

The Role of Self-regulated Learning in Enhancing Learning Performance

Eric C. K. Cheng

The Hong Kong Institute of Education, Hong Kong

Abstract

The paper aims to explore the relationship between students' self-regulation ability and their learning performance. In this study, self-regulation ability is conceptualized by four dimensions: learning motivation, goal setting, action control and learning strategies. 6,524 students from 20 aided secondary schools in Hong Kong participated in the questionnaire survey. Factor analysis and reliability test were used to confirm the constructed validity and the reliability of the survey instrument. Multiple regression analysis was applied to explore the relationship among variables. The results showed that students' learning motivation, goal setting, action control and learning strategies played a significant role in their learning performance.

Key Words: Self-regulated Learning, Learning Performance

Introduction

One of the most important aims of education reform in Hong Kong is to promote students' ability in learning to learn (Education Commission, 2000). In order to achieve this aim, teachers need to teach students both knowledge and skills. In turn, students need to acquire said knowledge and skills, which will help them become capable lifelong learners after they leave school. In order to develop students' ability in learning to learn, appropriate and effective teaching strategies are required. However, there is little empirical research on this area in Hong Kong. The purpose of this paper is to discuss how to assist Hong Kong teachers to develop suitable teaching strategies to enhance students' ability in learning to learn.

Learning to learn is the ability to pursue and persist in learning, to organize one's own learning, including through effective management of time and information. This is closely related to the theory of self-regulated learning that emerged in the 1980s. In the process of self-regulated learning, students monitor and adjust their learning strategies. Monitoring activities include checking the content of study, judging learning difficulties, assessing progress and predicting learning outcomes. Since self-regulated learning is a multi-dimensional activity which involves an individual's cognition, emotion, action and surroundings, teachers need to

give advice to students on self-assessment, goal setting, learning strategies, motivation and monitoring.

Self-regulated learning is conceived of as a learning process in which learners employ self-regulatory skills, such as self-assessing, self-directing, controlling and adjusting, in order to acquire knowledge (Zimmerman 1989). Students who can conduct self-regulated learning, have a clear idea of how and why a specific self-regulatory strategy should be employed. They are active learners in terms of metacognition, motivation and action control. For example, they focus on enhancing their learning performance, employ self-regulatory strategies, give themselves feedback and improve their learning based on that feedback. As a result, they change their sense of self or learning strategies.

In the process of self-regulated learning, learners need to set their learning goals, make their learning plans, choose their learning strategies, monitor their learning processes, evaluate their learning outcomes and suppress interference. Lei and his research fellows (2002) believe that high achievers' self-regulation ability is higher than that of low achievers. The importance of self-regulated learning lies in providing students with successful experience in order to enhance their intrinsic motivation and promote their self-regulation ability (Boekaerts, Pintrich & Zeidner, 2000). Teaching is not just about providing students with knowledge but also about helping students to develop their intrinsic motivation and self-efficacy and enhance their learning values. If learners do not have these abilities, they learn by depending on the guidance and monitoring of others and fail to achieve a high level of learning. Therefore, the establishment of a theoretical framework of self-regulated learning and the development of relevant teaching strategies are both beneficial in terms of promoting students' ability in learning to learn.

Zimmerman was the first academic to propose the construct of self-regulated learning in educational psychology (1989). He believes that self-regulated learning is a process in which learners actively participate to some extent in their own learning in terms of metacognition, motivation and action. He also proposes a model of self-regulated learning in order to illustrate how learners actively employ specific strategies in their study to achieve the course objectives, based on their own willingness, motivation and metacognition. Zimmerman and Pons (1986) also believe that self-regulation ability is the best predictor of students' learning performances.

Zimmerman, Bonner, and Kovach (1996, p.11) proposed a cyclical model of self-regulated learning which comprises four correlated processes: self-evaluation and monitoring, goal setting and strategic planning, strategy implementation and monitoring, and strategic-outcome monitoring. Self-evaluation and monitoring is the first phase, in which individuals evaluate their personal effectiveness in relation to a specific learning task. For example, students evaluate their self-efficacy and assess current learning progress based on their record of past learning performances and outcomes. The second phase is goal setting and strategic planning, which involves analysis of learning tasks, setting specific goals, creating learning plans and refining learning strategies. The third phase is strategy-implementation monitoring, in which students employ specific strategies in their learning according to their learning plans and monitor their accuracy in implementing these specific strategies. The last phase is strategic-outcome monitoring, in which students judge their personal effectiveness based on their learning performances and actual strategic processes. Zimmerman's model highlights the importance of motivation and strategies in self-regulated learning. They suggest that students' self-efficacy and their learning strategies play a crucial role in self-regulated learning. Furthermore, these four phases are closely related to each other. If students want to self-regulate their learning, they need both self-learning ability and motivation.

Pintrich's framework for self-regulated learning is developed from Zimmerman's social cognitive model of self-regulation (Puustinen & Pulkkinen, 2001). Pintrich (1999) believes that self-regulated learning refers to the strategies students use to regulate their cognition and manage resources, which means operating and controlling the environment. He thinks that self-regulation activities act as mediators between learners, the contexts and their overall learning performances. Self-regulated learning significantly influences individuals' learning achievements. It is closely related to the application of metacognition. Pintrich (1990) focused on investigating learners' individual learning behaviour. He examined the effect of learner motivation on the implementation of cognitive, metacognitive and self-regulated strategies for effective learning.

Pintrich and DeGroot (1990) point out there are three important general categories of self-regulated learning based on the results obtained from several studies on self-regulated learning. These three categories are: (a) learners' metacognitive strategies, which involve planning, monitoring

and assessing the learning process, (b) learners' efforts and persistence in learning. For instance, students will achieve a high standard if they increase their level of attention and spend more time on a difficult object of learning, (c) learners' cognitive strategies employed in learning, memorisation and comprehension. Different cognitive strategies such as practising, illustrating and organising learning content can effectively increase students' own initiative in learning and further improve their learning performances.

Pintrich (2000) explains the relationship between motivation and self-regulated learning from the perspective of goal orientation. Pintrich classifies goal orientations into two types: mastery orientation and performance orientation. Mastery orientation relates to learners learning to use self-set goals or to improve themselves, while performance orientation refers to learners learning in order to surpass others. Pintrich's theory of goal orientation can be generalised in that it describes individual motivation and its link with self-regulated learning. His framework for self-regulated learning involves learners' cognition, motivation, behaviour and the context. There are several similarities between Pintrich's (2000) framework and Zimmerman's (1989) model. For example, both are developed from the theories of social cognition and define self-regulated learning in a similar way, starting from the phase of anticipation and ending with the phase of self-reflection. However, Pintrich's framework highlights goal orientation in the research of self-regulated learning.

Boekaerts (1999) defines self-regulated learning as a series of reciprocally related cognitive and affective processes that operate together on different components of the information processing system (p.447). Boekaerts integrates three different schools of thought: research on learning style, research on metacognition and regulation styles and theories of the self into a three-layered model of self-regulated learning.

The innermost layer of the model concerns regulation of the processing mode, which means students choose different cognitive strategies according to different learning materials or objectives. The middle layer of the model pertains to regulation of the learning process, which refers to students employing strategies such as planning, monitoring, assessing and correcting in their learning process in order to direct their learning. The outermost layer of the model represents regulation of self, which involves use of the strategies of motivation control, willingness control and allocation of resources.

Boekaerts (1999) classifies the functions of self-regulation into two categories with six elements, each of which represents a type of prior knowledge. The first category pertains to self-regulation of cognition, while the second concerns self-regulation of motivation. Self-regulation of cognition is sub-classified into content knowledge, cognitive strategies and regulatory strategies. Self-regulation of motivation is also subdivided into motivational beliefs, motivational strategies and regulatory strategies. Boekaerts believes that self-regulated learners can regulate their strategies or behaviour according to their intrinsic feedback, but non-self-regulated learners deal with new information depending on extrinsic regulation. Boekaerts (1999) focuses on cognitive strategies in the research of self-regulated learning.

The above-mentioned three models all highlight that self-regulated learning is a process in which students think, feel and act on their own initiative in order to achieve their learning goals. In the process of self-regulated learning, learners implement strategies by which they choose, use, monitor and adjust learning strategies and employ the strategies to control action in order to achieve specific learning goals. The process at least involves learners' learning motivation, goal setting, action control and learning strategies. These four components are assumed to be the predictive factors for students' performance.

The study explores the relationship between the above-mentioned four components of students' self-regulated learning and their learning performances. The theoretical framework for enhancing student learning performance via developing students' self-regulation ability is shown in

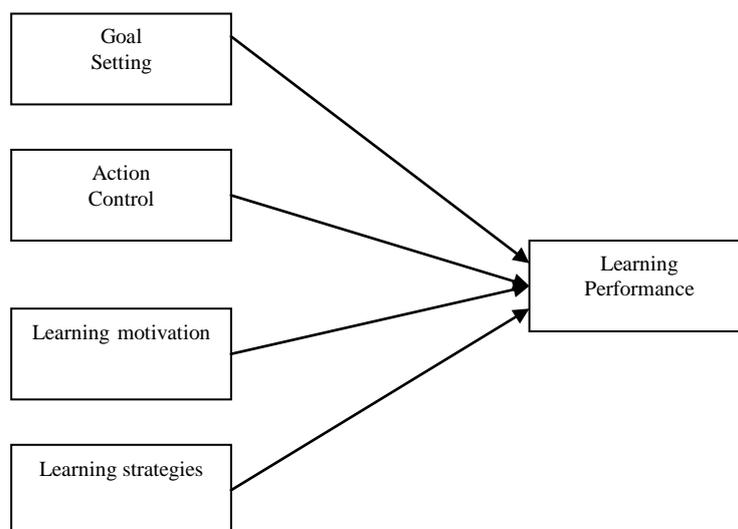


Figure 1. Theoretical framework of the study

Method

Research Design

A predictive cross-sectional quantitative research design was used in this study to determine the relationship between students' self-regulated learning and their perception of learning effectiveness. The independent variables are the four factors of self-regulated learning and the dependent variable is the learning performance. A self-response quantitative questionnaire survey was designed to collect data from students of the selected aided schools in Hong Kong. The data was collected directly from the target subjects via the questionnaire.

Participants

The subjects in the study were students from aided secondary schools in Hong Kong. There are around 480 secondary schools in Hong Kong, of which 90% are aided schools, 5% are government schools, and the remaining 5% are direct subsidy schools. Only aided secondary schools were chosen for this study, because they form the major sector and constitute a homogeneous group. The sample schools were selected randomly by cluster sampling. This was more convenient when the population was very large or spread out over a wide geographical area in Hong Kong. It involved less time and expense, and was generally more convenient. There were smaller differences among the group means and the group variances, and the cluster sample in relation to a stratified sample was better. 20 aided secondary schools (4% of the total number of aided schools) were chosen in proportion to the total number of schools in the districts according to the list of schools from the Education Bureau. Eleven schools were drawn from the New Territories, five schools from Kowloon Peninsula, and the other four from Hong Kong Island. There are around 1,000 students per sample school. 6,524 valid questionnaires were collected for this study.

Instruments

An instrument was developed to investigate the students' perceptions of their learning motivation, goal setting, action control, learning strategies and learning performance. The content of the scales was based

on a careful examination of the literature. Each variable was operationalised into 6 to 12 observable statements. The statements representing the 4 independent variables and the dependent variable were developed from Boekaerts (1999), Pintrich (2000) and Zimmerman, Bonner, and Kovach (1996). The data was treated as an interval scale. Students were asked to indicate the extent to which they conduct their learning in response to 36 statements. All statements were measured using a 6-point Likert-type scale ranging from 1 (strongly disagree) to 6 (strongly agree).

Data Analysis

Exploratory factors analysis and a reliability test were employed to confirm the constructed validity and internal consistency of the self-developed instrument. Factor analysis was performed to examine the factor structure of the instruments and to tap into the underlying constructs of the three variables. The factor with eigenvalue greater than 1 will be extracted. Reliability has been generally defined as the degree to which assessment results are free from errors of measurement, and so was examined using quantitative procedures to determine the degree of consistency or inconsistency inherent in this instrument. Principal axis factor (PAF) analysis with Promax rotation was used to select the items in data reduction by using the SPSS program, while Cronbach's Alpha-reliability measure for internal consistency was used to test the reliability of the derived scales. The multiple regressions test was applied for analysing data in order to explore the relationships among multiple continuously distributed independent variables and a single dependent variable. The $P \leq .05$ level of significance was used as the criterion for rejection of the null hypotheses.

Results

The results of the exploratory factor analysis show that 5 factors emerged, namely Factor 1 (Learning Strategies), Factor 2 (Learning Performances), Factor 3 (Action Control), Factor 4 (Goal Setting) and Factor 5 (Learning Motivation), from 25 items (See Table 1).

The results indicate that the questionnaire has desirable construct validity. The Cronbach α coefficients for the items on all variables were also calculated. They were 0.808 for Learning Strategies, 0.721 for Learning Performances, 0.761 for Action Control, 0.682 for Goal Setting, and 0.582 for Learning Motivation. Since a desirable Cronbach α coefficient

is commonly expected to be higher than 0.5, these Cronbach α coefficients indicate that the items measuring all the five variables in the questionnaire have satisfactory reliability.

Table 1
Factor Analysis Results

No. of items	Factor 1 Learning strategies	Factor 2 Learning performances	Factor 3 Action control	Factor 4 Goal setting	Factor 5 Learning motivation
1.	0.694				
2.	0.577				
3.	0.552				
4.	0.569				
5.	0.502				
6.	0.494				
7.	0.486				
8.	0.457				
9.	0.428				
10.	0.436				
11.	0.352				
12.	0.300				
13.		-1.022			
14.		-0.887			
15.		-0.381			
16.			-0.888		
17.			-0.748		
18.			-0.635		
19.			-0.396		
20.			-0.369		
21.				0.973	
22.				0.506	
23.				0.433	
24.					0.556
25.					0.568
Eigenvalue	10.410	2.063	1.689	1.428	1.330
Variance	32.053	6.353	5.202	4.396	4.097
Cronbach α coefficient	0.808	0.721	0.761	0.682	0.582
M	3.99	3.48	3.57	3.95	3.90
SD	0.63	0.96	0.82	0.87	1.05

Multiple linear regression analysis was conducted to investigate the influence of four variables (i.e. Learning Strategies, Action Control, Goal Setting and Learning Motivation) on Learning Performances. Table 2 illustrates the result of the analysis.

Table 2

Regression Analysis of Independent Variables and Learning Performances

Variables	B	Std. Error	β	t	p	VIF	Adj-R ²	F
Constant	0.246	0.062	--	4.276	0.000	--	0.359	914.675
Learning strategies	0.209	0.022	0.137	9.641	0.000	2.070		
Action control	0.304	0.015	0.262	19.644	0.000	1.804		
Goal setting	0.113	0.014	0.103	8.069	0.000	1.644		
Learning motivation	0.220	0.011	0.239	19.736	0.000	1.494		

*p ≤ 0.005

All the Variance Inflation Factors (VIF) are below 10, indicating that there is no overlap in any of the four independent variables. As shown in Table 3, the partial regression coefficients of the independent variables are all statistically significant and positively correlated to learning performances, which means that students who have higher learning motivation, are more capable of setting learning goals and have better mastery of action control and learning strategies, will learn better. Of the four independent variables, Action Control on Learning Performances has the greatest influence ($\beta=0.304$). After this comes Learning Motivation ($\beta=0.220$), followed by Learning Strategies ($\beta=0.209$) and Goal Setting ($\beta=0.113$). Figure 2 illustrates how students' learning performance is related to these four variables.

Discussion

The questionnaire content was designed on the basis of the theories propounded by Zimmerman (1989), Pintrich (1999) and Boekaerts (1999). Factor Analysis confirmed the existence of the five variables measured in the questionnaire, indicating the satisfactory structural and inner validity of the questionnaire. The Cronbach α coefficients for the items on all variables were all higher than 0.5, verifying the reliability of the questionnaire. In addition, multiple linear regression analysis also revealed the positive relationships between learning strategies, action control, goal setting, learning motivation and learning performance.

The model gives teachers a direction in terms of developing students' self-regulation ability. Since self-regulation ability is teachable (Pintrich, 1995), schools may consider injecting self-regulated learning into the

curriculum and teachers could set it as one of their teaching objectives. The following sections discuss how to develop students' self-regulation ability, including goal setting, motivational promotion, learning strategies and self-monitoring.

Helping Students Set Learning Goals

In order to promote students' self-regulated learning, teachers should first help them to set a specific learning goal. Setting goals can facilitate students' understanding of their own learning tasks (Lei, Wang & Tanjia, 2001). A perfect goal should be specific, measurable, feasible and timely. Teachers should assist students to move towards a determined goal by various measures including deciding a deadline, formulating a plan, anticipating achievements, encouraging and conducting self-assessment (Rader, 2005). In a first step, teachers can help students record their goals and the reasons for choosing their goals. After several days, the teachers ask students to check their records and delete the goals they are no longer interested in, and then set up their specific goals. The second step is to teach students how to decide the deadline for their goals according to the actual learning progress. The third step is to help students list the obstacles to achieving their learning goals, think about solutions and then make a strategic plan. The fourth step is to guide students to predict the outcome if they achieve their learning goals. The fifth step is to continuously encourage them to move towards their learning goals and give positive feedback on students' weaknesses. Lastly, the teacher should assist students with self-assessment.

Because individual students set different learning goals and have different levels of learning ability, they cannot achieve their learning goals at the same time. Teachers should assist those students who achieve their learning goals to set themselves more challenging goals, and help those who do not achieve their learning goals to adjust their strategies and encourage them to make efforts to realise their learning goals. Irrespective of whether students achieve their learning goals, the teachers should acknowledge their efforts and performances.

Promoting Students' Learning Motivation

Promoting students' learning motivation is a key component of self-regulated learning (Boekaerts, 1995; Corno, 1986, 1987; Pintrich & DeGroot, 1990). Teachers should design long-term and short-term learning goals according to the learning objectives and encourage students to learn step by step. This learning model can help students improve their metacognition and self-efficacy and promote their learning motivation. The teacher can also use other strategies such as norm-referenced measurement and attributional feedback to promote students' motivation (Zhang & Tai, 2004). Using norm-referenced measurement, the teacher avoids criticising students in class and publicising test results, which may have an adverse impact on students' enthusiasm in terms of competing with others. In class, students are differentiated in terms of aptitude. Comparing students' performances may frustrate some diligent students with lower achievement levels and lead them to give up on learning. Teachers should avoid merely giving marks or grades to students. Rather, they should point out students' strengths and weaknesses and suggest a remedial plan to improve their learning. Their comments should highlight the progress in knowledge and skills made by the students and develop students' mastery orientation. In addition, teachers should provide attributional feedback and emphasise that students' progress is directly related to the effort applied. Lastly, teachers should explain to students the values of different subjects in class and relate subject topics to their real lives. The teacher should design assignments that target problem-solving in real life situations and use multiple teaching methods in order to increase students' learning interests (Lin, 1997).

Developing Students' Learning Strategies

The results of this study show that mastering the application of learning strategies can improve students' learning performances. Schunk & Zimmerman (1998) propose a four-phase model for developing students' learning strategies. The first phase is to assist students to develop necessary skills such as writing and note-taking strategies. The second phase involves checking and discussing students' writing and introducing the objectives and strengths of teaching writing strategies and how and when to self-assess. The third phase is to demonstrate how to use

appropriate self-writing strategies such as defining questions, planning, using strategies, self-assessment, copying, correction, and self-enhancement. In the fourth phase, the students should memorise the steps of writing strategies and self-statement. They should be encouraged to explain the meanings and maintain creative meanings. Ultimately, students should use this strategy independently in their own work. If students always use self-regulatory strategies step by step, for example goal setting or self-assessment, they can start to work independently.

Developing Students' Self-regulated Ability

Of all the factors considered in this study, action control makes the most significant contribution to students' learning performances. Action control plays a critical role in the self-regulation process for monitoring students' learning process. It not only reveals students' learning weaknesses but also alerts them to the effectiveness of their learning strategies (Zimmerman & Paulsen, 1995). Teachers should demonstrate how to conduct self-regulation and choose strategies for learning by thinking aloud and teaching students the skills of self-monitoring through directed instruction (Zimmerman, Bonner and Kovach, 1996). For example, teachers may demonstrate their own self-monitoring tables or choose one strategy under specific circumstances and assess the outcomes of implementation, then modify the strategy based on the outcomes. By helping students develop self-monitoring skills, teachers can transfer the responsibility for learning to the students.

Zimmerman & Paulsen (1995) propose four teaching steps for developing students' self-regulation ability. These are benchmark self-monitoring, structured self-monitoring, independent self-monitoring and self-regulatory monitoring. In benchmark self-monitoring, students collect the baseline data of their own learning difficulties and set up a benchmark. Teachers may ask students to record their reading materials and assess the efficacy of their reading comprehension, including start and end time, number of pages, location and environment. Students should regard their reading efficacy as a benchmark and add their own comments. After establishing the benchmark, they set up their reading objectives.

Structural self-monitoring means that students observe their learning according to the self-monitoring model provided by the teacher in class. Teachers should specifically define the requirements of learning activities

and assist students to self-monitor their learning on the basis of these requirements. For example, in a reading activity whose purpose is to understand the meaning of a text, teachers may demonstrate how self-questioning can help them monitor whether they really comprehend the text's meaning. These questions are as follows:

1. Can I summarise the main idea of the text?
2. Can I list the five important learning points in this chapter?
3. Can I write a short comment?
4. Can I discuss the topic raised in this chapter?
5. Are the important learning points I list consistent with those proposed by my classmates and teacher?

After being taught the principles of structured self-monitoring, students should apply self-monitoring in their learning and develop their own independent monitoring mechanism. Independent self-monitoring refers to the internalisation of the structural self-monitoring model applied in the course of their individual learning. Teachers should use different types of structured monitoring models over several weeks and guide students to develop their own self-monitoring models in order to master the learning content. If students can apply their own monitoring model to regulate their learning progress by referring to the self-monitoring models provided by their teachers, their self-monitoring matures and develops.

Self-regulatory monitoring refers to students developing self-regulatory models targeting other learning activities. The teacher asks students to develop their own self-monitoring regulations and actions, for example taking the initiative to prepare for exams, refining their learning notes and writing up reading reports. In the process of self-regulated learning, the teacher does not directly teach students strategies but helps them to effectively self-regulate their learning (Wu, 2004). Therefore, when teachers develop students' self-regulation ability, they must demonstrate different kinds of self-regulatory strategies and the efficacy of self-regulated learning, keep continuous records of students' learning progress and predict students' problems in self-regulated learning. They can then integrate self-regulated learning into their courses and modify their teaching methods according to their experiences of self-regulated learning.

Conclusion

The study established a model of self-regulated learning based on empirical evidence. It demonstrated that students' learning performances were closely related to their learning motivation, goal setting, action control and learning strategies. The study also proposes some methods of developing students' learning to learn ability, which is one of the objectives of education reform in Hong Kong. The suggestions include assisting students to set up specific and feasible learning goals, guiding them to choose appropriate learning strategies, helping them learn to accurately self-monitor the learning process, and promoting positive attitudes towards learning outcomes. Self-regulated learners optimise their learning strategies through continuous self-assessment of their learning efficacy. It is in the interests of teachers to develop students' self-regulation ability if they really want to enhance students' learning.

References

- Boekaerts, M. (1995). Self-regulated learning: Bridging the gap between metacognitive and metamotivation theories. *Educational Psychologist, 30* (4), 195-200.
- Boekaerts, M. (1999). Self-regulated learning: where we are today. *International Journal of Educational Research, 31*, 445-457.
- Boekaerts, M., Pintrich, P. R., & Zeidner, M. (2000). *Handbook of Self-regulation*. California: Academic Press.
- Corno, L. (1986). The metacognitive control components of self-regulated learning. *Contemporary Educational Psychology, 11*, 333-346.
- Corno, L. (1987). *Teaching and self-regulated learning*. In D. C. Berliner, & Rosenshine, B. V. (Eds.), *Talks to Teachers* (pp. 249-266). New York: Random House.
- Education Commission (2000). *Review of education system-reform proposals (consultation document)*. Hong Kong: The Government Printer.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-development inquiry. *American Psychologist, 34* (10), 906-911.
- Flavell, J. H. (1993). *Cognitive Development*. Englewood Cliffs, N.J.: Prentice-Hall.
- Lei, L., Wang, L. & Tanjia, C (2001). The role of goal-orientation in self-regulated learning. *The Journal of Psychology, 33* (4), 349-353.

- Lei, L., Wang, L. & Tanjia C (2002). Comparative study of self-regulated learning between high achievers and low achievers. *Psychological Development and Education*, 2, 6-11.
- Lin, J. P. (1997). *Supervising Learning— Theories and Practices*. Taipei: Wunan Press.
- Pintrich, P. R., & DeGroot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33-40.
- Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Journal of Educational Research*, 31, 459-470.
- Pintrich, P. R. (1995). Understanding self-regulated learning. *New Directions for Teaching and Learning*, 63, 3-12.
- Pintrich, P. R. & DeGroot, E. V. (1990). Motivational and self-regulated learning components of classroom performance. *Journal of Educational Psychology*, 82, 33-40.
- Pintrich, P. R. (2000). *The role of goal orientation in self-regulated learning*. In M., Boekaerts, & P. R., Pintrich. (Eds.) *Handbook of Self-regulation* (pp.451-502). San Diego: Academic Press.
- Puustinen, M, & Pulkkinen, L. (2001). Models of self-regulated learning: a review. *Scandinavian Journal of Education Research*, 45 (3), 269-286.
- Rader, L. A. (2005). Goal setting for students and teachers: Six Steps to Success, *The Clearing House*, 78 (3), 123-126.
- Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational Psychologist*, 40 (2), 85-94.
- Schunk, D. H. & Zimmerman, B. J. (1998). *Self-regulated Learning: From Teaching to Self-reflective Practice*. New York: Guilford Press.
- Wu, L. (2004). Guiding strategies of self-regulated learning. *Psychological Exploration*, 10, 40-43.
- Zhang, W. & Tai, W. (2004). The role of motivation in self-regulated learning and its implication for our education. *The Journal of Jinlin Grain college*, 19(2), 34-37.
- Zimmerman, B. J., & Pons, M. M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. *American Educational Research Journal*, 23(4), 614-628.
- Zimmerman, B. J. (1989). A social cognitive view of self-regulated learning. *Journal of Educational Psychology*, 81, 329-339.
- Zimmerman, B. J. & Paulsen, A. S. (1995). *Self monitoring during college studying: An invaluable tool for academic self-regulation*. In Pintrich (Ed.), *New directions in college teaching and learning*, vol. 63, pp13-27. San Francisco, Jossey Bass.
- Zimmerman, B. J., Bonner S., & Kovach, R. (1996). *Developing Self-regulated Learners: Beyond Achievement to Self-efficacy*. USA: American Psychology Association.

Eric Cheng, Assistant Professor of Department of Education Policy and Leadership, The Hong Kong Institute of Education. Email: eckcheng@ied.edu.hk.