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EVALUATIVE FEEDBACKS EFFECT ON STUDENTS' SELF-EFFICACY

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Abstract

The study investigated how teachers can shape students' self-efficacy through the evaluative feedback they provide. With the aim of determining which of summative and formative evaluative feedback methods will have greater influence on changes in students' self-efficacy. The study population comprised of 105 University Matriculation Examination (UME) candidates under going a remedial course in preparation for the examination. 55 of the UME candidates were randomly selected and were invited to participate in a "Vocabulary Builder Program". Two questionnaires and two self-constructed tests were used for data collection in the study. The collected data were analyzed using t-test and ANOVA to test the study hypothesis. The result after the first feedback indicates a significant increase in the performance of the formative feedback group in the second test, but the increase in the summative feedback group was not significant. Also, while the difference in the self-efficacy measures of the formative feedback group was significant, the difference in the self-efficacy measures of the summative group was found not to be significant, and that there was a significant interaction effect between evaluative feedback methods and self-efficacy. Hence, it is suggested that teachers should endeavour to use formative feedback through which students will be provided with valuable information for performance improvement.

Key words: Formative feedback, Summative feedback, Self-Efficacy, Evaluative, Performance

Introduction

Self-efficacy is defined as the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations (Bandura, 1997). More precisely, it is the self-evaluation of the degree of control that one, as the agent, has over the means in the attainment of goals. In the concept of control, there is a triadic relation among the agents, means, and ends. Skinner (1996) defined perceived agent-means relation as the extent to which a potential means is available to a particular agent, and means-ends relation as the connection between potential causes and desired or undesired outcomes. Even if people believe that outcomes can be influenced by certain means, they will not attempt to exert control unless they also believe that they can acquire these means. The belief in oneself (agent) of being able to exercise control over certain action (means) is self-efficacy and it is distinguished from outcome expectation which is the belief about whether the actions (means) can affect outcomes (ends) (Bandura, 1997). Bandura (1989) postulated that self-efficacy beliefs operate through cognitive, motivational, and affective intervening

processes. Perceived self-efficacy and cognitive simulation affect each other bi-directionally (Bandura, 1986). Self-efficacy can affect thought patterns that are self-aiding or self-hindering. People with higher self-efficacy set higher goals and have firmer goal commitment. They are also more likely to focus their attention and direct their effort to the situation, especially when they face obstacles. They also tend to attribute failure to effort. In contrast, people with low self-efficacies distract attention from the task and ruminate on their deficiencies. They are more likely to attribute failure to ability (Bandura, 1986, 1989). In addition, self-efficacy affects people's motivation and choice (Bandura, 1986). Positive evaluation of self-efficacy motivates people to engage in activities that foster the growth of personal competence. A strong sense of efficacy to survive failures and deal with the uncertain difficulty of a task stimulates skill and knowledge acquisition.

On the contrary, people with low self-efficacy are more likely to doubt their capabilities and give up, hindering the opportunities of growth (Bandura, 1986). In general, individuals have the tendency to choose activities that they see themselves capable at and avoid tasks that they perceive to exceed their limits (Bandura, 1977). Furthermore, self-efficacy exerts impact on affective processes. It affects how much stress and depression people experience in times of threat. Individuals with high self-efficacy do not invoke apprehension and hence are not disturbed by it. Inefficacious individuals, on the other hand, have a tendency to dwell on their deficiencies which would consequently increase their level of stress and decrease their competence (Bandura, 1989).

Perceived academic self-efficacy is defined as the personal judgment of one's capabilities to organize and execute courses of action to attain designated types of educational performances (Zimmerman, 1995). It is identified as one of the key components of student motivation that enables academic success. Research has shown that self-efficacy is positively related to positive outcomes of schooling such as motivation, memory, persistence, stress management, cognitive engagement, use of self-regulatory strategies and actual achievement (Linnenbrink and Pintrich, 2002; Zimmerman, 1995). A meta-analysis of 39 studies showed that self-efficacy, academic performances and persistence outcomes have positive and statistically significant relationships regardless of the subjects, experimental designs and methods of assessment (Multon et al; 1991). Educational psychology is concerned with understanding the learner, the learning environment and the learning process. Research on academic self-efficacy is important in providing information to parents, teachers, students, and education policy makers about how the learning process and context can be structured for the benefit of all parties. Studying academic self-efficacy within the school context is even more important because schools serve as an agency for cultivating self-efficacy. According to Bandura (1986), family is often the origin of efficacy experiences but as children grow, school gradually becomes the backdrop for them to acquire knowledge about their capability. At schools, students engage in social comparison with peers, learn from more capable models and use such information for efficacy appraisal and verification. Moreover, as Bandura (1986) pointed out, a major aim of research in the scholastic domain is to clarify how different types of educational practices and structures affect the development of social and cognitive competencies. In the long run, students who have developed a strong sense of self-efficacy are well equipped to educate themselves when they have to rely on their own initiatives. Therefore, the study of academic self-efficacy in the school context is of both theoretical and practical significance.

Teachers play an influential role in shaping students' self-efficacy. They determine the mastery experience of students by setting evaluative measures that are pivotal to students' academic success and failure. The choice of evaluation standard has a determining impact on students. For example, by assigning a different passing score, teachers draw a different line for where failure begins. A real case scenario can be taken from schools in Hong Kong. For some schools, the minimal passing score for an academic test is 60%. Under such circumstances, students who have 55% accuracy in a test are considered failed. In other schools where the passing score is 50%, students with the same result are considered to have passed the test. Thus different reference standards for the same absolute score are likely to determine students' level of mastery which in turn contributes to their appraisal of self-efficacy. With regard to vicarious experience, teachers who are responsible for designing classroom activities can decide whether they include modeling for students. A

teacher who does not use models reduces the opportunity that students can increase their self-efficacy through vicarious experience. In contrast, a teacher who uses models in the classroom increases the probability that students can reinforce their self-efficacy through vicarious learning. Given evidence that students who observed peer models had higher self-efficacy for learning and achievement than those that observed teacher models (Schunk and Hanson, 1985), teachers' choice of model also influences students' vicarious experience and thus self-efficacy. Furthermore, in academic settings, teachers are the main source of social persuasion for students. Teachers that confirm students' capabilities are likely to enhance their self-efficacy. On the contrary, teachers who discourage students or inform students of their incapability are likely to lead students to doubt their ability. Teachers who give students unfounded praise may increase students' self-efficacy but once the students experience failure, the increase in self-efficacy will eventually be negated. Moreover, the teachers' instruction and evaluative feedback also constitute social persuasion that can either boost or undermine students' self-efficacy. Evaluative feedback is one of the common practices teachers use to inform and influence students with regard to their academic performance. Different types of evaluation affect the triadic relationship in the concept of control differently. While students' role as the agent remains constant, evaluative feedback can exert influence on both the means and ends of control.

The relationship between teachers' evaluative feedback and students' self-efficacy has important implications for educational practices. However, there is only a small scope of research in this realm. For example, Schunk (1984) and Schunk and Lilly (1984) examined the effect of feedback on student's mathematics self-efficacy. Research that focuses on students' self-efficacy in literacy is even more limited. Several studies demonstrated the importance of feedback on students' self-efficacy. Karl, O'Leary-Kelly, and Martocchio (1993) compared the effect of the presence and absence of performance feedback on 122 undergraduates' reading self-efficacy and performance. It was found that performance feedback was beneficial to the performance of all participants but did not have a significant impact on absolute change in self-efficacy. However, the sign of feedback had a substantial impact on change in self-efficacy. Participants who received more positive feedback had greater increase in self-efficacy.

Evaluative feedback directly influences self-efficacy and acts on self-efficacy through achievement goals as well. According to Schunk (1990), a goal is what an individual endeavors to achieve and goal setting involves both the establishment and modification of a goal. Placing students' academic self-efficacy in the concept of control (Skinner, 1996) illustrates the importance of goals in educational setting. The triadic relationship is such that students are the agents, learning strategies are the means, and specific educational goals are the ends. The extent to which students believe that they are capable of exercising control over the learning strategies is self-efficacy, and whether the strategies can lead to the achievement of such educational goals is outcome expectation. However, in reality, students are not independent in setting their educational goals. Instead, teachers, who are responsible for the design and maintenance of the teaching, the evaluation process, and the learning environment, often determine the goals.

Different types of evaluative feedback activate different achievement goals and hence influence the means and the ends in the concept of control. There are some types of feedback that provide information about the type or direction of past errors, which allows individuals to correct performance (Payne and Hauty, 1955). For example, both formative feedback and summative feedback provide information about previous error. However, the main difference is that summative feedback places more emphasis on summarizing the previous errors while formative feedback highlights what can be done for improvement in the future. Both types of feedback exert direct influence on the means in the concept of control.

Formative feedback assesses the learning progress and orients students towards a learning goal (McAlpine, 2004). It also provides the means of improvement to reach the goal, prompting students to make progress with effort. On the contrary, evaluative feedback that withholds such information from the students will probably weaken the linkage between the means and the ends. Students are thus less likely to perceive control over the means. Consequently, their self-efficacy is less likely to be reinforced. For instance, summative feedback puts emphasis on the learning outcome (McAlpine, 2004) without providing explicit information on how students can improve. This product orientation soon shifts to a performance orientation

(Ames, 1992) and students are more likely to associate their performance with the evaluation of their ability. To prevent revealing incompetence, students may adopt the performance-avoidance goal. Under summative feedback, the goal of the students is to produce a quality end product that is reflective of their ability. On the other hand, formative feedback enables students to focus on the process of learning, hence adopt a learning goal (Slavin, 1978) and use effort to make progress. As self-efficacy is concerned with having control over the means towards a designated goal; formative feedback provides strategy information for one to learn in the process and make improvement while summative feedback only addresses previous performance that is no longer changeable or controllable. In fact, research has shown that teachers' feedback that links skill improvement to the use of specific strategies or increased ability can result in an increase in self-efficacy and achievement. (Schunk and Gunn, 1986).

The aim of this study was to compare the effects of summative and formative feedback on students' self-efficacy. It is generally believed that summative feedback highlights performance goal and that formative feedback emphasizes learning goal. The aim and goal of students during summative assessment that produces summative feedback is to produce a quality end product reflective of their ability. While formative feedback enables students to focus on the process of learning, hence adopt a learning goal and use effort to make progress (Slavin, 1978). As self-efficacy is concerned with the agent's perceived control over the means towards a designated goal; formative feedback provides strategy information for one to learn in the process and make improvement while summative feedback only addresses previous performance that is no longer changeable or controllable. This then leads to the hypothesis: *that the self-efficacy of the students who received formative feedback would be significantly higher than that of the students who received summative feedback.*

Method

Population and Sample

The population and the sample consisted of 105 University Matriculation Examination (UME) candidates under going a remedial course in preparation for the examination. 55 of the UME candidates were randomly selected and were invited to participate in a "Vocabulary Builder Program". The design of study was quasi-experimental with 33 students in the formative feedback group and 22 students in the summative feedback group. The sample was randomly assigned to the two groups. The sequence of instructions and the instructor for the programme were the same for both groups. The only difference was in the evaluation method for the tests in the program. Students in both groups received feedback in terms of the number of correct answers they obtained in the test. In addition, students in the summative group were given a list of the correct and incorrect item numbers while those in the formative group were given a list that identified some of the incorrect item numbers and suggested strategies that could rectify them.

The 55 randomly selected UME candidates were invited for a one day "Vocabulary Builder Program". The instructor, who was well versed in vocabulary acquisition strategies, had five assistants to help distribute questionnaires, monitor the procedures and to quickly score the participants responses to tests. The students were arranged in a hundred seater University lecture room in manner that will prevent participants from viewing the results of one another. The program presented vocabulary instruction and exercises, specifically on the use of prefixes, and tests to participants. The participants were exposed to two instructional sessions, at the end of each session a test and a questionnaire were administered on them.

Research Instruments

Two questionnaires were used for data collection in the study. In both questionnaires students were asked to evaluate their perceived self-efficacy with regard to the subsequent instruction sessions and tests. In the first questionnaire, students were to evaluate their confidence and control over learning well in the first instruction session and getting good results in the first test. In the second questionnaire, they were asked to respond to

the same questions with regard to the second instruction session and second test. Specifically, they were asked to evaluate their self-efficacy in response to the following four questions: How confident are you to do well in the next test? How much control do you have over the result of the next test? 3 How confident are you to learn all the prefixes in the next lesson? 4 How much control do you have over how well you learn in the next lesson? A seven-point scale from 1 for “not confident at all” or “no control at all” to 7 for “very confident” or “very much control” was used. The ratings of these four items were averaged and used as the indicator of self-efficacy. The four-item scale reported a Cronbach’s alpha coefficient of .88 for the first questionnaire and .89 for the second Questionnaire.

The second questionnaire also had two other sections, one of the sections was used to check if students in the two groups perceived the instruction and classroom management as the same, students were to evaluate the quality of instruction and the learning environment using seven-point Likert scales. They were to evaluate the clarity of teaching using the scale from 1 for “not clear at all” to 7 for “very clear.” For usefulness of the examples in the instruction, students rated from 1 for “not useful at all” to 7 for “very useful.” For noise level of the classroom, students rated from 1 for “not noisy at all” to 7 for “very noisy.” We also asked the students to indicate if they had learnt more prefixes after the two lessons to check if the teaching was effective. Moreover, we asked students to indicate the number of correct answers they got for Test 1 to check if they remembered that they got less than half of the questions correct. The last section of the second questionnaire was aimed at participants self evaluation of success. The ratings were made on a seven point scale from 1 for “not successful at all” to 7 for “very successful”. The two sections respectively reported Cronbach’s alpha coefficient of .79 and .83

Results

Table 1: t-test Showing the Difference in Feedback Groups’ Evaluation of Instruction Session

Students’ Evaluation of Instructional Session	Summative Group			Informative Group			t	Df	P
	N	X	SD	N	X	SD			
Usefulness of example	22	5.00	1.02	33	5.63	1.39	-1.84	53	<.05
Classroom noise level	22	4.86	1.04	33	5.51	1.48	-1.48	53	<.05
Teaching clarity	22	4.59	1.01	33	5.12	1.43	-1.51	53	<.05

Table 1 present the result of students’ evaluation of the clarity of teaching, the usefulness of examples in the instruction, and the noise level of the classroom. The two groups’ evaluation of the instruction sessions was then compared. It was revealed that there was no significant difference in these evaluations. Students in the summative group ($X = 4.59$, $SD = 1.01$) and the formative group ($X = 5.12$, $SD = 1.43$) both rated the clarity of teaching as quite clear ($t=-1.51$, $df = 53$, $p <.05$). With regard to the usefulness of the examples in the instructions, students in both the summative group ($X = 5.0$, $SD =1.02$) and the formative condition ($X = 5.63$, $SD= 1.39$) also rated the examples as quite useful ($t = -1.84$, $df = 53$, $p<.05$). Students in both the summative condition ($X = 4.86$, $SD = 1.04$) and the formative condition ($X = 5.51$, $SD = 1.4$) also rated the noise level of the classroom as very low ($t = -1.48$, $df = 53$, $p <.05$).

Table 2: t-test Showing the Difference in Groups’ Test Performance

Students' Evaluation of Instructional Session	Summative Group			Formative Group			t	df	P
	N	X	SD	N	X	SD			
1 st Test	22	10.18	2.22	33	9.45	2.24	1.185	53	<.05
2 nd Test	22	10.90	1.41	33	11.67	1.71	-2.10	53	>.05

The real performance of the students was recorded and compared. In Test 1, students in the summative group ($X = 10.18$, $SD = 2.22$) did better than students in the formative group ($X = 9.45$, $SD = 2.24$) and the difference was not significant ($t = 1.19$, $df = 53$, $p = .05$). In the 2nd test students in both groups had an increase in their performance, the formative group had ($X = 11.67$, $SD = 1.71$) while the students in the summative group ($X = 10.90$, $SD = 1.41$) and there was a significant difference ($t = -2.10$, $df = 53$, $p < .05$).

Table 3: t-test Showing the Difference in Summative/Formative Self-Efficacy Measures

Feedback Method	Self-Efficacy Measures						
	1 st Questionnaire Measure			2 nd Questionnaire Measure			
	N	X	SD	N	X	SD	T
Summative	22	17.14	2.03	22	17.54	2.19	-1.49
Formative	33	17.09	1.83	33	19.64	3.66	-6.71

The participants in both feedback groups as revealed in Table 3 have an increase their self-efficacy after the administration of the first and second questionnaire. The self-efficacy of the participants in the formative feedback group increased from 17.09 ($SD = 1.83$) to 19.64 ($SD = 3.66$), $t = -6.71$. The effect size of the increase was large and significant at 0.05 level of significant. It could also be observed from the Table 1 that there is an increase in the self-efficacy of the participants in the summative feedback group from 17.14 ($SD = 2.03$) to 17.54 ($SD = 2.19$), $t = -1.49$, $df = 21$. The effect of this increase was small and it is not significant at 0.05 level of significance.

To compare the self-efficacy of participants in both feedback groups before the first and second test, a Univariate Analysis of Variance (Two Way ANOVA) was carried out. In this Analysis self-efficacy (measure 1 and measure 2) were considered to be within-participant factor and feedback group (summative and formative) considered to between-participant factor. Table 4 presents the result.

Table 4: Two-way ANOVA Showing the Interaction Effect of Self-Efficacy/Feedback Method

Source	Sum of Squares	df	Mean Square	F	P
Corrected Model	143.873	3	47.958	7.112	<.05
Intercept	33355.855	1	33355.855	4946.322	<.05
Feedback	36.873	1	36.873	5.468	<.05
Efficacy Measures	45.873	1	45.873	6.802	<.05
Efficacy/Feedback	39.764	1	39.764	5.879	<.05
Error	714.818	106	6.744		
Total	36068.0	110			

The ANOVA as presented on Table 4 yielded significant main effect for self-efficacy, $F(1, 106) = 6.80$, significant main effects for feedback, $F(1, 106) = 5.47$ and a significant two-way interaction between self-efficacy and feedback, $F(1, 106) = 5.88$ all at 0.05 level of significance. Thus it could be concluded that the self-efficacy of participants in the formative feedback group is significantly higher than that of those in summative group after the second instruction session as a result of the way feedback 1st test was reported to them. The hypothesis that the self-efficacy of the students who received formative feedback would be significantly higher than that of the students who received summative feedback is upheld.

Discussion

The results of the study revealed that although students who received formative and summative feedback did not show difference in their self-efficacy before the first test and second test, the difference that was observed in the change in self-efficacy of the two groups after receiving feedback had a significant effect size. This was supported by the fact that both groups evaluated the learning environment and the clarity of instruction as the same, and encountered the same setback in terms of the number of correct answers they got; the difference in evaluative feedback had an impact on students' perception of their self-efficacy and sense of successfulness.

In the formative feedback group, the process for achieving the desired goal of learning was highlighted for the students. The feedback was presented in such a way that it will encourage students to make effort for necessary improvement. The students in the group were also told that the suggestions for improvement were tailor-made for them; hence the agent-means relation could also be reinforced. As a result, the triadic relationship of agent, means and ends in the concept of control was consolidated to instigate the increase in their self-efficacy in the early stage of developing vocabulary acquisition skills. On the contrary, students in the summative group through the feedback they got at the end of the first instruction session were oriented towards a product goal of performance. The feedback was presented as a review and conclusion of their previous performance without any explicit suggestions for improvement. Hence, the means-ends relation was weak as nothing could be done to change the previous performance. Students as the agents could not exert control over the means to alter the quality of the end product. Given that both the agent-means and means-ends relations were relatively fragile, the increase in students' self-efficacy in the early acquisition of the new skill was insignificant, ignorable and hence can not be said to be as a result of the feedback given. To eliminate the effect of students' actual performance on their perception of self-efficacy and sense of successfulness, the students' actual vocabulary skills in both first and second tests were compared. Students in the formative feedback group were originally performing worse than their counterparts in the summative group in the first test. However, in the second test, significant improvement was noticed in the performance of those in formative feedback group. Through which the performance of the students in formative feedback group caught up with that of the summative feedback group and significantly surpassed them during the program. Therefore, along with self-efficacy, the students' actual performance was also empowered by the formative feedback. This illustrated that the highlighting of useful strategies in tackling the test with reference to students' previous weakness might have served its purpose as the means towards improvement.

The results as obtained in this study were consistent with findings in the literature of goal theory of achievement motivation (Ames, 1992). It was revealed in the study that, formative feedback informed students about how to learn from their past performance and use learning strategies to benefit future performance. Learning strategies, as the means, promise a sense of control over academic goals and strengthen the means-ends relation. Thus, students, as the agents would perceive more control in the agent-means relation, hence enhanced their self-efficacy. In contrast, summative feedback did not provide students with learning strategies as means of improvement. Students were likely to perceive a lack of control over the means-ends relation, as well as the agent-means relation. Hence, it was more difficult for them to maintain their self-efficacy.

CONCLUSION

In conclusion, the study is suggesting that teachers should endeavour to use formative feedback through which students will be provided with valuable information for performance improvement. Formative feedback that encompasses strategy use information is especially useful for students as achievement outcomes often depend on choice of task strategies (Anderson & Jennings, 1980). For application in educational settings, teacher may consider including strategy effective information in the evaluative feedback for students. For instance, instead of providing a summary on the rights and wrongs of students' performance, teachers can inform students about what strategies are useful for future improvement. In addition, teachers can use social persuasion, contingent on students' performance, to convince students of their capability (Chan Chung Yan, 2006).

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