs, NJ: Educational Technology.
- Hughes, S., Wickersham, L., Ryan-Jones, D., & Smith, S. (2002). Overcoming social and psychological barriers to effective on-line collaboration. *Educational Technology and Society, 5*(1), 86.
- Johnson, D. W., & Johnson, R. T. (1993). Cooperative learning and feedback in technology-based instruction. In J. V. Dempsey & G. C. Sales (Eds.), *Interactive instruction and feedback* (pp. 133-158). Englewood Cliffs, NJ: Educational Technology.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Johnson, D. W., Johnson, R. T., Richards, S., & Buckman, L. (1986). The effect of prolonged implementation of cooperative learning on social support within the classroom. *Journal of Psychology, 119*(405-411).
- Johnson, R. T., Johnson, D. W., & Stanne, M. B. (1985). Effects of cooperative, competitive, and individualistic goal structures on computer-assisted instruction. *Journal of Educational Psychology, 77*(5), 668-677.
- Jonassen, D. H. (1991a). Context is everything. *Educational Technology, 31*(6), 33-34.
- Jonassen, D. H. (1991b). Objectivism versus constructivism: Do we need a new philosophical paradigm? *Educational Technology Research and Development, 39*(3), 5-14.
- Judge, T. A., & Bono, J. E. (2001). Relationship of core self-evaluation traits—self-esteem, generalized self-efficacy, locus of control, and emotional stability—with job satisfaction and job performance: A meta-analysis. *Journal of Applied Psychology, 86*(1), 80-92.
- Judge, T. A., Locke, E. A., & Durham, C. (1997). The dispositional causes of job satisfaction: A core evaluation approach. *Research in Organizational Behavior, 19*, 151-188.
- Kanfer, R. (1991). Theory of industrial and organizational psychology. In M. Dunnette & L. Hough (Eds.), *Handbook of industrial and organizational psychology* (Vol. 1, pp. 75-170). Palo Alto, CA: Consulting Psychologists Press.
- Kanfer, R., & Ackerman, P. L. (1989). Motivation and cognitive abilities: An integrative/aptitude-treatment interaction approach to skill acquisition. *Journal of Applied Psychology, 74*, 657-690.
- Kanfer, R., & Ackerman, P. L. (1990). *Ability and metacognitive determinants of skill acquisition and transfer (Final report)*. Minneapolis: University of Minnesota: U.S. Air Force Office of Scientific Research.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Keller, J. M. (2008a). First principles of motivation to learn and e-learning. *Distance Education*, 29(2), 175.
- Keller, J. M. (2008b). An integrative theory of motivation, volition, and performance. *Technology, Instruction, Cognition, and Learning*, 6, 79.
- Keller, J. M., & Suzuki, K. (1987). Use of ARCS motivation model in courseware design. In D. H. Jonassen (Ed.), *Instructional designs for microcomputer courseware* (pp. 401-430). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Kim, C., & Keller, J. M. (2008). Effects of motivational and volitional email messages (mvem) with personal messages on undergraduate students' motivation, study habits and achievement. *British Journal of Educational Technology*, 39(1), 36.
- Koestner, R., Zuckerman, M., & Koestner, J. (1987). Praise, involvement, and intrinsic motivation. *Journal of Personality and Social Psychology*, 53(2), 383-390.
- Konings, D. K., & Brand-Gruwel, S. (2007). Teachers' perspectives on innovations: Implications for educational design. *Teaching and Teacher Education*, 23, 985.
- Krause, U. M., Stark, R., & Mandl, H. (2009). The effects of cooperative learning and feedback on e-learning in statistics. *Learning and Instruction*, 19, 158.
- Kuhl, J. (1985). Volitional mediators of cognition-behavior consistency: Self-regulatory processes and action versus state orientation. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 101-128). New York: Springer-Verlag.
- Kuhl, J. (1987). Action control: The maintenance of motivational states. In F. Halisch & J. Kuhl (Eds.), *Motivation, intention, and volition* (pp. 279-291). Berlin: Springer-Verlag.
- Kuhl, J., & Kraska, K. (1989). Self-regulation and metamotivation: Computational mechanisms, development, and assessment. In R. Kanfer, P. L. Ackerman, & R. Cudeck (Eds.),

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

*Abilities, motivation, and methodology : The Minnesota Symposium on learning and individual differences* (pp. 343-373). Hillsdale, NJ: Erlbaum.

Kulhavy, R. W. (1977). Feedback in written instruction. *Review of Educational Research*, 47(1), 211-232.

Kulhavy, R. W., & Anderson, R. C. (1972). Delay-retention effect with multiple-choice tests. *Journal of Educational Psychology*, 63(5), 505-512.

Kulhavy, R. W., & Stock, W. A. (1989). Feedback in written instruction: The place of response certitude. *Educational Psychology Review*, 1(4), 279-308.

Kulhavy, R. W., & Wager, W. (1993). Feedback in programmed instruction: Historical context and implications for practice. In J. V. Dempsey & G. C. Sales (Eds.), *Interactive instruction and feedback* (pp. 3-20). Englewood Cliffs, NJ: Educational Technology.

Kulik, J. A., & Kulik, C. C. (1988). Timing of feedback and verbal learning. *Review of Educational Research*, 58(1), 79-97.

Larose, S., Ratelle, C. F., Guay, F., Senecal, C., & Harvey, M. (2006, August). Trajectories of science self-efficacy beliefs during the college transition and academic in sciences and technology programs. *Educational Research and Evaluation*, 12(4), 373-393.

Lipnevich, A. A., & Smith, J. K. (2009, Nov). "I really need feedback to learn": Students' perspective on the effectiveness of the differential feedback messages. *Educational Assessment, Evaluation and Accountability*, 21(4), 347.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal-setting and task performance*. Englewood Cliffs, NJ: Prentice-Hall.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Lockee, B. B., Moore, D. M., & Burton, J. K. (2004). Foundations of programmed instruction. In D. H. Jonassen (Ed.), *Handbook of research on educational communications and technology* (pp. 545-569). Mahwah, NJ: Lawrence Erlbaum.
- Loiser, G. F., Vallerand, R. J., & Blais, M. R. (1993). Construction et validation de l'échelle des perceptions de compétence dans les domaines de vie (epcdv) [Construction and validation of the perceived competence in life contexts scale]. *Science et Comportement*, 23, 1-16.
- Malone, T. W. (1981). Toward a theory of intrinsically motivating instruction. *Cognitive Science*, 4, 333-369.
- McCann, E., & Garcia, T. (1999). Maintaining motivation and regulating emotion: Measuring individual differences in academic volitional strategies. *Learning and Individual Differences*, 11(3), 259.
- McCarthy, P., Meier, S., & Rinderer, R. (1985). Self-efficacy and writing: A different view of self-evaluation. *College Composition and Communication*, 36(4), 465.
- Meyer, W. (1982). Indirect communications about perceived ability estimates. *Journal of Educational Psychology*, 74(6), 888-897.
- Miao, Y., Badger, R., & Zhen, Y. (2006). A comparative study of peer and teacher feedback in a Chinese EFL writing class. *Journal of Second Language Writing*, 15, 179.
- Mischel, H. N., & Mischel, W. (1983). The development of children's knowledge of self-control strategies. *Child Development*, 54, 603-619.
- Mory, E. H. (1991). The effects of adaptive feedback on student performance, feedback study time, and lesson efficiency within computer-based instruction. (Unpublished doctoral dissertation). Florida State University, Tallahassee, FL.



## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Mory, E. H. (1996). Feedback research. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 354-378). New York: Simon and Schuster Macmillan.
- Mory, E. H. (2004). Feedback research revisited. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (2<sup>nd</sup> ed., pp. 745-783). Mahwah, NJ: Lawrence Erlbaum.
- Multiadou, M., & Savenye, W. C. (2003). Applying social cognitive constructs of motivation to enhance student success in online distance education. *Educational Technology Review*, *11*(1), 156-171.
- Naypor, J. C., Pitchard, R. D., & Ilgen, D. R. (1980). *A theory of behavior in organization*. New York: Academic Press.
- Nelson, T. O., & Narens, L. (1990). Metamemory: A theoretical framework and new findings. In G. Bower (Ed.), *The psychology of learning and motivation: Advances in research and theory* (Vol. 26, pp. 125-173). New York: Academic Press.
- Neuwirth, C. M., Chandook, R., Charney, D., Wojahn, P., & Kim, L. (1994, April 24-28). *Distributed collaborative writing: A comparison of spoken and written modalities for reviewing and revising documents*. New York: Association for Computing Machinery.
- Newby, T. J., & Alter, P. A. (1989). Task motivation: learner selection of intrinsic versus extrinsic orientations. *Educational Technology Research and Development*, *37*(2), 77-90.
- Nguyen, D. M., Hsieh, Y. J., & Allen, G. D. (2006). The impact of web-based assessment and practice on students' mathematics learning attitudes. *Journal of Computers in Mathematics and Science Teaching*, *25*(3), 251.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Nolen-Hoeksema, S., Seligman, M. E., & Girgus, J. S. (1986). Learned helplessness in children: A longitudinal study of depression, achievement, and explanatory style. *Journal of Personality and Social Psychology, 51*(2), 435-442.
- Nulty, D. D. (2008, June). The adequacy of response rates to online and paper surveys: What can be done? *Assessment and Evaluation in Higher Education, 33*(3), 301-314.
- Oliver, R., & DeSarbo, W. (1988). Response determinants in satisfaction judgments. *Journal of Consumer Research, 14*, 495.
- Orrell, J. (2006). Feedback on learning achievement: Rhetoric and reality. *Teaching in Higher Education, 11*(4), 17.
- Pintrich, P. R., & Schunk, D. H. (1996). *Motivation in education: Theory, research, and application* (K. M. Davis, Ed.). Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). *A manual for the use of the motivated strategies for learning questionnaire (MSLQ)*. Ann Arbor, MI: University of Michigan.
- Rhea, N., Rovai, A., Ponton, M., Derrick, G., & Davis, J. (2007). The effect of computer-mediated communication on anonymous end-of-course teaching evaluations. *International Journal on E-learning, 6*(4), 581.
- Rieber, L. P. (1992). Computer-based microworlds: A bridge between constructivism and direct instruction. *Educational Technology Research and Development, 41*(1), 93-106.
- Roca, J. C., Chiu, C., & Martinez, F. J. (2006). Understanding e-learning continuance intention: An extension of the technology acceptance model. *Human-Computer Studies, 64*, 683-696.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Roper, W. J. (1977). Feedback in computer-assisted instruction. *Programmed Learning and Educational Technology, 14*, 43.
- Rotter, J. B. (1966). Generalized, expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80*(1), 1-28.
- Russell, J., Elton, L., Swinglehurst, D., & Greenhalgh, T. (2006). Using the online environment in assessment for learning: a case-study of a web-based course in primary care. *Assessment and Evaluation in Higher Education, 31*(4), 465.
- Seal, K. C., & Przasnyski, Z. H. (2003). Using technology to support pedagogy in an OR/MS course. *Interfaces, 33*(4), 27.
- Shell, D. F., Murphy, C. C., & Runing, R. H. (1989). Self-efficacy and outcome expectancy mechanisms in reading and writing achievement. *Journal of Educational Psychology, 81*(1), 91-100.
- Shrauger, J. S., & Schoenemann, T. J. (1979). Symbolic interactionist view of self-concept: Through the looking glass darkly. *Psychological Bulletin, 86*(3), 549.
- Simon, K. M. (1979). *Effects of self-comparison, social comparison, and depression on goal setting and self-evaluative reactions*. Berlin: Springer-Verlag.
- Sitthiworachart, J., & Joy, M. (2007). Computer support of effective peer assessment in an undergraduate programming class. *Journal of Computer Assisted Learning, 24*(3), 217.
- Skinner, B. F. (1958). Teaching machines. *Science, 128*, 969-977.
- Snow, R. E. (1989). Toward assessment of cognitive and cognitive structures in learning. *Educational Researcher, 18*(9), 8.
- Snow, R. E. (1992). Aptitude theory: Yesterday, today, and tomorrow. *Educational Psychologist, 27*(1), 5-32.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Stevens, A. E. (1973). The effects of positive and negative evaluation on the written composition of low performing high school students. *Dissertation Abstracts International*, 34, 1778.
- Straub, R. (1995). Teacher response as conversation: More than casual talk, an exploration. *Rhetoric Review*, 14, 374-399.
- Straub, R. (1997). Students' reactions to teacher comments: An exploratory study. *Research in the Teaching of English*, 31(1), 91-119.
- Suler, J. (2004). The online disinhibition effect. *CyberPsychology and Behavior*, 7, 321.
- Tait, K., Hartley, J. R., & Anderson, R. C. (1973). Feedback procedures in computer-assisted arithmetic instruction. *British Journal of Educational Psychology*, 43, 161-171.
- Tang, M., & Byrne, R. (2007). Regular versus online versus blended: A qualitative description of the advantages of the electronic modes and a quantitative evaluation. *International Journal on E-learning*, 6(2), 257.
- Taylor, W., & Hoedt, K. (1966). The effect of praise upon the quality and quantity of creative writing. *Journal of Educational Research*, 60, 80.
- Vance, R. J., & Coella, A. (1990). Effects of two types of feedback on goal acceptance and personal goals. *Journal of Applied Psychology*, 75(1), 68-76.
- Visser, J., & Keller, J. M. (1990). The clinic use of motivational messages: An inquiry into the validity of arcs model of motivational design. *Instructional Science*, 19, 467-500.
- Waldrop, P. B., Justin, J. E., & Adams, T. M. (1986). A comparison of three types of feedback in a computer-assisted instruction task. *Educational Technology*, 26(2), 43.
- Wang, S., & Wu, P. (2008). The role of feedback and self-efficacy on web-based learning: The social cognitive perspective. *Computers and Education*, 51, 1589.

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

- Webb, N. (1982). Group composition, group interaction, and achievement in cooperative small groups. *Journal of Educational Psychology*, 74(4), 475-484.
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review*, 92(4), 548-573.
- Weiner, B. (1990). History of motivational research in education. *Journal of Educational Psychology*, 82, 616.
- Wiltse, E. M. (2001, August). *The effects of motivation and anxiety on students' use of instructor comments*. Washington, DC: Association for Education in Journalism and Mass Communication.
- Windschitl, M. (1998). The www and classroom research: What path should we take? *Educational Researcher*, 27(1), 28-33.
- Winne, P. H. (1992). State-of-the-art instructional computing systems that afford instruction and bootstrap research. In M. Jones & P. H. Winne (Eds.), *Foundations and frontiers of adaptive learning environments* (pp. 153-189). Berlin: Springer-Verlag.
- Yair, G. (2000). Reforming motivation: How the structure of instruction affects students' learning experiences. *British Educational Research Journal*, 26(2), 191-211.
- Yi, Y. (1990). A critical review of customer satisfaction. In V. Zeithaml (Ed.), *Review of marketing* (pp. 271-300). Chicago, IL: American Marketing Association.
- Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology*, 81, 329.
- Zimmerman, B. J. (2001). Theories of self-regulated learning and academic achievement: An overview and analysis. In B. J. Zimmerman & D. H. Schunk (Eds.), *Self-regulated*

## IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

*learning and academic achievement: Theoretical perspectives* (pp. 1-36). Mahwah, NJ: Erlbaum.

Zimmerman, B. J., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment. *American Educational Research Journal*, 31(4), 845-862.

Zimmerman, B. J., & Ringle, J. (1981). Effects on model persistence and statements of confidence on children's self-efficacy and problem solving. *Journal of Educational Psychology*, 73(4), 485-493.

Zimmerman, B. J., & Schunk, D. H. (1989). *Self-regulated learning and academic achievement: Theory and research*. New York: Springer-Verlag.

Zimmerman, B. J., & Tsikalas, K. E. (2005). Can computer-based learning environments (CBLEs) be used as self-regulatory tools to enhance learning? *Educational Psychologist*, 40, 267.

Zusho, A., & Pintrich, P. R. (2003). Skills and will: The role of motivation and cognition in the learning of college chemistry. *International Journal of Science Education*, 25(9), 1081-1094.

Appendix A

IRB Permission Letter



VirginiaTech

Office of Research Compliance  
Institutional Review Board  
2000 Kraft Drive, Suite 2000 (0497)  
Blacksburg, Virginia 24060  
540/231-4606 Fax 540/231-0959  
e-mail [irb@vt.edu](mailto:irb@vt.edu)  
Website: [www.irb.vt.edu](http://www.irb.vt.edu)

**MEMORANDUM**

**DATE:** April 21, 2010

**TO:** John K. Burton, Wei Wang

**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires June 13, 2011)

**PROTOCOL TITLE:** The Impact of Volitional Feedback on Student Self-Efficacy and Course Satisfaction

**IRB NUMBER:** 10-246

As of April 21, 2010, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the new protocol for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

**PROTOCOL INFORMATION:**

Approved as: **Expedited, under 45 CFR 46.110 category(ies) 5, 7**

Protocol Approval Date: **4/21/2010**

Protocol Expiration Date: **4/20/2011**

Continuing Review Due Date\*: **4/6/2011**

\*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

**FEDERALLY FUNDED RESEARCH REQUIREMENTS:**

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

*Invent the Future*

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY  
*An equal opportunity, affirmative action institution*

# IMPACT OF VOLITIONAL FEEDBACK ON SELF-EFFICACY AND SATISFACTION

IRB Number 10-246

page 2 of 2

Virginia Tech Institutional Review Board

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

\*Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office ([irbadmin@vt.edu](mailto:irbadmin@vt.edu)) immediately.

cc: File

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY  
*An equal opportunity, affirmative action institution*



Appendix B

Fair Use Evaluation for Figure 14

VT Fair Use Analysis Results

10/17/11 5:46 AM

**Draft 09/01/2009**

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: [gailmac@vt.edu](mailto:gailmac@vt.edu))

(Please ensure that Javascript is enabled on your browser before using this tool.)

## Virginia Tech ETD Fair Use Analysis Results

*This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.*

Name: Wei Wang

Description of item under review for fair use: The Education Online of Beijing Institute of Fashion Technology

Report generated on: 10-17-2011 at : 05:31:11

### **Based on the information you provided:**

#### **Factor 1**

Your consideration of the purpose and character of your use of the copyright work weighs: *in favor of fair use*

#### **Factor 2**

Your consideration of the nature of the copyrighted work you used weighs: *in favor of fair use*

#### **Factor 3**

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: *in favor of fair use*

#### **Factor 4**

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: *in favor of fair use*

**Based on the information you provided, your use of the copyrighted work weighs: *in favor of fair use***