
PERGAMON

International Journal of
Educational Research 31 (1999) 459–470

International Journal of
Educational
Research

www.elsevier.com/locate/ijedures

Chapter 2

The role of motivation in promoting and sustaining self-regulated learning

Paul R. Pintrich

Combined Program In Education And Psychology, The University of Michigan, Ann Arbor, MI 48109, USA

Abstract

A general framework is presented to help understand the relationship between motivation and self-regulated learning. According to the framework, self-regulated learning can be facilitated by the adoption of mastery and relative ability goals and hindered by the adoption of extrinsic goals. In addition, positive self-efficacy and task value beliefs can promote self-regulated behavior. Self-regulated learning is defined as the strategies that students use to regulate their cognition (i.e., use of various cognitive and metacognitive strategies) as well as the use of resource management strategies that students use to control their learning.

Recent models of self-regulated learning stress the importance of integrating both motivational and cognitive components of learning (Garcia & Pintrich, 1994; Pintrich, 1994; Pintrich & Schrauben, 1992). The purpose of this chapter is to describe how different motivational beliefs may help to promote and sustain different aspects of self-regulated learning. In order to accomplish this purpose, a model of self-regulated learning is briefly sketched and three general motivational beliefs related to a model of self-regulated learning in our research program at the University of Michigan are discussed. Finally, suggestions for future research are offered.

1. A model of self-regulated learning

Self-regulated learning offers an important perspective on academic learning in current research in educational psychology (Schunk & Zimmerman, 1994). Although there are a number of different models derived from a variety of different theoretical perspectives (see Schunk & Zimmerman, 1994; Zimmerman & Schunk, 1989), most models assume that an important aspect of self-regulated learning is the

0883-0355/99/$ - see front matter
PII: S0883-0355(99)00015-4

students' use of various cognitive and metacognitive strategies to control and regulate their learning. The model of self-regulated learning described here includes three general categories of strategies: (1) cognitive learning strategies, (2) self-regulatory strategies to control cognition, and (3) resource management strategies (see Garcia & Pintrich, 1994; Pintrich, 1988a,b; Pintrich, 1989; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991; Pintrich, Smith, Garcia, & McKeachie, 1993).

1.1. Cognitive learning strategies

In terms of cognitive learning strategies, following the work of Weinstein and Mayer (1986), rehearsal, elaboration, and organizational strategies were identified as important cognitive strategies related to academic performance in the classroom (McKeachie, Pintrich, Lin & Smith, 1986; Pintrich, 1989; Pintrich & De Groot, 1990). These strategies can be applied to simple memory tasks (e.g., recall of information, words, or lists) or to more complex tasks that require comprehension of the information (e.g., understanding a piece of text or a lecture) (Weinstein & Mayer, 1986).

Rehearsal strategies involve the recitation of items to be learned or the saying of words aloud as one reads a piece of text. Highlighting or underlining text in a rather passive and unreflective manner also can be more like a rehearsal strategy than an elaborative strategy. These rehearsal strategies are assumed to help the student attend to and select important information from lists or texts and keep this information active in working memory, albeit they may not reflect a very deep level of processing. Elaboration strategies include paraphrasing or summarizing the material to be learned, creating analogies, generative note-taking (where the student actually reorganizes and connects ideas in their notes in contrast to passive, linear note-taking), explaining the ideas in the material to be learned to someone else, and question asking and answering (Weinstein & Mayer, 1986). The other general type of deeper processing strategy, organizational, includes behaviors such as selecting the main idea from text, outlining the text or material to be learned, and using a variety of specific techniques for selecting and organizing the ideas in the material (e.g., sketching a network or map of the important ideas, identifying the prose or expository structures of texts). (See Weinstein & Mayer, 1986.) All of these organizational strategies have been shown to result in a deeper understanding of the material to be learned in contrast to rehearsal strategies (Weinstein & Mayer, 1986).

1.2. Metacognitive and self-regulatory strategies

Besides cognitive strategies, students' metacognitive knowledge and use of metacognitive strategies can have an important influence upon their achievement. There are two general aspects of metacognition, knowledge about cognition and self-regulation of cognition (Brown, Bransford, Ferrara & Campione, 1983; Flavell, 1979). Some of the theoretical and empirical confusion over the status of metacognition as a psychological construct has been fostered by the confounding of issues of metacognitive knowledge and awareness with metacognitive control and self-regulation

(Brown et al., 1983). Pintrich, Wolters, and Baxter (1999) have suggested that metacognitive knowledge be limited to students' knowledge about person, task, and strategy variables. Self-regulation would then refer to students' monitoring, controlling, and regulating their own cognitive activities and actual behavior. In the research program at the University of Michigan, the focus has been on the strategies individuals use to plan, monitor, and regulate their cognition, not their metacognitive knowledge.

Most models of metacognitive control or self-regulating strategies include three general types of strategies: planning, monitoring, and regulating (see, for example, Corno, 1986; Zimmerman & Martinez-Pons, 1986,1988); the University of Michigan model is no different (see Pintrich, 1988a,b; 1989; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991; Pintrich et al., 1993). Although these three types of strategies are highly related conceptually (Pintrich et al., 1999) and, at least in our data (e.g., Pintrich, 1989; Pintrich et al., 1993), seem to be highly correlated empirically, they can be discussed separately.

Planning activities that have been investigated in various studies of students' learning include setting goals for studying, skimming a text before reading, generating questions before reading a text, and doing a task analysis of the problem. These activities seem to help the learner plan their use of cognitive strategies and also seem to activate or prime relevant aspects of prior knowledge, making the organization and comprehension of the material much easier.

Monitoring of one's thinking and academic behavior is an essential aspect of self-regulated learning. In order to be self-regulating, there must be some goal or standard or criterion against which comparisons are made in order to guide the monitoring process. Weinstein and Mayer (1986) see all metacognitive activities as partly the monitoring of comprehension where students check their understanding against some self-set goal. Monitoring activities include tracking of attention while reading a text or listening to a lecture, self-testing through the use of questions about the text material to check for understanding, monitoring comprehension of a lecture, and using test-taking strategies (i.e., monitoring speed and adjusting to time available) in an examination situation. These various monitoring strategies alert the learner to breakdowns in attention or comprehension that can then be "repaired" using regulation strategies.

Regulation strategies are closely tied to monitoring strategies. As students monitor their learning and performance against some goal or criterion, this monitoring process suggests the need for regulation processes to bring behavior back in line with the goal or to come closer to the criterion. For example, as learners asks themselves questions as they read in order to monitor their comprehension, and then go back and reread a portion of the text, this rereading is a regulatory strategy. Another type of self-regulatory strategy for reading occurs when a student slows the pace of their reading when confronted with more difficult or less familiar text. Of course, reviewing any aspect of course material (e.g., lecture notes, texts, lab material, previous exams and papers) that one does not remember or understand that well while studying for an examination reflects a general self-regulatory strategy. During a test, skipping questions and returning to them later is another strategy that students can use to regulate

their behavior. All these strategies are assumed to improve learning by helping students correct their studying behavior and repair deficits in their understanding.

1.3. Resource management strategies

The final component of our model of learning and self-regulatory strategies, resource management strategies, concerns strategies that students use to manage and control their environment. Examples include managing and controlling their time, their effort, their study environment, and other people, including teachers and peers, through the use of help-seeking strategies (cf., Corno, 1986; Ryan & Pintrich, 1998; Zimmerman & Martinez-Pons, 1986,1988). In line with a general adaptive approach to learning, these resource management strategies are assumed to help students adapt to their environment as well as change the environment to fit their goals and needs (see, for example, Sternberg, 1985). Although these resource management strategies are important, due to space limitations, they are not discussed further in this chapter. (The interested reader is encouraged to read the relevant articles and chapters included in the references.)

2. The role of motivational beliefs in self-regulated learning

Although there are many models of motivation that may be relevant to student learning (Pintrich & Schunk, 1996), we have concentrated on three general types of motivational beliefs in our empirical work including: (a) self-efficacy beliefs (that is, judgments of one's capabilities to do the academic task), (b) task value beliefs (that is, beliefs about the importance of, interest in, and value of the task), and (c) goal orientations (that is, whether the focus is on mastery and learning of the task, grades or extrinsic reasons for doing the task, or relative ability in relation to social comparisons with other students).

The relations among these three general types of motivational beliefs have been examined and the use of self-regulatory strategies in both middle school contexts as well as college and university contexts have been explored. The research program has focused on describing how different motivational beliefs help to promote, sustain, or facilitate self-regulated learning. The research has generally been correlational with data collected over 1, 2, 4, and 5 points in time. In the studies of middle school children, one group of students has been followed over the course of three years in school (seventh, eighth, and ninth grade) with five waves of data collected; other middle school studies have sampled fewer waves of data. In all, data on approximately 1000 middle school students have been collected over the years.In the college studies, data have been collected mainly at two points in time, early in a 15 week semester and then again late in that same semester. The college samples have included over 3000 cases in the different studies.

All the research has used the Motivated Strategies for Learning Questionnaire (MSLQ, see Pintrich et al., 1993), a self-report instrument designed to measure students' motivation and self-regulated learning in classroom contexts. Data have also

been collected on the students' performances on examinations and papers, as well as their final grade for the course. It is important to note that all of these studies have been conducted at the "class" level in the middle school samples (e.g., Mathematics, Science, English, or Social Studies) or the course level in the college samples (e.g., Introductory Psychology, English Literature, Introductory Biology, Introductory Sociology, Calculus, etc.). Students' motivation and self-regulated learning are assumed to be context specific and, thus, a focus on the class or course level was seen as the most appropriate level of context. Accordingly, the MSLQ is not designed to assess students' global motivation and self-regulation for school or college, nor is it sensitive enough to detect differences in motivation or self-regulation as a function of different tasks within a class (e.g., a multiple choice test vs. a research paper within the same class).

In these studies the relations between motivation and self-regulation have been examined using correlational and regression analyses. Tables 1 and 2 summarize the findings across many different samples and studies. The numbers in the cells of the tables represent the range of regression coefficients and zero-order correlations between the motivation variables and the self-regulated learning and performance variables. The regressions included many different predictors, including measures of self-regulated learning from earlier waves of data, so the lower end of the range (i.e., 0.03) in the tables represent the unique contribution of the motivational variables to the variance of the self-regulated learning and performance variables over and above earlier measures of these outcomes. The higher end of the ranges (i.e., some in the a 70s) represent the simple zero-order correlations between motivation and self-regulation variables. The next three sections summarize the findings for each of the three motivational beliefs.

2.1. The role of self-efficacy beliefs

Self-efficacy has been defined as individuals' beliefs about their performance capabilities in a particular domain (Bandura, 1986; Schunk, 1985). The construct of

Table 1
Relations between self-efficiency and task value and self-regulated learning outcomes[a]

	Self-efficacy		Task value	
	Middle school	College/University	Middle school	College/University
Rehearsal	—	0.10–0.27	—	0.03–0.30
Elaboration	0.26–0.61	0.09–0.35	0.11–0.63	0.04–0.55
Organization	—	0.13–0.36	—	0.06–0.41
Self-regulation	0.29–0.67	0.12–0.58	0.02–0.73	0.03–0.67
Performance	0.19–0.38	0.27–0.45	0.17–0.30	0.03–0.20

[a]Numbers represent range of regression coefficients or zero-order correlations across different studies. Dashed lines reflect no data available for that relation.

Table 2
Relations between goal-orientation and self-regulated learning outcomes[a]

	Mastery goals		Extrinsic goals		Relative ability goals	
	Middle school	College/University	Middle school	College/University	Middle school	College/University
Rehearsal	—	0.06–0.27	—	(− 0.03)–0.04	—	—
Elaboration	0.48–0.63	0.11–0.39	(− 0.15)–(− 0.20)	0.03–0.11	0.16–0.33	—
Organization	—	0.32–0.39	—	0.03–0.11	—	—
Self-regulation	0.38–0.73	0.20–0.40	(− 0.31)–(− 0.41)	(− 0.03)–0.06	0.09–0.18	—
Performance	0.02–30	0.03–0.23	(− 0.05)–(− 0.21)	0.03–0.23	0.12–0.22	—

[a]Numbers represent range of regression coefficients or zero-order correlations across different studies. Dashed lines reflect no data available for that relation.

self-efficacy includes individuals' judgments about their ability to accomplish certain goals or tasks by their actions in specific situations (Schunk, 1985). In an achievement context (such as the aforementioned studies), it includes students' confidence in their cognitive skills to learn or perform the academic course work.

The findings for self-efficacy showed very positive relations between self-efficacy and self-regulated learning for both middle school and college students (see Table 1, and Pintrich, 1989; Pintrich & De Groot, 1990; Pintrich & Garcia, 1991). It is important to note that for the middle school studies the three different types of cognitive strategies did not factor into separate scales, so only one cognitive strategy use scale was created. Students who felt more efficacious about their ability to do well in the course were more likely to report using all three types of cognitive strategies (rehearsal, elaboration, and organizational strategies). Students high in self-efficacy were more likely to be cognitively involved in trying to learn the material in comparison to those low in efficacy, even if some of their strategies (i.e., rehearsal) were not deep level comprehension strategies. Self-efficacy also was positively related to self-regulatory strategies such as planning, monitoring, and regulating. Self-efficacy also was strongly related to academic performance including examsinations, lab reports, papers and overall final grade.

2.2. The role of task value beliefs

Eccles (1983) has proposed that three components of task value are important in achievement dynamics: the individual's perception of the importance of the task, their personal interest in the task, and their perception of the utility value of the task for future goals. The importance component of task value refers to the individuals' perceptions of the task's importance or salience for them. Interest is assumed to be individuals' general attitudes or liking of the task that is somewhat stable over time and a function of personal characteristics. Utility value is determined by the individuals' perceptions of the usefulness of the task for them. For students this may include beliefs that the course will be useful for them immediately in some way (e.g., help them cope with college), in their major (e.g., they need this information for upper level courses), or their career and life in general (e.g., this will help them somehow in graduate school). In the studies summarized in Tables 1 and 2, task value was operationalized in terms of students' perceptions of the importance, utility, and interest of the course material for them (see Pintrich et al., 1993).

As can be seen in Table 1, task value beliefs were correlated positively with cognitive strategy use including rehearsal, elaboration, and organizational strategy use. In addition, students who reported higher levels of interest and value were more likely to report that they were using more strategies to monitor and regulate their cognition. We also found that task value was correlated to performance, albeit these relations were not as strong as those for self-efficacy (Pintrich, 1989; Pintrich & Garcia, 1991; Pintrich et al., 1993).

2.3. The role of goal orientation

Although a number of researchers have discussed goal orientation (e.g., Ames, 1992; Dweck & Elliott, 1983; Dweck & Leggett, 1988; Nicholls, 1984) using alternative terms and definitions, we have focused on three general orientations (Wolters, Yu & Pintrich, 1996). A mastery goal orientation refers to a concern with learning and mastering the task using self-set standards and self-improvement. An extrinsic orientation includes a focus on getting good grades and pleasing others (teachers, parents) as the main criterion for judging success. Finally, a relative ability orientation has been included. This orientation refers to a concern with comparing one's ability or performance to others and trying to best them, to do better than them on the task.

This work on goal orientation fits nicely with self-regulated learning theory because it is assumed that in order for students to self-regulate their learning, performance, and behavior, they must have some goal or standard or criterion against which to compare their progress. Goal theory offers the idea that students have a general orientation to achievement tasks that can be described in terms of the three general orientations of mastery, extrinsic, and relative ability. If students adopt one orientation more than the others, then the setting of this general orientation or standard should be related to their use of various self-regulatory strategies (see Pintrich, in press).

In fact, very consistent relations have been found between the different goals and self-regulation. As shown in Table 2, mastery goals were strongly positively related to the use of cognitive strategies as well as self-regulatory strategies. In addition, mastery goals were somewhat related to actual performance in the class. Extrinsic goals (see Table 2) were the only motivational variable that showed consistent negative relations to self-regulated learning and performance. In Table 2, negative relations are shown for all variables for middle school students, with extrinsic goals negatively related to use of cognitive strategies (from -0.15 to -0.20), to use of self-regulatory strategies (from -0.31 to -0.41) and performance (from -0.05 to -0.21). In contrast, for college students, the relations between extrinsic goals and self-regulation included negative relations (-0.03 for rehearsal and self-regulation), but also positive ranges (from 0.04 to 0.23).

This is the only case where there were some developmental differences in the pattern of relations between motivation and self-regulation. It may be that for American college and university students, who do have much more choice and control over their time, their effort, their studying, and even class attendance, than middle school students, a concern about getting grades helps to motivate them to at least attend class and be somewhat involved in the course work (Pintrich & Garcia, 1991). This focus on extrinsic goals is not better than a focus on mastery goals, but it does seem to help college students somewhat, certainly in terms of performance (0.23, see Table 2). In contrast, for middle school students, it seems very clear than a concern for getting grades and pleasing others is not associated with an adaptive pattern of self-regulated learning and performance.

Finally, in the middle school research, a measure of student's relative ability orientation was used (see Wolters et al., 1996). Contrary to normative goal theory, a concern with besting others did not necessarily have a negative relation with

self-regulation. Rather, students concerned with being better than others did report using more cognitive and self-regulatory strategies and also performed better in the class (see Table 2). In the very traditional classrooms, a concern with social comparison and besting others may help students maintain their involvement with overlearned and relatively boring classroom tasks. Although these findings are not in line with normative goal theory (which suggests that a focus on trying to outperform others should have a negative effect on motivation and learning), they are in line with experimental work with college students that shows that a relative ability orientation can have positive effects (see Harackiewicz, Barron & Elliot, 1998; Pintrich, in press).

3. Conclusions and future directions for research

The research reviewed here suggests very clearly that certain types of motivational beliefs are adaptive and do help to promote and sustain self-regulated learning. Self-regulated learning is neither easy nor automatic. The use of various cognitive and self-regulatory strategies involves a level of engagement that is often more demanding in terms of time and effort for students than their normal level of engagement. In order for them to invest the extra time and effort in self-regulated learning, they must be motivated to use these various strategies. Our research suggests the following three generalizations about an adaptive profile of motivational beliefs for promoting and sustaining self-regulated learning.

First, self-efficacy is positively related to self-regulated learning. Students who believe they can learn and are confident in their skills are more likely to report the use of self-regulatory strategies. This finding is in line with efficacy theory (Bandura, 1986) and suggests that self-efficacy is a personal resource that students can draw upon when they are faced with the difficult and time-consuming tasks associated with academic learning and self-regulated learning.

Second, task value beliefs are positively related to self-regulated learning. Students who believe that their course work is interesting, important, and useful are more likely to report the use of self-regulatory strategies. As suggested by expectancy-value theory (Eccles, 1983), students who value their academic work are more willing to put forth more effort and spend more time engaged in their school work. In addition, students who are more interested in and value their school work are less likely to be distracted by irrelevant thoughts and more likely to have relevant prior knowledge activated (Schiefele, 1991). The activation of relevant prior knowledge could free more capacity in working memory for the monitoring and regulatory processes involved in self-regulated learning.

Third, adopting a mastery goal orientation is the most adaptive goal orientation for self-regulated learning. If students set as their goal self-improvement and learning, then they will be much more likely to continue to engage in various cognitive and metacognitive activities in order to improve their learning and comprehension. The goal or criterion of learning and mastery seems to be a much better standard for self-regulated learning than an extrinsic goal. When operating under an extrinsic goal of just getting good grades, students may be able to attain this goal without much

in-depth cognition or self-regulation. In contrast, a relative ability goal of besting others can have some positive effect on self-regulation if it spurs the student on to deeper levels of engagement, but clearly more research is need to understand the dynamics of relative ability and performance goals (Pintrich, in press).

Although these three generalizations are based on the research program at Michigan, they do parallel findings from other studies, both correlational and field studies (Pintrich, in press; Pintrich & Schrauben, 1992). At the same time, there is still a need for more research on the role of motivation in self-regulated learning. Although there are a number of issues (Pintrich, in press), three areas seem to be the most pressing.

There is a need to examine the reciprocal and interactive relation between motivation and self-regulation. In our own research program, very few interactions among the different motivational beliefs have been found. For example, there were no multiplicative relations such that being simultaneously high in mastery, extrinsic, and relative ability goal orientations represented the best pattern of goal orientation for self-regulation. Nevertheless, it does seem possible that students can pursue multiple goals simultaneously and these multiple goals should interact or condition their attempts at self-regulation in some manner. More fine-grained, dynamic, and on-line analyses of students' multiple goals and their self-regulation are needed to tease apart these relations.

Most of our research has implicitly centered on how motivational beliefs predict self-regulation. However, the process is conceptualized as one of reciprocal relations over time between motivation and self-regulated learning. Clearly, there is a need for more developmental and longitudinal research on how the use of various cognitive and metacognitive strategies can influence students' own motivation, their efficacy for learning, their interest in the task, and the goals they adopt. At the same time, there has been little research on how student may monitor, control and regulate their own motivation (see, however, Boekaerts, 1993; Wolters, 1998); this should be an active area for future research.

A second general theme for future research concerns the cultural and contextual constraints on these generalizations. Most of our research has focused on white, middle class students in fairly traditional classroom settings. Our generalizations might not hold for different groups of students (e.g., African–American, Latino, poor, at-risk, gifted students) where the dynamics of motivation and self-regulation may be quite different. In addition, our studies have been conducted within one particular Western culture; there may be significant cultural differences between American culture and other cultures throughout the world. Self-regulated learning does highlight the individual student; in other cultures where the self is not as central in comparison to a more group-orientation the operation of motivation and regulation may depart quite dramatically from our model. There is a clear need for more research that examines different populations within western cultures as well as cross-cultural research that tests the generalizability of our models.

Finally, our work has focused on investigating the role of motivation and self-regulated learning as it occurs in traditional classroom settings. The classrooms were not designed specifically to improve motivation or self-regulated learning and, in fact, may not offer many opportunities for self-regulation. It seems important for future research to understand how self-regulated learning develops in contexts, not just in

classrooms, but other contexts outside schools such as families, play settings, and work sites. In addition, research is needed on how classroom practices can be changed to foster adaptive motivation and self-regulation.

The research on motivation and self-regulated learning does suggest that classroom practices can be changed to facilitate adaptive efficacy beliefs, encourage interest and value, and foster the adoption of mastery goals (see Pintrich & Schunk, 1996). If these changes are adopted, they will tend to promote the use of self-regulatory strategies. At the same time, these self-regulatory strategies are not easily developed or learned and there must be instruction and scaffolding of these strategies. There is a need for research on how to combine both "motivational" interventions to improve motivation in schools as well as "cognitive" interventions to improve students' cognition, learning, and self-regulation. This integration of both motivation and cognition, not just in our research, but in our attempts to change instructional practice, should result in more motivating classrooms and more deeply engaged and self-regulating students.

References

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, *84*, 261–271.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Boekaerts, M. (1993). Being concerned with well-being and with learning. *Educational Psychologist*, *28*, 149–167.

Brown, A., Bransford, J., Ferrara, R., & Campione, J. (1983). Learning, remembering, and understanding. In J. Flavell, & E. Markman, *Handbook of child psychology: Cognitive development*, 3 (pp. 77–166). New York: Wiley.

Corno, L. (1986). The metacognitive control components of self-regulated learning. *Contemporary Educational Psychology*, *11*, 333–346.

Dweck, C. S., Elliott, E. S. (1983). Achievement motivation. In E. M. Hetherington, *Handbook of child psychology*: Vol. 4. Socialization, personality, and social development (pp. 643–691). New York: Wiley.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, *95*(2), 256–273.

Eccles, J. (1983). Expectancies, values and academic behaviors. In J. T. Spence, *Achievement and achievement motives* (pp. 75–146). San Francisco: Freeman.

Flavell, J. (1979). Metacognition and cognitive monitoring: A new area of cognitive- developmental inquiry. *American Psychologist*, *34*, 906–911.

Garcia, T., & Pintrich, P. R. (1994). Regulating motivation and cognition in the classroom: The role of self-schemas and self-regulatory strategies. In D. H. Schunk, & B. J. Zimmerman, *Self-regulation of learning and performance: Issues and educational applications* (pp. 127–153). Hillsdale, NJ: Lawrence Erlbaum Associates.

Harackiewicz, J., Barron, K., & Elliot, A. (1998). Rethinking achievement goals: When are they adaptive for college students and why?. *Educational Psychologist*, *33*, 1–21.

McKeachie, W. J., Pintrich, P. R., Lin, Y. G., & Smith, D. (1986). *Teaching and learning in the college classroom: A review of the research literature*. Ann Arbor, MI: National Center for Research to Improve Postsecondary Teaching and Learning. The University of Michigan

Nicholls, J. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review*, *91*(3), 328–346.

Pintrich, P. R. (1988). A process-oriented view of student motivation and cognition. In J.S. Stark, & L. Mets, *Improving teaching and learning through research*. vol. 57. New directions for institutional research (pp. 55–70). San Francisco: Jossey-Bass.

Pintrich, P. R. (1988b). Student learning and college teaching. In R. E. Young, & K. E. Eble, *College teaching and learning: Preparing for new commitments*. vol. 33. New Directions for teaching and learning (pp. 71–86). San Francisco: Jossey-Bass.

Pintrich, P. R. (1989). The dynamic interplay of student motivation and cognition in the college classroom. In C. Ames, & M. Maehr, *Advances in motivation and achievement: Motivation enhancing environments*, vol. 6. (pp. 117–160). Greenwich, CT: JAI Press.

Pintrich, P. R. (1994). Continuities and discontinuities: Future directions for research in educational psychology. *Educational Psychologist*, *29*, 37–148.

Pintrich, P. R. (in press). The role of goal orientation in self-regulated learning. In M. Boekaerts, P.R. Pintrich, & M. Zeidner, *Handbook of self-regulation*. San Diego, CA: Academic Press.

Pintrich, P. R., & De Groot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, *82*, 33–40.

Pintrich, P. R., & Garcia, T. (1991). Student goal orientation and self-regulation in the college classroom. In M. Maehr, & P.R. Pintrich, *Advances in motivation and achievement: Goals and self-regulatory processes*, vol. 7. Greenwich, CT: JAI Press.

Pintrich, P. R., & Schrauben, B. (1992). Students' motivational beliefs and their cognitive engagement in classroom academic tasks. In D. Schunk, & J. Meece, *Student perceptions in the classroom* (pp. 149–183). Hillsdale, NJ: Lawrence Erlbaum Associates.

Pintrich, P. R., & Schunk, D. H. (1996). *Motivation in education: Theory, research, and applications*. Englewood Cliffs, NJ: Prentice Hall Merrill.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement*, *53*, 801–813.

Pintrich, P. R., Wolters, C., & Baxter, G. (1999). Assessing metacognition and self-regulated learning. In G. Schraw, Issues in the measurement of metacognition: Proceedings from the Tenth Buros-Nebraska symposium on measurement and testing. Lincoln, NE: The University of Nebraska Press.

Ryan, A., & Pintrich, P. R. (1998). Achievement and social motivational influences on help-seeking in the classroom. In S. Karabenick, *Strategic help seeking: Implications for learning and teaching* (pp. 117–139). Mahwah, NJ: Lawrence Erlbaum Associates.

Schiefele, U. (1991). Interest, learning, and motivation. *Educational Psychologist*, *26*, 299–323.

Schunk, D. (1985). Self-efficacy and school learning. *Psychology in the Schools*, *22*, 208–223.

Schunk, D. H., & Zimmerman, B. J. (1994). *Self-regulation of learning and performance: Issues and educational applications*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Sternberg, R. (1985). *Beyond IQ: A triarchic theory of human intelligence*. New York: Cambridge University Press.

Weinstein, C. E., & Mayer, R. E. (1986). The teaching of learning strategies. In M. Wittrock, *Handbook of research on teaching* (pp. 315–327). New York: Macmillan.

Wolters, C. (1998). Self-regulated learning and college students' regulation of motivation. *Journal of Educational Psychology*, *90*, 224–235.

Wolters, C., Yu, S., & Pintrich, P. R. (1996). The relation between goal orientation and students' motivational beliefs and self-regulated learning. *Learning and Individual Differences*, *8*, 211–238.

Zimmerman, B., & Martinez-Pons, M. (1986). Development of a structured interview for assessing student use of self-regulated learning strategies. *American Educational Research Journal*, *23*, 614–628.

Zimmerman, B., & Martinez-Pons, M. (1988). Construct validation of a strategy model of student self-regulated learning. *Journal of Educational Psychology*, *80*, 284–290.

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

Paul R. Pintrich is Professor of Education and Psychology and Chair of the Combined Program in Education and Pscychology at the University of Michigan. He also serves as the Associate Dean for Research for the School of Education at Michigan. His research focuses on the development of motivation and self-regulated learning.