Journal of Educational Enquiry, Vol. 1, No. 2, 2000

Developing efficacy beliefs in the classroom.

Alison Sewell and Alison St George
Massey University, New Zealand

Abstract

A major goal of education is to equip children with the knowledge, skills and self-belief to be confident and informed citizens - citizens who continue to see themselves as learners beyond 'graduation'. This paper looks at the key role of nurturing efficacy beliefs in order to learn and participate in school and society. Research findings conducted within a social studies context are presented, showing how strategy instruction can enhance self-efficacy for learning. As part of this research, Creative Problem Solving (CPS) was taught to children as a means to motivate and support learning. It is shown that the use of CPS can have positive effects on self-efficacy for learning, and be a valuable framework to involve children in decision-making that leads to social action. Implications for enhancing self-efficacy and motivation to learn in the classroom are discussed.

Introduction

Over the years, Western societies have undergone extraordinarily rapid change. Today, Westerners experience very different social patterns; they have vastly developed technological gadgetry, their economic systems are more complex and intertwined than ever before, and their everyday lives are affected more directly by events in distant places. This trend toward globalisation presents new challenges for people to exercise personal control over their lives. According to Bandura (1997), people are 'proactive, aspiring organisms' (p. vii), yet these rapid cycles of drastic change have placed a premium on perceptions of efficacy to shape the future.

Because self-efficacy operates within a broad network of sociocultural influences (Bandura, 1997), it is argued here that social studies education has the potential to help students enhance their sense of efficacy to participate in their world. More specifically, this paper reports on research that examines the relationship between strategy instruction using Creative Problem Solving (CPS) and the development of self-efficacy beliefs. A curriculum designed around CPS can provide opportunities for students to feel that their efforts make a difference; that

Contact details: A.M.Sewell@massey.ac.nz

they can be part of a process to make positive change that affects their lives. Teachers must enable students to experience efficacy, albeit on a small scale, in order to help them become 'informed, confident and responsible citizens' (Ministry of Education, 1997, p. 8).

Self-efficacy theory

The construct of self-efficacy has grown out of social cognitive theory (Bandura, 1977). Perceived self-efficacy refers to 'a judgment of one's ability to organise and execute given types of performances' (Bandura, 1997, p. 21). Personal beliefs about capabilities are a vital and yet too-often ignored part of attempts to create learning. Indeed, measures of self-efficacy may be better predictors of behaviour than what one is actually capable of achieving (Bandura, 1989). So, when students exclaim 'I can do this' or 'I'll have a go at that', they need to be celebrated and affirmed, for these are signs of a developing self-efficacy.

Recent self-efficacy research

'Self-efficacy touches at least to some extent most everything we do' (Bandura, 1984, p. 251). The context-specific nature of self-efficacy means that students may feel efficacious about performing a dance, yet lack the efficacy for solving mathematical or word problems. Research findings have documented the wide-ranging effects of efficacy perceptions on learning and motivation. Self-efficacy theory predicts that highly efficacious students will choose to participate in learning activities more often (Berry & West, 1993). They will expend more effort on challenging learning tasks (Zimmerman & Martinez-Pons, 1990) and persist longer in the face of difficulty (Bandura, 1986; Schunk, 1991). In addition, they will remain resilient and cope serenely in the face of adversity (Pajares, 1996). Self-efficacy is a strong predictor of academic achievement and motivation to learn (Schunk, 1991). Wolters and Pintrich (1998) have also found that efficacious students report using a greater variety of cognitive and self-regulatory strategies with greater performance accomplishments. A strong correlation exists between high self-efficacy and self-regulatory strategies (cognitive and metacognitive), goal setting and successful performance (Bouffard-Bouchard, 1990; Locke & Latham, 1990; Pintrich & De Groot, 1990; Zimmerman & Martinez-Pons, 1992).

In contrast, low perceptions of efficacy can lead to task avoidance, passivity, lack of task engagement and a resignation that failure is inevitable (Bandura, 1997). Such negative beliefs can bring about stress, depression and a narrow view of how to solve problems. Less efficacious learners also tend to be less strategic and more teacher-dependent (Pressley et al, 1990). These results combine to suggest that high self-efficacy is related to deeper and more strategic processing of information during learning. The following is a summary of the cognitive, metacognitive and motivational processes seen in highly efficacious students.

Highly efficacious students:

- choose to participate in their learning
- expend more effort in their learning
- seek more challenging learning experiences
- persist longer when faced with difficulty
- cope serenely in the face of adversity
- recover from failure more quickly
- are more motivated to learn
- achieve higher goals in learning
- use a variety of learning strategies
- quickly discard a faulty strategy
- attribute success to ability and strategic effort
- attribute failure to inappropriate strategy use

Sources of efficacy

Beliefs concerning our efficacy can be developed via four sources. The most effective way to create a strong sense of efficacy is through mastery experiences (Bandura, 1982; Pajares, 1996; Pintrich & Schunk, 1996). Successful performance accomplishments provide the most authentic evidence of whether one can bring about success. In contrast, failure, especially if it occurs early in the learning experience, undermines one's sense of efficacy. The second source for creating efficacy beliefs is via vicarious experiences made available by social models. Belief in one's own capability to master similar tasks is strengthened by seeing others who are similar or held in high regard succeed by persevering (Bandura, 1986; Schunk, 1987). Conversely, observing others fail despite persistent effort tends to lowers one's judgements of efficacy.

The third source for enhancing self-efficacy is social or self-persuasion of capability. Unrealistic boosts in efficacy via persuasion are quickly deflated by failure, especially if it happens after hearing: 'Come on, you can do it'. Such social persuasion, while commonly used by teachers, is also one of the least effective means of raising self-efficacy. The final and often most subtle source is one's physiological and emotional stress reactions, including sweating, trembling and getting the 'butterflies'. Interpretation of these body signals informs our sense of efficacy. For instance, trembling may be viewed as a sign of vulnerability to poor performance, or it may be viewed as determination to succeed (Bandura, 1995).

These four sources of information combine to signal to students how capable they are and how well they are learning and performing. As a result, self-efficacy is re-appraised, which in turn affects ongoing motivation and learning. Figure 1

outlines a model of the sources and motivations stemming from efficacy judgements.

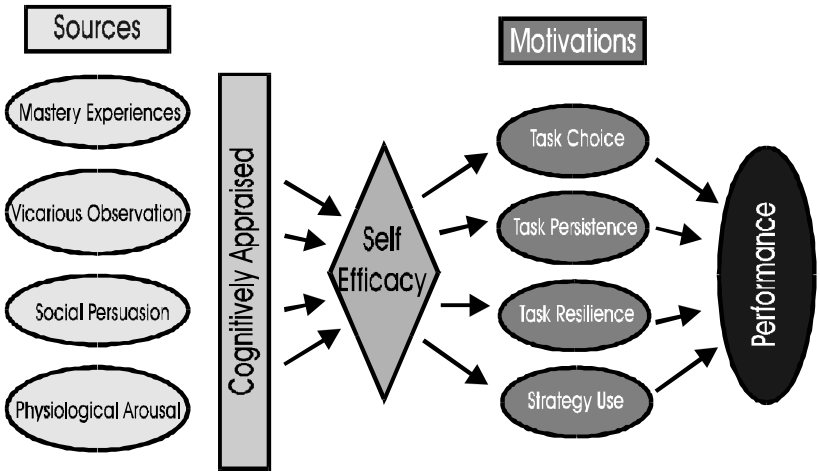

Figure 1: A model of the sources for and motivations of self-efficacy judgements.

Self-efficacy in social studies

Clearly, perceptions of self-efficacy have a commanding role to play in learning. Unfortunately, the paucity of research examining age-related changes in self-efficacy (Berry & West, 1993) make it impossible to predict whether efficacy beliefs in specific domains will be sustained after leaving the classroom. Self-efficacy has been shown to influence career choice, health practices, athletic skills, parenting skills, relationship skills and social participation (Bandura, 1997). Successful social participation is the overarching goal of social studies education in New Zealand, and it is to this 'civic efficacy' we now turn.

From 2000, citizenship education will comprise a key part of social studies in New Zealand schools (Barr, 1996). Teachers will be responsible for assisting their students to develop the knowledge, understandings, skills, values and civic efficacy required for New Zealand to move ahead as a multicultural, democratic society within a global community. In order to achieve these goals, students need to pursue knowledge, think independently, question convention and critically analyse data, as well as participate in creative problem-solving, rational decision-making and values exploration. To experience success in such citizenship education, students need to develop a strategic approach.

Creative Problem Solving

The question we now ask is *how* can robust efficacy beliefs be developed in social studies learners, so that they may come to see themselves as creative agents capable of social participation, capable of making a difference? One answer includes strategy instruction to guide authentic social inquiry - Creative Problem Solving (CPS). CPS was developed by Osborn (1963) and later refined by Parnes (1981) and Feldhusen and Treffinger (1985). Figure 2 outlines the six strategic steps of CPS, each with a distinct purpose for supporting the higher-level thinking inherent in unravelling the messy nature of real-world problems. CPS starts by sensing concerns, supporting a fact-finding process to arrive at a problem statement. Creative ideas are brainstormed and judged, then the best solutions are acted upon. The final stage of CPS provides opportunities for students to implement and reflect upon their solution. CPS, therefore, fits hand-in-glove with the aims and processes of *Social Studies in the New Zealand Curriculum*; both emphasise the social construction of knowledge, creativity, inquiry, values-exploration and social decision-making.

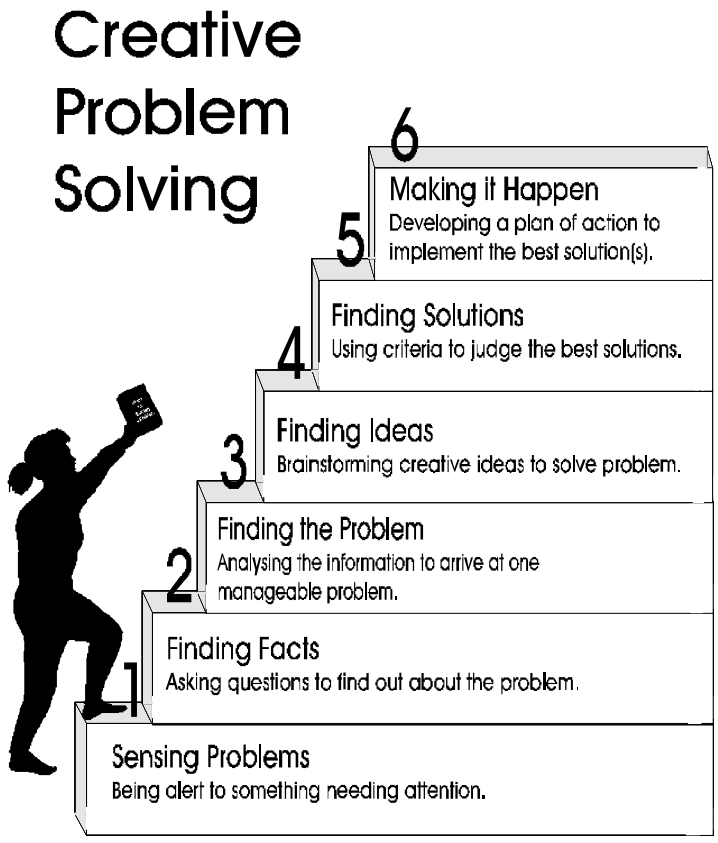

Figure 2: The Creative Problem Solving Model

A study of self-efficacy in the classroom

It was proposed that if performance in CPS is successful, self-efficacy for social participation will be enhanced. A classroom intervention was carried out to test this hypothesis.

Method

Participants: 30 year three- and four-level students were sampled from one class of a primary school in a provincial New Zealand city that catered for students of years 1-6. There were 16 females and 14 males. Ages ranged from 6.1-8.8 years (M = 7.8 years).

Measures: All children completed an eleven-item self-report questionnaire that assessed self-efficacy for learning in social studies prior to CPS instruction. The positively worded items were adapted from a reading self-efficacy questionnaire (Pereira-Laird & Deane, 1995), so as to reflect the unique nature of social studies education. Each item was read to the students by the researcher, and children recorded their response on a four-point scale ranging from (1) 'No, never' to (4) 'Yes, always'. Eleven items were used, examples of which included: 'Do you have trouble solving problems in social studies?' and 'Are you an excellent thinker in social studies?' From this base-line data, four low self-efficacy students and four high self-efficacy students were identified. At the conclusion of the intervention, all students were again measured against the same self-efficacy questionnaire. Pre- and post-instructional interviews were conducted with the eight target students to find out about their attitudes toward learning and their experiences and feelings using CPS. Classroom observations were also recorded during the intervention.

Procedures: Over a two-week period immediately following the initial measurements, the six steps of CPS were taught to the whole class by the first author, within a social studies unit entitled 'My school: A special place in my community'. While this unit drew on elements from mathematics, it mainly emphasised achievement objectives from the *Place and Environment* strand, and the *Inquiry* and *Social Decision-Making* processes of *Social Studies in the New Zealand Curriculum*. Prior to teaching the steps of CPS, a story (*Adventures in the Big Thicket)* was read to the class. In the story, characters often sensed problems and used a variety of ineffective strategies to solve them. Each step of CPS was then separately taught using road safety as a parallel problem. Students listened to the researcher think aloud, then practised the same skills using another problem. Feedback attributing good performance to strategic effort was given to students throughout the intervention. Once all six steps had been practised separately, the students set about sensing real problems in their school environment. One shared problem emerged: their play area was seen as uninteresting and dangerous.

Figure 3 shows a summary of the children's problem-solving efforts at each step of CPS. Students asked questions, found answers, thought creatively, shared ideas, voted and solved problems together as a community of learners. In addition to this, they also took the final step to act in ways that brought about positive change in

their environment. A letter of request and recommendation was sent to a Board of Trustees, which led to their inclusion on a sub-committee to design a new adventure playground.

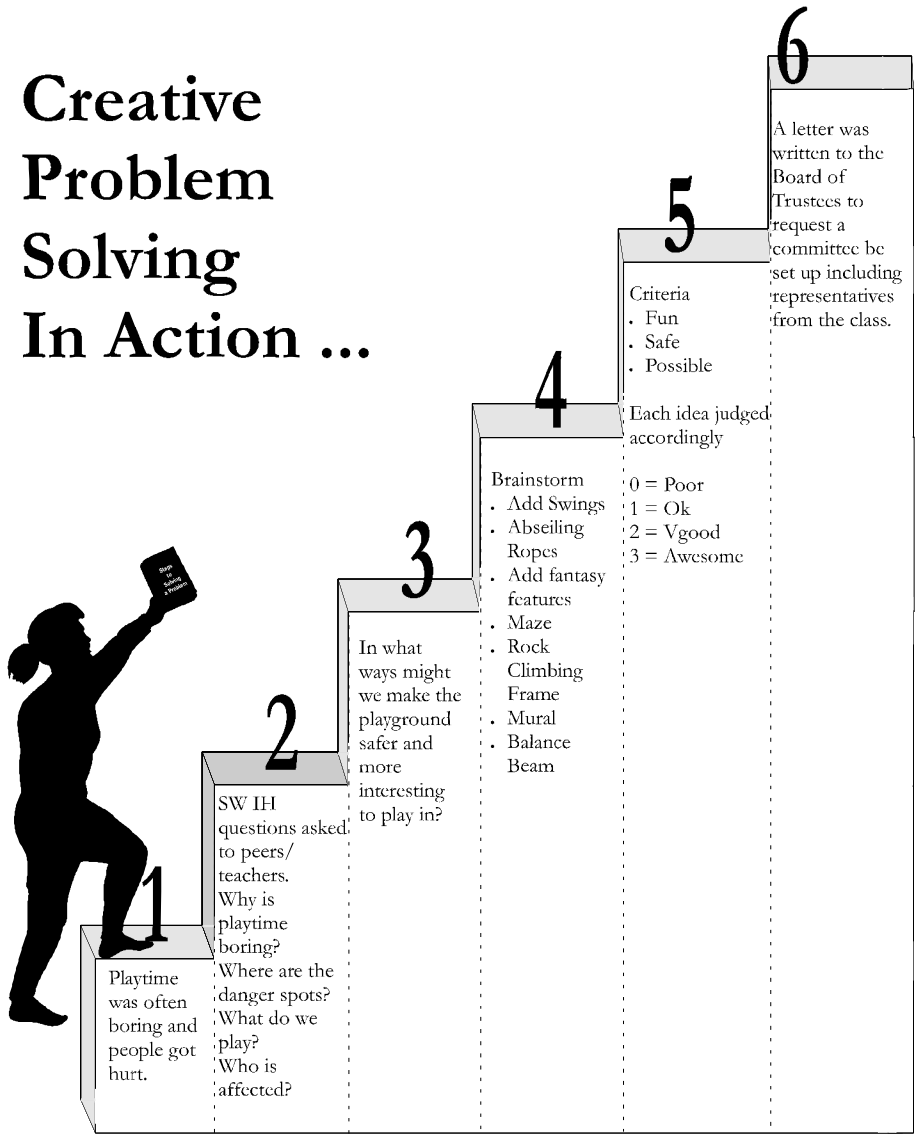

Figure 3: The Creative Problem Solving Model in Action

Results

The pre- and post-test scores for all students are shown in Figure 4. The pre-test scores fell between 22 and 38, with a mean of 31. The post-test scores for all students ranged between 27 and 41, with the mean score increased to 35. Using Wilcoxon's signed rank test ($p<0.01$), an overall increase in pre- to post-test scores was detected, signalling a statistically significant improvement in efficacy beliefs for inquiry in social studies across the whole class.

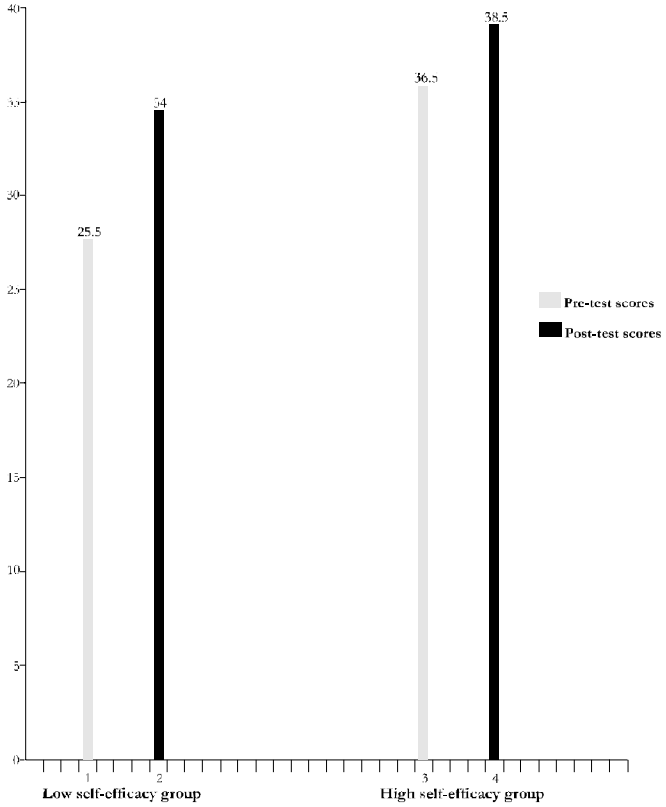

Figure 5: Change in scores from pre-test to post-test for low and high Self-efficacy groups

Figure 5 compares the changes in test score made by the four low and four high self-efficacy students before and after CPS instruction. The score of the low self-efficacy group increased by 33% compared to an increase of only 5% by the high self-efficacy students. This result could be expected, as the low self-efficacy group had a far greater potential for improvement than the already high-scoring self-efficacy students.

Post-instructional interviews with the eight identified students and classroom observations revealed some interesting thoughts and feelings. The only common expression from all eight students was a 'pretty good feeling' at working through

problems and making decisions and acting on them. However, only the high self-efficacy students believed in the utility of CPS and recognised its strategic value outside the classroom. Not surprisingly, these students spoke more confidently about their ability to use CPS effectively, clearly articulating each step. The high self-efficacy group was highly motivated during the instructional phase; members were willing to work alongside a similar peer, persisted in the face of difficulty, and asked well-considered questions to seek help. Indeed, this group appeared to hold high expectations for their performance, viewing difficulties as challenges. These students also believed they had made considerable progress with CPS, attributing this progress to their strategic efforts. The positive nature of these efficacious students' social and self-evaluative outcomes was evident in the interviews.

In contrast, the low self-efficacy group expressed feelings of incompetence using CPS, despite making six times the gains in self-efficacy compared to the high self-efficacy group. The low self-efficacy group either 'didn't like it' or 'found it hard'. These students could not recall all the CPS steps, nor did they value its utility beyond the classroom. They did not see themselves as competent users of CPS. They were also easily distracted and less motivated in class and did not persevere when they had difficulty.

Discussion

These results suggested that in this intervention, instruction in CPS as part of social studies education enhanced students' self-efficacy and enabled them to participate in their local school community in ways that led to positive change. Students practised the skills of citizenship and learned, both in an individual and a collective sense, that their actions could make a difference. Such individual and collective efficacy is very important if students are to become empowered and effective learners and agents of change. These self-beliefs are vital for the citizens of tomorrow, if they are to live their lives fully as individuals and group members in a local, national and global sense.

There are, however, certain design features of this study which suggest the results be interpreted with some caution. First, the self-efficacy measure was new, and while it had face validity, both its reliability and validity need further investigation. Second, the pre-test may have sensitised students to particular issues, with such reflection leading to increased post-test scores. Third, while the teacher/researcher was not the regular teacher, she was well known to the students, which may have influenced results. Fourth, because the researcher was also the intervention teacher, classroom observations were less systematic. Finally, the small sample size, short time-frame and the one-off nature of this intervention means that the results cannot be widely generalised, nor can it be assumed that this intervention alone caused the changes in self-efficacy.

Nevertheless, these results do suggest that instruction in CPS was associated with an increase in perceived self-efficacy in social studies for these students. Moreover, classroom observations and interviews revealed differences in the thoughts, feelings, motivation and behaviour consistent with high and low self-

efficacy students (Bandura, 1992; Schunk, 1989). The disparity between the self-efficacy measured post-test and the interview responses of the low self-efficacy group was disappointing. However, the negative nature of their responses is consistent with the cognitive and affective behaviours of low self-efficacy learners. Such learners generally find it difficult to 'exercise some influence over how they live their lives' (Bandura, 1997, p. 10), and tend to be more apathetic, resigned and despondent, and to devalue their achievements.

It is possible that while the post-test showed raised self-efficacy perceptions of the low group, this increase in perceived self-efficacy was relatively fragile. The interviews may have challenged these children to reflect on what they understood and could do, at which point they became less sure of their competence to solve problems in social studies. The low self-efficacy group may also have needed more practice using CPS to consolidate increases in perceived self-efficacy. For low self-efficacy students, mastery experiences may need to be repeated a number of times for their value as efficacy cues to be realised and translated into stable attitude and change in behaviour.

So, what can be learnt from this study, in conjunction with the wider self-efficacy literature, that can provide guidelines for classroom practice? To address this question, the following is an examination of some of the salient features of this intervention in terms of the sources of efficacy information. While there is no neat kit for enhancing self-efficacy (Pajares, 1996), there do seem to be some directions for targeting students who appear to have low self-efficacy and to more generally promote the efficacy of all students.

The use of CPS is only one way of fostering student self-efficacy in social studies. It utilises a number of features which relate directly to sources of self-efficacy. First, it provides opportunities for guided mastery experiences, with direct instruction of the strategies required at each step of the problem-solving process. In applying the techniques of CPS, the intervener provides coaching, modelling and scaffolding, and makes opportunities for students to practise the strategies. As Bandura (1995) points out, successful efficacy builders structure situations in ways that are likely to bring about success, especially early on in the learning process when new skills are being acquired.

A second influential source of self-efficacy information comes from models, and this is also utilised within the framework of CPS. In the study reported here, teacher modelling of strategies was employed as steps of the CPS process were being learnt. Later, peer models were available as the class was involved in sensing, exploring and solving a real problem in their school environment. While teacher explanations combined with cognitive modelling may be particularly useful in the early stages of strategy instruction, a study by Schunk, Hanson and Cox (1987) suggests that the use of both peer mastery models and peer coping models are effective in enhancing students' self-efficacy. Mastery models demonstrate a task competently and confidently, while coping models make explicit the difficulties students experience in doing a task and the strategies they use to overcome these.

The intervention teacher in this study also used verbal persuasion. As mentioned earlier, general exhortations of the 'Come on, you can do it' kind are not very effective in building efficacy (although correspondingly negative verbalisations seem rather more effective in decreasing self-efficacy). Here, general encouragement was supported by the provision of specific, differentiated feedback. Clear feedback about specific skill development, especially when combined with specific, proximal goals (provided here in the steps of the CPS process), can be an important influence on self-efficacy (Alderman, 1999; Brophy, 1998).

Teacher feedback can also influence the attributions students make regarding their success and failure. Students with high self-efficacy tend to attribute difficulties or failure to insufficient effort, adverse conditions or using the wrong strategies, whereas those with low self-efficacy attribute failure or problems along the way to insufficient ability (Bandura, 1995). In this study, the link between successful performance and the use of strategic effort and development of skills was emphasised to students. Alderman (1990) has argued that if self-efficacy is to be increased, teachers should encourage students to attribute successful performance to their own ability (operationalised as knowledge and skills) as well as personal effort (operationalised as practice and strategy use). In this endeavour, promoting the idea of ability as incremental and domain-specific is fundamental.

The final source of information for self-efficacy outlined by Bandura (1995) is physiological state. Physical symptoms indicative of anxiety can interfere with perceptions of self-efficacy and hence performance. While no specific attention was given to physical symptoms, an attempt was made here to provide a supportive learning environment to emphasise task involvement rather than performance evaluation, in an effort to reduce anxiety in less confident learners. As students were encouraged to choose a real and personally relevant problem to investigate and solve, the task in this study was authentic. In addition, interpersonal comparison was reduced as students worked collaboratively, thereby maintaining a collective focus. Brophy (1998, p. 60) highlights the paradox that 'self-efficacy perceptions are optimised when they are not an issue at all. That is, learning proceeds most smoothly when students are concentrating on the task rather than on evaluating their performance'.

Extensive opportunities can be made within the realm of social studies to incorporate the kinds of experiences and sources of information that support and enhance self-efficacy. The study reported here is just a start; the intervention could be extended over time and across curriculum areas. What is important, however, is that even within a short-term intervention, the CPS strategies can be taught in a way that provides supportive and empowering learning experiences that lead to students developing a heightened sense of self-efficacy. Such instructional and motivational strategies should be integrated within overall curriculum design, in order to support and enhance the development of students with not only skills and knowledge, but also the efficacy beliefs to use them well. In our local and global communities of change, we need students and citizens who will say 'I'll have a go at that!'

References

Alderman, M. (1990) Motivation for at-risk students. *Educational Leadership*, Vol. 48, No.1, pp. 27-30.

Alderman, M. (1999) *Motivation for Achievement: Possibilities for Teaching and Learning*. Mahwah, New Jersey: Lawrence Erlbaum.

Barr, H. (1996) Citizenship education and the national curriculum. *The New Zealand Journal of Social Studies*, Vol. 5, No. 2, pp. 24-30.

Bandura, A. (1977) Self-efficacy: toward a unifying theory of behavioural change. *Psychology Review*, Vol. 84, No. 2, pp. 191-215.

Bandura, A. (1982) Self-efficacy mechanism in human agency. *American Psychologist*, Vol. 37, pp. 122-147.

Bandura, A. (1984) Recycling misconceptions of perceived self-efficacy. *Cognitive Therapy and Research*, Vol. 8, pp. 231-255.

Bandura, A. (1986) *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, New Jersey: Prentice Hall.

Bandura, A. (1989) Regulation of cognitive processes through perceived self-efficacy. *Developmental Psychology*, Vol. 25, pp. 729-735.

Bandura, A. (1992) Self-efficacy Mechanism in Socio-cognitive Functioning. Paper presented at the Annual Meeting of the American Educational Research Association.

Bandura, A. (Ed.) (1995) *Self-efficacy in Changing Societies*. New York: Cambridge University Press.

Bandura, A. (1997) *Self-efficacy: The Exercise of Control*. New York: W. H. Freeman and Company.

Berry, J. & West, R. (1993) Cognitive self-efficacy in relation to personal mastery and goal setting across the life span. *International Journal of Behavioural Development*, Vol. 16, No. 2, pp. 351-379.

Bouffard-Bouchard, T. (1990) Influence of self-efficacy on performance in a cognitive task. *The Journal of Social Psychology*, Vol. 130, No. 3, pp. 353-363.

Brophy, J. (1998) *Motivating Students to Learn*. Boston: McGraw Hill.

Feldhusen, J. & Treffinger, D. (1985) *Creativity and Thinking in Problem Solving for Gifted Education*. Dubuque, IA: Kendall-Hunt.

Locke, E. & Latham, G. (1990) *A Theory of Goal Setting and Task Performance.* Englewood Cliffs, New Jersey: Prentice-Hall.

Ministry of Education. (1997) *Social Studies in the New Zealand Curriculum.* Wellington: Learning Media.

Osborn, A. (1963) *Applied Imagination*. New York: Scribner.

Pajares, F. (1996) Self-efficacy beliefs in academic settings. *Review of Educational Research*, Vol. 66, No. 4, pp. 543-578.

Parnes, S. (1981) *The Magic of the Mind*. Buffalo, New York: Creative Education Foundation.

Pereira-Laird, J. & Deane, F. (1995) Validation of a Reading Self-efficacy Scale for Adolescents. Unpublished manuscript. Department of Psychology, Massey University, New Zealand.

Pintrich, P. & De Groot, E. (1990) Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, Vol. 82, No. 1, pp. 33-40.

Pintrich, P. & Schunk, D. (1996) *Motivation in Education: Theory, Research, and Applications*. Englewood Cliffs, New Jersey: Prentice-Hall.

Pressley, M. et al. (1990) *Cognitive Strategy Instruction That Really Improves Children's Academic Performance.* Cambridge, Massachusetts: Brookline Books.

Schunk, D. (1987) Peer models and children's behavioural change. *Review of Educational Research*, Vol. 57, pp. 149-174.

Schunk, D. (1989) Self-efficacy and cognitive skill learning. In C. Ames & R. Ames (Eds.) *Research on Motivation in Education, Volume 3: Goals and Cognitions.* San Diego: Academic Press Incorporated.

Schunk, D. (1991) Self-efficacy and academic motivation. *Educational Psychologist*, Vol. 26, No. 3-4, pp. 207-231.

Schunk, D., Hanson, A. & Cox, P. (1987) Peer model attributes and children's achievement behaviors. *Journal of Educational Psychology*, Vol. 79, pp. 54-61.

Wolters, C. & Pintrich, P. (1998) Contextual differences in student motivation and self-regulated learning in mathematics, english, and social studies classrooms. *Instructional Science*, Vol. 26, No. 1-2, pp. 27-47.

Zimmerman, B. & Martinez-Pons, M. (1990) Student differences in self-regulated learning: Relating grade, sex and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology*, Vol. 82, No. 1, pp. 51-59.

Zimmerman, B. & Martinez-Pons, M. (1992) Perceptions of efficacy and strategy use in the self-regulation of learning. In D. Schunk & J. Meece (Eds.) *Student Perceptions in the Classroom*. Hillsdale, New Jersey: Erlbaum.