"I'll have a go at that!"
Developing efficacy beliefs in the classroom.

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Abstract. A major goal of education is to equip children with the knowledge, skills and self-beliefs to be confident and informed citizens - citizens who continue to see themselves as learners beyond 'graduation'. This presentation will look at the key role of nurturing efficacy beliefs 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 will be shown that the use of CPS can have positive effects on self-efficacy for learning, and that it can be a valuable framework to involve children in social decision making leading to social action. Implications for enhancing self-efficacy and motivation to learn in the classroom are discussed.
Introduction

The societies we grew up in have undergone extraordinarily rapid change. Today we experience very different social patterns; we have vastly developed technological gadgetry; our economic systems are more complex and intertwined than ever before, and our 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 their 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 provided opportunities for students to feel that their efforts made a difference; that they could be part of a process to make positive change that affected 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 grew 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). Self-efficacy theory also distinguishes between these efficacy judgments and outcome expectations. An outcome expectancy is a judgment of likely consequences such performances will produce. These outcomes can take three major forms: physical, social, and self-evaluative. A winning performance, therefore, may bring about pleasant sensory experiences, it may also bring social recognition, conferral of status and power, and self-satisfaction.

The relationship between efficacy judgments and outcomes expectations is causal. The outcomes that people anticipate (outcome expectations) depend largely on their judgments of how they will perform in given situations (efficacy judgements). For instance, students who judge themselves to be poor spellers will expect to perform poorly and feel negative physical, social and self-evaluative outcomes. These students who perform unsuccessfully may do so, however, not because they lack the skills and knowledge, but because they lack the efficacy beliefs to use them well (Bandura, 1997). Personal beliefs about capabilities are a vital and yet too often ignored part of our 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", celebrate and affirm it, 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 students may feel efficacious about performing a dance, yet lack the efficacy for solving mathematical 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 & Pintrich (1998) also found that efficacious students reported 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 (Pintrich & De Groot, 1990; Bouffard-Bouchard, 1990; Locke & Latham, 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 tends to be less strategic and more teacher dependent (Pressley & Associates, 1990). These results combine to suggest that high self-efficacy is related to deeper and more strategic processing of information during learning. Table 1 summarises the cognitive, metacognitive and motivational processes seen in highly efficacious students.

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. Seeing similar others, or those held in high regard succeed by persevering, raises one's own beliefs of capability to master similar tasks (Bandura, 1986; Schunk, 1987). Conversely, by observing others fail despite persistent effort, lowers one's judgments of efficacy.

The third source for enhancing self-efficacy is social or self-persuasion of one's 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 'butterflies'. It is the interpretation of these body signals that 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.

Self-efficacy in social studies

Clearly, perceptions of self-efficacy have a commanding role to play in our 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 our 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.

As from 2000 citizenship education will comprise a key part of social studies in New Zealand (Barr, 1996). Teachers will be responsible for developing in their students the knowledge, understandings, skills, values and civic efficacy required if New Zealand is 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, critically analyse data, as well as participate in creative problem-solving, rational decision-making and values exploration. Students need to experience success in such citizenship education by developing a strategic approach.
Creative Problem Solving

The question we now ask is **how** might we develop robust efficacy beliefs 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 was developed by Osborn (1963) and refined by Parnes (1981) and Feldhusen & 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 and supports a fact-finding process to arrive at a problem statement. Creative ideas are brainstormed and judged with best solutions 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* as both emphasise the social construction of knowledge, creativity, inquiry, values-exploration and social decision making.

A study of self-efficacy in the classroom

It is 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*: Participants for the intervention were 30 Year three and four students in one class from a Year one to six primary school in a provincial New Zealand city. There were 16 females and 14 males. Ages ranged from 6.11 years to 8.8 years (M = 7.88 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 *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. These 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 they 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 the summary of the children's problem solving efforts at each step of CPS. Students have asked questions, found answers, thought creatively, shared ideas, voted, and solved problems together as a community of learners. But, in addition to this, they 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 the Board of Trustees which led to inclusion on a sub-committee to design a new adventure playground.
Creative Problem Solving 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. Overall, the increase in pre to post-test scores signalled a statistically significant improvement in efficacy beliefs for inquiry in social studies across the whole class using Wilcoxon's signed rank test (p<0.01).

Figure 5 compares the changes made by the four low and four high self-efficacy students before and after CPS instruction. 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 their “pretty good feeling” at working through a problem and making decisions and acting on them. However, it was only the high self-efficacy students who 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 were highly motivated during the instructional phase, willing to work alongside a similar peer, persisting in the face of difficulty, and asking 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 considerable progress had been made with CPS, progress they attributed 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 inadequacy with CPS. They either "didn't like it" or they "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 suggest that 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 were practising the skills of citizenship and were learning, 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 change agents. These self beliefs are vital for the citizens of tomorrow if they are to live their lives fully as individuals and group members, locally, nationally and globally.

There are, however, certain design features of this study which mean the results need to 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 of students with high and low self-efficacy which are consistent with the literature (Schunk, 1989; Bandura, 1992). 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 some of the salient features of this intervention are teased out and examined 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, as well as more generally promoting the efficacy of all students.

The use of CPS is but 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. Coaching, modelling and scaffolding are all provided, along with opportunities 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 was also utilised within the framework of CPS. Teacher modelling of strategies was employed as steps of the CPS process were being learnt and, 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 they experienced in doing the task and the strategies they used to overcome them.

Verbal persuasion was also used. 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). In this study general encouragement was supported by giving specific, differentiated feedback. Clear feedback about specific skill development, especially when combined with specific, proximal goals (provided here by 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 for 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 was emphasised to students, as well as their developing skills. Alderman (1990) has argued that teachers should encourage students to attribute their own successful performance to their ability (operationalised as knowledge and skills) as well as personal effort (operationalised as practice and strategy use) if self-efficacy is to be increased. Promoting the idea of ability as incremental and domain specific is fundamental in this endeavour.

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 thence performance. While no specific attention was given to physical symptoms, an attempt was made to provide a supportive learning environment which emphasised task involvement rather than performance evaluation, in an effort to reduce anxiety in less confident learners. Allowing students to choose a real and personally relevant problem to investigate and solve highlighted an authentic task in this study. In addition, interpersonal comparison was reduced as students worked collaboratively, thereby maintaining a collective focus. Brophy (1998) highlights the paradox that "self-efficacy perceptions are optimized 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" (p.60).

Social studies provides extensive opportunities to incorporate the kinds of experiences and sources of information that support and enhance self-efficacy. The study reported here is just a start. It could be extended over time and across curriculum areas. What is important, however, is that even within this short-term intervention the CPS strategies could be taught in a way that provided supportive and empowering learning experiences, which lead to students developing a heightened sense of self-efficacy. The strategies of Creative Problem Solving were taught within a curriculum that emphasised gradual mastery of challenging but achievable objectives. This took place in the context of a collaborative community of learners, all working on a relevant authentic problem, with guidance and feedback to support their learning and problem solving. Instructional and motivational strategies need to be integrated within the overall curriculum design in order to support and enhance the development of students who not only have skills and knowledge, but also the efficacy beliefs to use them well. We need students and citizens who will say "I'll have a go at that!" in our local and global communities of change.
References


