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THE EFFECTS OF AN ADVENTURE EDUCATION PROBLEM-BASED APPROACH PROGRAM ON STUDENTS' SELF-ESTEEM AND PERCEIVED PROBLEM SOLVING ABILITY

By

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ABSTRACT

This study investigated changes in self-esteem and perceived problem solving ability of academically at-risk students participating in a program called Science of Survival. The program combined adventure education and problem based learning approaches. One hundred and fifty-five male and female students, between the ages of 16 and 24 years completed the Self-Esteem Inventory and the Problem Solving Inventory at the beginning of the semester, after an adventure experience weekend, and at the end of the semester. A group of seventy-seven first year social science students, serving as a control group, also completed the inventories on the same time schedule. Self-esteem and perceived problem solving ability scores were analyzed by two one-way (treatment versus control) repeated measures (three assessments times) ANOVAs. Correlations between the two measures were also computed. Results indicated significant ($p<.05$) interactions of group by time for both self-esteem and perceived problem solving ability and significant correlations. Further analysis showed the Explorations II program was effective at increasing self-esteem and perceived problem solving ability and that these two constructs are related. The control group did not change in self-esteem over the period, but showed a deterioration in perceived problem solving ability.

RÉSUMÉ

Le but de cette étude était d'examiner les changements d'estime de soi et de capacité perçue de résolution de problèmes d'étudiants en échec scolaire potentiels suivant un programme appelé Science de Survie. Ce programme combinait des activités de plein air et une approche d'apprentissage basée sur la résolution de problèmes. Cent cinquante-cinq étudiants et étudiantes, âgés de 16 à 24 ans, ont complété des mesures d'estime de soi et de résolution de problèmes au début de l'année scolaire, après un week-end de plein air et à la fin du premier semestre. Un groupe de soixante et dix-sept étudiants de première année en sciences sociales ont complété les mêmes mesures dans le même laps de temps. Les scores d'estime de soi et de la capacité perçue de résolution de problèmes ont été analysés suivant une analyse de variance (groupe traitement par rapport au groupe contrôle) avec mesures répétées (3 mesures effectuées). Des corrélations entre ces deux variables ont été aussi calculées. Les résultats ont montré des interactions significatives (groupe par rapport au temps, $p<.05$), ainsi que des corrélations significatives pour l'estime de soi et la capacité perçue de résolution de problèmes. Des analyses complémentaires ont démontré que le programme Explorations II a été efficace dans l'augmentation respective de l'estime de soi et de la capacité perçue de résolution de problèmes et que ces deux variables étaient reliées. L'estime de soi du groupe contrôle n'a pas varié durant cette période, mais une baisse de la capacité perçue de résolution de problèmes a été remarquée chez les sujets de ce même groupe.

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CHAPTER I

INTRODUCTION

In the past two decades, colleges and universities have attempted to make higher education more accessible to diverse groups, even as the pool of traditionally academically prepared freshman has decreased. Because of these social pressures, increasing needs for generating revenue, and other factors, many institutions are admitting students who are below the normal admission standards (Thombs, 1995).

Vanier College in Montreal, Quebec developed a program for students that would not normally be accepted into the college system. The students admitted have an academic average below 65% leaving high school. The program is called Explorations II. It consists of three mandatory courses: 1. Science of Survival – to bring students to a college level of proficiency in the area of problem solving. 2. Skills for the 21st Century – to help students develop study skills in the context of another course. 3. Work, Future, and Yourself – to help students choose their academic and career directions. In addition to these courses, all students are expected to take two to four other academic courses in their first semester. The primary objective of the program is to keep these students in school and to integrate them into a regular academic program in their second semester.

Students are enrolled in the program as a whole, but the part of particular interest was the Science of Survival course. This was for two reasons. The first was its use of adventure education as part of its learning environment and second was its emphasis on problem solving skills.

The benefits of adventure education have long been recognized. This not only includes the physical and cognitive, but also affective aspects. There is no clear beginning to adventure education, but one of the most influential sources of its development has been Outward Bound. The concept of Outward Bound was of an intense experience surmounting challenges in a natural setting, through which the individual builds his/her sense of self worth, the group comes to heightened awareness of human interdependence, and all grow in concern for those in danger and in need (Miner, 1990).

Much of the evaluative research of adventure education has examined positive changes in the individual's perception of himself or herself. Studies that have looked at changes in self-esteem before and after participation in various adventure education experiences have reported positive increases in self-concept (Clifford and Clifford, 1967; Fersch and Smith, 1972; Hazelworth and Wilson, 1990; Lambert, Segger, Staley, Spencer, and Nelson, 1978). Depending upon the experience, either a general self-concept or sub-dimension of self-esteem was affected.

Research into the theory of self-esteem has used many terms (self-esteem, self-image, self-concept, etc.) to mean the same or similar things. There are no agreed upon definitions and there is a great deal of overlap among them. In an attempt to distinguish among these terms, Eysenck (1996) provides some clarification. Self-concept is the combination of self-esteem and self-image. Self-esteem is the evaluative aspect of self-concept and self-image is the descriptive aspect of the self-concept. Coopersmith (1967/1981) expanded upon the evaluative aspect and defined self-esteem as a personal judgement of worthiness in the attitudes the individual expresses toward himself or herself.

Adventure education has been incorporated in academic programs to enhance self-esteem. It has also been used to enhance curricula in higher education by integrating the learning from the adventure experiences into the particular academic needs of the college coursework. These activities place the students in novel situations where direct experience, personal and group interaction, individualized learning, and the benefits of problem solving work to empower the learning processes (Gass, 1990).

Problem solving skills have not only been identified as a benefit of adventure education, but are also the foundation of an innovated teaching technique - problem based learning (PBL). PBL was first introduced into medical schools and since has been incorporated into other educational fields. Research that has examined the overall effects of this learning approach in medical schools has been positive. There was an indication that students from a PBL method were not performing as well as students from a traditional method on the National Board of Medical Examiners part 1 examination (Albanese and Mitchell, 1993). However, findings from further statistical analysis cast doubt on the finding. Results that support this approach are performance on clinical examinations that are as good and sometimes better than that of traditional students, significantly higher scores on student program evaluations, and reports from students and faculty that this method is more nurturing and enjoyable (Vernon and Blake, 1993).

Research that has examined the incorporation of PBL into elementary and secondary schools has also been positive (Gallagher, Stepien, and Rosenthal, 1992; Slavin, Madden, Dolan, and Wasik, 1994). Participating students have received improved scores on

statewide performance-based tests and students have been very enthusiastic toward the programs.

Not only has the research been concerned with the performance outcome of PBL, but increasing attention has been given to the perception of problem solving ability. Heppner and Petersen (1982) developed the Problem Solving Inventory, which was designed to measure perceived problem solving ability. Nezu (1986) found that as people develop their problem solving skills there is a corresponding increase in appraisal of ability.

Heppner, Reeder, and Larson (1983) found a relationship between perceived problem solving ability and self-esteem, and suggested that programs designed to enhance problem solving skills also need to look at increasing self-esteem. This relationship could be explained in an alternate way. Mruk (1995) suggests that learning problem solving skills helps people reach personal goals and these successes tend to increase self-esteem. A cause and effect relationship has not been determined. It is possible that the relationship is circular, with the first effecting the second, which in turn effects the first.

Science of Survival, one of three courses in the Explorations II program at Vanier College, combines adventure education and problem-based learning. Each component could increase either self-esteem or perceived problem solving ability. However, because of the relationship, the course should have an effect on both combined.

Science of Survival uses survival in an outdoor setting as a vehicle to teach problem solving skills. The objectives of the course are to learn the steps in the problem solving method and to understand the connection between problem solving in outdoor situations and problem solving in the college environment. These steps are: 1. identify problems in

various settings, 2. hypothesize the appropriate solutions for the problems, 3. use the appropriate and available resources in the process, 4. take the required action dictated in the hypothesis, 5. make accurate observations as the results of the actions present themselves, 6. draw conclusions based on the results of the efforts in the search for solutions to the problems. The skills taught are not only necessary for this course, but are also used in both school and in living in general.

In addition to problem solving skills, Science of Survival provides the students with a unique experience that will help them adjust to their new college environment. In the outdoors a great deal of interdependence among students and between students and staff is necessary for survival. The relationships developed in the wilderness are brought back to the college to provide the students with a strong support system. They feel they can approach staff and depend on other students when they encounter difficulties. Gass (1990) proposed that attachment to peers and faculty-student interaction are important to the positive integration of students into the college environment and that adventure education helps to reach these developmental needs.

The students in the Explorations II program are academically at-risk. It is the goal of this program for these students to be integrated into a main academic program in their second semester. Science of Survival uses adventure education and problem-based learning to improve their problem solving skills both in and outside of the classroom. A review of the literature lends support for the propostition that this program could increase both self-esteem and perceived problem solving ability and that there should be a significant relationship between them.

Significance of the Study

The development of the use of adventure education programs at the college and university levels has usually been through the self-designed efforts of one or two individuals at a particular institution. They are devised to meet the specific needs of the institution. Because of the independent growth of these programs, potential expansion has been limited (Gass, 1990). Explorations II was developed by a team to meet the needs of Vanier College. Evaluations of different programs must be made in order to understand the changes occurring in the participants of these programs. This will help both the development and application of adventure education in higher education.

Explorations II has gone through many changes as it has developed. Its teachers finally felt that the program had reached its potential in achieving its objectives. Students reported positive changes in their self evaluation and this was supported by teachers' comments and observations. There was a minimal dropout rate and program evaluations were positive. The next step in program assessment was to use objective measurements that could evaluate whether or not the goals were being met. There were three courses that made up Explorations II. However, both teachers and students felt that Science of Survival had the biggest impact on the students. There was the need to examine problem solving because that was the emphasis of this course. It was also decided that an objective self-esteem measure was needed to support the comments and observations of positive self change reported in the students.

Statement of the Problem

The purpose of this study was to determine if there were any changes in students' self-esteem and perceived problem solving ability after participation in the Science of Survival and other parts of the Explorations II program.

Hypotheses

The following hypotheses were examined:

1. General self-esteem would be improved through participation in the Science of Survival and the rest of the Explorations II program.
2. Perceived problem solving ability would be improved through participation in Science of Survival and the rest of the Explorations II program.
3. The improvements in self-esteem and perceived problem solving ability observed in those participating in the Science of Survival and the rest of the Explorations II program would not be seen in a sample of other first year Vanier College students in a social science program.
4. There would be a significant relationship between self-esteem and perceived problem solving ability for the Explorations II group and the control group and this relationship would be maintained throughout the semester.

Delimitations

1. The experimental and control groups were pre-existing groups. There was a selection bias in that all subjects in the experimental group had a 59 to 64% academic average coming out of high school and the subjects in the control group had a 65% or above academic average.
2. The subjects were students from Vanier College, Montreal, Quebec, Canada.

Operational Definitions

Explorations II program: a combination of three courses at Vanier College (Science of Survival, Skills for the 21st Century, and Work, Future, and Yourself) for students accepted with low academic averages designed to integrate them into the main college program.

Self-esteem: a personal judgement of worthiness in the attitudes the individual expresses toward himself or herself as measured by the Coopersmith Self-esteem Inventory (Coopersmith, 1967/1981).

Perceived problem solving ability: an individual's perception of their problem-solving behaviours and abilities as measured by the Problem Solving Inventory (Heppner and Petersen, 1982).

CHAPTER II

REVIEW OF LITERATURE

This chapter presents an overview of the literature on self-esteem and problem solving. Self-esteem is discussed in terms of its theoretical background and the research involving self-esteem and adventure education. Problem solving is then examined followed by problem based learning and perceived problem solving ability.

Self-Esteem

William James is often considered to be the founder of American psychology and the originator of modern self-esteem theory. In his work Principles of Psychology, James (1890/1981) defined self-esteem in terms of achievement. He believed that self-esteem could be represented as a fraction of which pretensions are the denominator and success the numerator:

thus, self-esteem = $\frac{\text{Success}}{\text{Pretensions}}$. (p. 296)

Self-esteem can be increased by either decreasing the denominator or by increasing the numerator. Jamed placed a great deal of importance on one's own values in determining self-esteem. When one has experienced little or no success in an area that is of little importance to that individual, self-esteem will be higher than in an individual who has experienced the same lack of success but values that area greatly.

Another source of self-esteem according to James is the social self, which is the recognition he gets from his peers. Sociologist Charles Cooley (1902/1967) expanded

upon James' social self and termed it the "looking glass self". This self-idea has three principle elements: 1. the imagination of our appearance to the other person, 2. the imagination of his judgement of that appearance, and 3. some sort of feeling, such as pride or mortification. Both James and Cooley believed that the outcome of the self evaluation is value based. "We are not interested in the mere mechanical reflection, but instead the imagined effect of this reflection upon another's mind. The values of the other person determine whether we feel pride or shame. We would be embarrassed to be cowardly in the presence of someone who is brave. The reflections of the self are from the judgements of the other mind." (Cooley, 1902/1964, p.184)

G. H. Mead (1934) contributed to the theory of self-esteem by expanding upon the idea of the social self. As an individual becomes a part of a social group, they take on the attitudes and beliefs of their group and express them as their own. This occurs for not only external objects but also one's self. Feelings about one's self are consistent with those in one's social group. According to Mead, it is the expressed views of others that are key in the formation of self-esteem.

Stanley Coopersmith (1967/1981) carried out an intensive study of self-esteem, focusing upon the antecedent conditions that contribute to the development of positive and negative attitudes toward oneself. He defined self-esteem as a personal judgement of worthiness that is expressed in the attitudes the individual holds toward himself. To measure self-esteem from the subject's perspective, a Self-Esteem Inventory was developed. The individual is asked to make self-evaluations from a range of life activities. Items are equally weighted and provide a total self-esteem score.

Recent developments in self-esteem theory emphasize a multidimensional approach. Epstein (1980) divides global self-esteem into four major dimensions: 1. general competence, 2. power, 3. normal self-approval, and 4. love-worthiness. General competence is subdivided into mental and physical abilities. Harter (1988) provides a self-perception profile to assess self-esteem. She has shown that the number of separate domains increases as we mature, with eight separate domains for adolescents compared to eleven in adults.

Assessments that use a multidimensional approach provide more information on specific areas of self-esteem, however they are assessing all individuals on the same structure. It is widely accepted that self-esteem structures are highly individualized. This occurs by giving varying degrees of importance to each domain of self-esteem. Individuals will have high self-esteem if they attach greater importance to domains in which they experience success.

Fox (1988) developed the Physical Self-Perception Profile (PSPP) to identify and measure major elements of the physical domain of self-esteem for a late adolescent/early adult population. To account for the personalized structure of physical self-esteem Fox also developed the Perceived Importance Profile (PIP) to accompany the PSPP. Together, the two instruments measure domains of the physical self-worth construct and the importance that the individual assigns to each domain. This provides greater information on how the domains combine to make up physical self-worth and how this in turn effects global self-esteem.

Self-esteem is an evaluation of oneself. Although different models of self-esteem have been developed, there are some similarities. It is agreed that self-esteem is a multidimensional construct. It is highly individualized, as it is influenced both by personal experiences and the unique importance that is placed on those experiences by the individual.

Self-Esteem and Adventure Education

The idea that more than mere skill development occurs during the adventure education learning process is not a new concept. Kurt Hahn, the founder of Outward Bound and a promoter of adventure education had a phrase for the phenomenon - when a young person "defeats their defeatism" to meet a challenge, it primes him/her to try for still more difficult achievement (Miner, 1990). Adventure education programs vary greatly in their specific structure, however, the desired outcome is often similar. The outcome that much of the research has focused on is positive changes in the individual's perception of him/herself (Clifford and Clifford, 1967; Fersch and Smith, 1972; Hazelworth and Wilson, 1990; Lambert, Segger, Staley, Spencer, and Nelson, 1978).

An Outward Bound School in the Colorado mountain wilderness was examined by Clifford and Clifford (1967). Adolescent boys aged 16 to 21 years participated in a one month summer training course. The objective was to build physical stamina and to push each individual to his physical limits. The emphasis was upon physical conditioning and the acquisition of a new set of skills. It was thought that feelings about competence should be affected. The researchers hypothesized that the experience of being challenged

to the limit of one's capacities would result in increased feelings of self-worth and competence. The boys were asked to complete three different assessments at the beginning and at the end of their training. Counsellors also completed a rating scale on each boy. The results showed that self-concept improved and that the discrepancies between the self and the ideal-self were reduced. The changes were related to the initial level of self-esteem and were general rather than specific.

Project Adventure was based on the concepts and principles of Outward Bound. The participants were tenth grade physical education students from a suburban Boston high school. The project included a variety of activities including a rigorous camping experience. Despite the physical and outdoor orientation of the program, the objectives were to develop self-confidence, improve self-concepts, as well as to improve physical functioning. Fersch and Smith (1972) evaluated the program with a number of measures. They examined changes in self-concept and other variables specific to the study. The Tennessee Self-concept Scale reported positive changes in general self-concept. Changes for physical self-concept were not significant. The Rotter Scale of Internal vs. External Control of Reinforcement demonstrated that there was also a change to a perception of less external control. Increases in self confidence were also reported.

Lambert et al. (1978) examined two college courses that incorporated a wilderness experience. The first course emphasized intense, sustained, physical and mental challenges, while the second emphasized traditional laboratory group activities in a wilderness retreat. Students in these courses were compared to students in a lecture type course. There were significant increases in total positive self-concept for both courses

with the wilderness experience. The course emphasizing the traditional laboratory group activities also showed significant increases on the self-satisfaction subscale. The course emphasizing the intense challenges not only showed increases in self-satisfaction but also on the self-criticism, identity, physical self, and moral ethical subscales. Although different from one another, both courses had an overall positive impact on the students involved.

A summer camp, the objective of which was to instill in the campers a sense of accomplishment and cooperation, was evaluated by Hazelworth and Wilson (1990) using the Tennessee Self-concept Scale. The hypothesis of the study was that there would be positive changes in self-concept as a result the outdoor adventure experience. The assessment was done with four different camp sessions. The results were inconsistent across the four sessions. Increases in some of the self-concept subscales were seen, but not for all sessions. These differences could be explained by the variation in organization of the camp among sessions. This suggests that the details of the adventure experience are important in achieving positive changes.

Adventure education has been adapted for specific needs in higher education. More and more colleges are using adventure education to help incoming students adjust to the new demands of college life. In Adventure Programs in Higher Education, Gass (1990) proposed several factors that contribute to the success of such programs. Two of them were: 1. attachment to/isolation from peers, and 2. faculty student interaction. Gass believes that adventure activities are well-suited to nurture the formation of positive peer group development. The bonds and interdependence developed to overcome the difficulties of the wilderness are used to overcome similar difficulties experienced by

students in their first year of school. Interaction with group members in adventure experiences requires support and reciprocity. Gass feels that being placed in these types of situations with faculty members provides incoming students with a sense of personal validity and a feeling that the college is concerned about the student as an individual. Students also develop a more comfortable feeling about approaching faculty.

It has been demonstrated that adventure education can positively effect self perceptions of the participants. This occurred in summer camp settings as well as when the experience was a part of an academic program. The benefits of adventure education in higher education may also include helping students make a successful transition into college life.

Problem Solving

Reading, writing, and arithmetic are the skills that have traditionally been the focus of education. Without explicit instruction, these skills would not be learned. Problem solving is not one of these skills. Everyone engages in problem solving with or without the benefit of formal education. However, a great deal can be learned to improve problem solving skills.

It can be argued that effective problem solvers are better equipped to manage their lives than ineffective problem solvers. Many of the problems with which people are confronted in daily life are personal in nature, and how effectively they can deal with them should be a major determinant of the level of happiness they achieve (Nickerson, 1994).

Problem solving methods fall into two categories - algorithmic or heuristic. An algorithm is a step by step procedure that if followed will always produce the intended

result. A heuristic approach is also a procedure for accomplishing a goal. However, it does not guarantee the intended result (Nickerson, 1994).

Because there is no one universally accepted theory of human problem solving, there are a wide range of opinions on how to teach this skill. One of the first documented problem solving methods taught was a step-wise process introduced by Polya (1945/1957). He distinguished four steps necessary to solve a problem. These steps were: 1. understanding the problem, 2. devising a plan, 3. carrying out the plan, and 4. looking back. Bransford and Stein (1984) used an easily remembered acronym to remember problem solving steps. IDEAL. I = Identify the problem, D = Define and represent the problem, E = Explore possible strategies, A = Act on the strategies, and L = Look back and evaluate the effects of your activities.

Research examining the effectiveness of problem solving methods has looked at the acquisition of domain specific knowledge and the development of general problem solving strategies that can be transferred to other disciplines. The importance of one is often given greater weight over the other, but it is clear that the two must work together in effective problem solving (Bransford, Sherwood, Vye, and Rieser, 1986). Problem solving methods that develop both specific knowledge and general strategies seem to work best.

The task of acquiring new information can be viewed as an instance of problem solving. Students who learn in ways that ensure an understanding of the significance or functions of information should be most likely to develop organizations of knowledge that facilitate access when relevant problems arise (Bransford et al., 1986).

Problem solving is a skill that everyone uses in day to day life. Various strategies have been developed to improve problem solving. Many identify a series of steps that should be followed. An effective strategy should ameliorate both specific knowledge and the development of general problem solving skills.

Problem Based Learning

Research into the nature of complex problem solving in graduate school students has suggested that providing students with training in answering well-structured problems in school does not adequately prepare them for the ill-structured problems which they will encounter outside of school and in their professional careers (Spiro, Coulson, Feltovich, and Anderson, 1988, as cited in Gallagher, Stepien, and Rosenthal, 1992). Problem Based Learning (PBL) addresses the problem of the differences between academic and real life problems. This teaching technique guides students through the process of solving ill-structured problems (Gallagher, Stepien, and Rosenthal, 1992).

PBL received its start in the mid-1960's at McMaster University medical school. Since then many medical schools, world-wide, have adopted the method in whole or in part (Norman and Schmidt, 1992). Because it has been used extensively in the field of medicine, much of the research on this teaching method has been focused within this field.

Norman and Schmidt (1992) reviewed the evidence concerning the psychological basis of problem-based learning. They came up with five main conclusions. 1. There is no evidence that the curricula result in any improvement in general, content-free problem-solving skills. 2. Learning in this format may initially reduce levels of learning but may

foster, over periods up to several years, increased retention of knowledge. 3. Some preliminary evidence suggests that the curricula may enhance both transfer of concepts to new problems and integration of basic science concepts into clinical problems. 4. This approach enhances intrinsic interest in the subject matter. 5. PBL appears to enhance self-directed learning skills, and this enhancement may be maintained.

In a meta-analysis of evaluative research on PBL, Albanese and Mitchell (1993) found both strengths and weaknesses with this teaching method. On basic science examinations, students received lower scores in some cases, as well as perceiving themselves as less well prepared than students in a traditional learning approach. Experts in the field use forward reasoning, whereas PBL graduates tend to use backward reasoning. Also, there appeared to be gaps in their cognitive knowledge base that could affect practice outcomes. On the positive side, it was found that graduates performed as well, and sometimes better on clinical and faculty examinations. Both students and faculty found this alternative method more nurturing and enjoyable. Overall, Albanese and Mitchell were cautious in recommending PBL over traditional teaching methods.

The study by Albanese and Mitchell (1993) used research from 1972 to 1992, comparing PBL to conventional learning. In another meta-analysis comparing the two methods of medical education, Vernon and Blake (1993) used research from 1970 to 1992. Much of the same research was used in both meta-analyses. Vernon and Blake however, concluded that the results generally support the superiority of PBL over traditional methods. In agreement with Albanese and Mitchell, Vernon and Blake found that students scored lower on the National Board of Medical Examiners Part I

examination (NBME I). However, there is doubt on the generality of this finding because the NBME I data displayed significant overall heterogeneity and significant differences among programs. There was no difference between the two methods on tests of factual and clinical knowledge. Clinical performance was significantly better in PBL students. Other factors that support this method that are less frequently measured are faculty attitudes, student mood, class attendance, academic process variables, and measures of humanism.

PBL is an established part of many medical schools but not until recently has it been used in other educational fields. Because of this, the research on this method of teaching outside the medical field is limited. The initial research has been positive and supports its use in other educational fields.

The Centre for Problem-Based Learning at the Illinois Mathematics and Science Academy (IMSA) has developed programs that can be incorporated into a variety of kindergarten to grade 12 settings. The students assume the roles of scientists, historians, doctors, or others who have a real stake in the proposed problems. By personalizing the problems, motivation increases and students come to realize that the point of view from which the data is interpreted is biased (Stepien and Gallagher, 1993). Teachers also take on new roles. At the beginning of the program they act as models, asking questions and practicing behaviour they want their students to use. As time passes, the teachers fade into the background assuming the role of a colleague instead of a leader. The students' learning becomes self-directed (Stepien and Gallagher).

One of the programs at IMSA that has received formal evaluation is Science, Society, and the Future (SSF). The problem-based course for gifted high school seniors was designed with three process-oriented goals: 1. to lead students to discover the interdisciplinary character of most real world problems, 2. to require students to engage in the process of solving ill-structure problems, and 3. to improve students problem solving skills (Gallagher et al., 1992). Students had to identify the difference between facts and inferences, establish a problem statement and evaluate the possible solutions for their positive and negative effects. However, no direct instruction in problem solving techniques was provided. SSF students and a group of comparison students were tested to determine changes in their spontaneous use of problem solving steps as they considered an ill-structured problem. Results showed some significant changes for the SSF group not observed in the comparison group (Gallagher et al.).

Another school program that incorporated problem based learning is Roots and Wings. There were two main objectives of the program: 1. for students to achieve high standards in the basic skills of reading, writing, mathematics, science, history, and geography (the roots), and 2. to engage students in activities that enable them to apply everything they learn so they can see the interconnectedness of knowledge (the wings) (Slavin, Madden, Dolan, and Wasik,1994). When students need information or skills to solve problems that have meaning to them, their motivation is greater. The program outcomes have been very positive. Overall reading performance of participating students improved and learning disabilities requiring special education were reduced. Also students received improved

scores in social studies, science, math, writing, and reading on statewide performance-based tests (Slavin et al.).

PBL teaches students how to solve ill-structured problems, typical of what they will encounter in the real world. This teaching method has been demonstrated to be effective in medical school and high school through tests of knowledge. However, what may be more important, is that students report increased motivation to learn and the experience is more enjoyable for both students and teachers.

Perceived Problem Solving Ability

The research that has been referred to so far has been concerned with the performance outcomes of PBL. Another focus of problem solving has been perceived problem solving ability. Most problem solving training programs focus on step-wise stages as previously mentioned. Heppner and Petersen (1982) examined the existence of underlying dimensions across the stages with people's perceptions of their real-life problem solving. Rotter (1978) postulated that the most important problem-solving attitude was the expectancy that one can effect, in part, what happens to oneself. This is what Rotter referred to as an internal locus of control. This seems to relate to confidence in one's problem solving ability (Heppner and Petersen, 1982). In a study examining the psychological differences between effective and ineffective problem solvers, Nezu (1985) found self-appraised effective problem solvers reported a more internal control orientation that self-appraised ineffective problem solvers.

Perceived problem solving ability is related to other psychological constructs and behaviours. Heppner, Reeder, and Larson (1983) examined the cognitive correlates of different self-appraised problem-solving effectiveness. They found that subjects that perceived themselves as effective problem solvers had higher self-concepts. The study did not find a cause and effect relationship however. It was suggested that an overall low self-concept would logically seem to inhibit one's problem solving performance (Heppner et al.). The implications on problem solving training programs were also discussed. Training programs need to look at both the specific skills as well as cognitive variables that mediate problem solving behaviour. It was suggested that until a person has a positive self-concept, specific skills training will not significantly effect their problem solving behaviour (Heppner et al.).

While there is research showing the relationship between problem solving and self-esteem, the causal relationship may work in the opposite direction. Mruk (1995) believes that problem solving can be used to enhance self-esteem. He feels that by acquiring problem solving skills, self-esteem can be positively effected. Knowing how to solve problems better increases the chances of being successful in any given understanding, and increasing successes helps self-esteem because they are reflections of competence. Although the cause and effect relationship has not been determined, it is agreed that self-esteem and problem solving work hand in hand.

Elliott, Godshall, Shrout, and Witty (1990) examined the relationship among problem-solving appraisal, self-reported study habits, and academic performance of academically at-risk college students. Among academically unprepared students, problem solving

appraisal was significantly predictive of study habits. Effective problem solvers recognize habits and attitudes that can potentially enhance adaptation in a particular environment. The effective problem solvers endorsed behaviours important to functioning successfully in an academic environment.

The perception of one's ability to solve problems has been identified as an important aspect of problem solving training. It is related to other psychological constructs such as locus of control and self-esteem. The relationship between self-esteem and perceived problem solving ability is reciprocal, each positively influencing the other. Perceived problem solving ability is also associated with study habits (Elliott et al., 1990). Effective problem-solving implies an ability to plan, organize, and recognize appropriate habits, attitudes, and behaviours crucial to adaptive problem-solving action (Heppner et al., 1983).

Assessment Instruments

Any research of self-esteem and perceived problem solving ability must involve some sort of assessment. There are various ways to measure these constructs (i.e. observation, case study, interview), but the one most common method is to have participants complete surveys or inventories. There is only one inventory that has been developed to measure perceived problem solving ability. This is the Problem Solving Inventory (PSI), developed by Heppner and Petersen (1982). The PSI has demonstrated good validity and reliability (Heppner and Petersen) and has been used in a body of independent research.

On the other hand, numerous surveys have been developed to measure self-esteem. Two frequently cited tests are the Piers-Harris Self-Concept Scale (Piers and Harris, 1969) and the Tennessee Self-Concept Scale (Fitts, 1988). Both have been useful in research and clinical settings, but are measures of self-concept instead of self-esteem, so they are measuring a slightly different construct.

Two instruments that look at self-esteem specifically are the Coopersmith's Self-Esteem Inventory (SEI) (Coopersmith, 1981) and the Multidimensional Self-Esteem Inventory (MSEI) (O'Brien and Epstein, 1983). The SEI is a 25 item questionnaire and produces a single score to reflect self-esteem. It is based on Coopersmith's model and research on self-esteem. Supporting its credibility, is its use in other independent research. The MSEI contains 116 questions and provides scores on 11 different scales. The inventory was developed from Epstein's (1980) multidimensional approach to self-esteem and is supported by research with both clinical and normal populations. One disadvantage is that its administration is time consuming and its interpretation is complicated.

Recent instruments have been developed by Harter (1988) and Fox (1988). They are referred to as self-perception profiles. Harter assesses several domains within global self-perception, whereas Fox measures specifically physical self-perception and the sub-domains within it.

So far only one instrument has been developed to measure perceived problem solving ability. Research investigating this construct would use the PSI. There are a number of instruments used to measure self-esteem and related constructs. The nature of the research and the desired information would determine which instrument is most suitable.

Summary

Self-esteem can be defined as an evaluation of worthiness an individual expresses toward himself or herself. It is a multidimensional construct and is personalized based upon the importance the individual assigns to each domain. Adventure education has been shown to be effective in creating positive changes in self-esteem.

PBL is gaining acceptance as an innovative teaching method in a variety of educational settings. PBL students perform as well and sometimes better on knowledge based tests than students in a traditional learning environment. In addition students report greater motivation to learn and both students and teachers find PBL more enjoyable.

Research concerning enhancing problem solving skills has also examined the associated elevations in the perception of this ability. Perceived problem solving ability is related to other psychological constructs and behaviours. Heppner et al. (1983) found a relationship between self-esteem and perceived problem solving ability that is supported both by research and theory. However, it is not clear whether a gain in self-esteem causes the increase in perceived problem solving ability or vice versa. Greater self-esteem can increase perceived problem solving ability which in turn increases self-esteem. Each seems to positively influence the other and they work together in a spiral effect. A program designed to enhance either self-esteem or problem solving ability would seem to benefit by an attempt to enhance both together.

CHAPTER III

METHODOLOGY

The purpose of this study was to determine if there were any changes in students' self-esteem and perceived problem solving abilities after participating in the Vanier College Science of Survival and other parts of the Explorations II program.

Having identified the problem it remained to determine the methods and procedures to resolve it. Here is outlined the sample of subjects studied, the instruments used, and the procedures followed in that quest. Essentially students in the established Explorations II program were assessed before, after an outdoor outing, and at the end of the semester on self-esteem and perceived problem solving ability and they were compared to a sample of somewhat similar students assessed on the same time schedule.

Participants

The experimental group consisted of all students registered in the Vanier College Science of Survival and Explorations II, 1996, fall program. The number of students registered in the program was 231, in eight separate sections of the course. All students in this group had a 59 to 64% academic average coming out of high school. Complete information was obtained for only 155 of these students. If students missed one of the assessments or if an inventory was not complete, they were not included in the final analysis. As all students with 59 to 64% averages were in the Science of Survival and Explorations II program, so that the control subjects had to be drawn from elsewhere. The control group consisted of volunteers from four social science classes. These students had

a high school average above 65%. Only first year students registered in a social science program were eligible for the control group. From the four classes, 91 students were eligible to participate as control group students and complete data was collected from 77. Both groups were comprised of approximately equal numbers of males and females. The age range of participants was 16 to 24 years with a mean age of 18 years.

Instrumentation

A review of literature revealed the types of evaluations that had been done in related settings and the instruments most appropriate for measuring the anticipated changes. After examining the advantages and disadvantages of potential measurements, it was decided to use the Coopersmith Self-Esteem Inventory (SEI) and the Problem Solving Inventory (PSI). It was felt that these would best measure the extent to which the program was achieving its objectives.

Coopersmith Self-Esteem Inventory

Self-esteem is a complex, multidimensional concept that is formed through numerous, individualized experiences. Rather than examine the concept in its entirety, this study focused on one dimension – global self-esteem. Interest was in seeing if participants experienced an overall increase in positive evaluation toward themselves.

For this study a global self-esteem measurement was needed that could be easily administered in a group setting. An inventory that did not require a long time to complete was also desired because this was one of two inventories that had to be completed three times during the semester. The Coopersmith Self-Esteem Inventory (SEI) met these

criteria. In addition, this instrument has been used in a large body of independent research which supports its credibility and allows for comparison to past research. The adult version of the SEI is a 25-item forced choice self-report questionnaire. The subject is presented with straightforward questions and is asked to respond by indicating whether the statement "is like me" or "is unlike me".

The SEI has shown "good" reliability. Reported internal consistency coefficients range from .80 to .86 (Coopersmith, 1981). In a three year longitudinal study examining test-retest consistency, the stability coefficient was $\underline{r} = .64$ (Coopersmith). Construct validity has been demonstrated in the fact that the SEI is consistent with research on self-esteem and there is the presence of content validity in terms of how the questions relate to what we know about self-esteem (Mruk, 1995). For a copy of the SEI see Appendix A.

Problem Solving Inventory

The main objective of Science of Survival is to bring students to a college level of proficiency in the area of problem solving. Measures of problem solving skills were obtained through regular academic testing. However, it was also of interest to know whether the students perceived that their problem solving ability had increased. This would also indicate whether students felt that their improvement in problem solving could be transferred from the class in which it was learned to other situations.

The Problem Solving Inventory (PSI) is a 35-item instrument designed to measure how individuals believe they generally react to personal problems in their daily lives. The term "problems" refers to personal problems such as getting along with friends, feeling

depressed, choosing a career, or deciding whether or not to get divorced. Although the PSI does not measure actual problem solving skills, it does measure the awareness of one's problem solving abilities or style. The total score is viewed as a single general index of problem solving perception (Heppner and Petersen, 1982).

The PSI has excellent internal consistency, with a reported alpha of .90 for the total measure. The test-retest correlation for a two-week period was .83, showing good stability (Heppner and Petersen, 1982). Extensive testing of the PSI reveals good validity in several areas. Concurrent validity was established by significant correlations between the PSI and scores on a self-rating scale of one's problem solving skills. Construct validity has been demonstrated in a number of studies through high positive correlations to related theoretical constructs (Fischer and Corcoran, 1994). For a copy of the PSI see Appendix B.

Procedures

The sample of subjects having been determined and the assessment instruments identified, it remained to determine the procedures to collect and analyze the data. Permission to conduct the study was obtained from the McGill Research Ethics Committee of the Faculty of Education and the Vanier College Research and Development Committee. There were four Science of Survival instructors, each teaching two sections of the course. In addition, there were four social science instructors who were willing to cooperate in collecting control group data for the study. The instructors were briefed as to the purpose and procedures of the study and were given the questionnaires.

On the first day of classes, or as close to that day as possible, the students were introduced to the study. The instructors read aloud the letter of informed consent to the students (Appendix C). It explained the nature and requirements of the study and that participation was strictly voluntary. They were given the informed consent form and the questionnaires. They were requested to sign the form and complete the questionnaires. The informed consent forms and questionnaires were collected when everyone had completed them. If students chose not to participate, they could sit quietly and do other work.

Each group was thus approached for self evaluation three times. At each evaluation period the Self-Esteem Inventory was given first and the Problem Solving Inventory second. In most cases they were given on two separate days, but in some instances, due to the class schedule, they were given on the same day. The inventories were administered by the course instructors in the classroom of the course. The pre-test was given at the beginning of the school year. The second evaluation was following the Science of Survival outdoor experience. The date of this evaluation depended upon the outing date. There were eight different sections of the Science of Survival course. The earliest outing was at the end of August and the latest was mid-October. The second evaluation for the control group was mid-October, the same time as the last Science of Survival section's post outing assessment. The final evaluation was two weeks before the completion of the first semester. This was at the same time for both the treatment and control groups and was at the end of November.

The treatment that the experimental group received was the Explorations II program. The program consisted of Science of Survival and two other courses. These courses were Skills for the 21st Century, and Work, Future, and Yourself. All three courses ran for the entire fall semester. They began at the end of August and were completed by early December.

Science of Survival is intended to bring students to a college level of proficiency in the area of problem solving. The method of problem solving taught is: Problem identification, Hypothesis, Action, Result, and Conclusion, referred to as the PHARC problem solving method. As a problem or task presents itself in the outdoor setting, the students are encouraged to solve it using the PHARC method. The connection between solving problems in outdoor situations and problem solving in an educational environment is made in the follow-up to the outing through discussions and a research paper comparing and contrasting the two different environments.

Science of Survival is divided into three parts. The first part is three evening lectures of three hours each that provide the students with information that enables them to familiarize themselves with equipment and details relating to the trip: particularly about what is expected of them and the teacher. The time is divided into lectures, demonstrations and discussions. As oral and written communication play an important role in the course, students are expected to take thorough notes in their log books and contribute to the various kinds of discussions and group activities. An example of a group activity, is building a shelter from varied available material. This activity is carried out on either the football field or in a nearby forest before the actual outing. The problem solving

method is introduced in this lesson and used to teach the skill of how to build a shelter. The second part is the adventure experience trip. The trip is two nights and three days in an outdoor setting. The setting can be rock climbing, wilderness camping, or canoe/kayak camping. The group dynamics require students to assist one another by sharing, cooperating, providing leadership and displaying a willingness to fend for themselves and make a contribution to the success of the group. The third part of the course is the follow-up. The follow-up is an hour and a half meeting once a week for the remainder of the semester. It is in this part of the course that the students are taught to transfer the problem solving skills learned in the outdoors to the college environment. Students are asked to research a science topic relevant to their survival experience using the Vanier College Library. They also select an assignment from another course to demonstrate their ability to apply the PHARC method to the satisfactory completion of that assignment. This includes the utilization of information and resources at hand in the same way as was done in the wilderness setting. In this way students demonstrate the ability to identify information and resources that are central to their academic success.

The objective of Skills for the 21st Century is to help students develop study skills in the context of another course. Each section of the course is paired with a social science course so that a group of students are together and have the same teacher for both courses. The study skills taught are applied to the social science course. The skills include time management, note taking, text book use, preparing for and writing exams, techniques for learning and remembering, and cooperative learning.

Work, Future, and Yourself is a course designed to help students choose their academic and career direction; to make them aware that a particular education leads to many careers and that there is no single straight line to a career. It also helps to make students aware of choices to be made, to take responsibility for their actions, and to become aware of their own skills and abilities. The course gives students information on their interests, aptitudes and abilities so that they can analyze their potential. The methodology is interactive and involves role-playing. It is project oriented. Presentations are made to the students in the form of films, readings and writings, and the students are taken to different work environments where they can interview people in occupations of interest to them. In addition to the three courses that make up Explorations II, the students are required to take an English course, a social science course, and up to two other courses for a total of 5 to 7 courses.

Treatment of the Data

The Coopersmith Self-Esteem Inventory and the Problem Solving Inventory were scored to obtain values on self-esteem and perceived problem solving ability at each of the three assessment times. The means and standard error of each group at each assessment time were calculated for both variables. Two, one-way (treatment x control) repeated measures (three assessments) ANOVAs were performed on the data for self-esteem and perceived problem solving ability. The ANOVAs were run using a Multiple General Linear Model instead of a simple factorial model to compensate for the unequal numbers in the treatment and control groups. Independent t-tests were performed to identify

significant differences between groups at each assessment time and paired t-tests were performed to identify within groups differences among the three times as indicated by the ANOVAs. The contrasts were conducted according to the previously developed hypotheses. Correlations were computed between self-esteem and perceived problem solving ability for each group and at each time to determine if there were significant relationships between the two variables.

The SYSTAT software package (SYSTAT Inc., 1990-1991) was used on a Macintosh personal computer. The .05 level of significance was used for all statistical analyses in this study.

CHAPTER IV

RESULTS

The primary interest of this study was to examine potential changes in students' self-esteem and perceived problem solving ability after participation in Science of Survival and other parts of the Vanier College Explorations II program in comparison to a control group. It was also of interest to see the relationship, if any, that exists between the two variables. The results are reported first for self-esteem, then for perceived problem solving ability. In each case there is a table that reports the means and standard errors, then a table reporting the results of the repeated measures analysis of variance followed by a brief section identifying significant differences. Finally the results from the correlations between self-esteem and perceived problem solving ability are presented.

Self-Esteem

Means and standard errors of self-esteem for the Explorations II and control group at the three administrations are displayed in Table 1. It would appear that the Explorations II group improved in self-esteem both as an immediate result of the outdoor education experience and the treatment over the remainder of the semester. The control group on the other hand seemed to decrease in average self-esteem over the semester.

Table 1

Self-Esteem Means and Standard Errors for Explorations II and Control Groups at Three Times.

		Time		
		Beginning of Semester	Post Outing	End of Semester
Explorations II	M	68.052	71.019	71.613
n=155	SE	1.598	1.573	1.571
Control	M	65.247	64.000	63.896
n=77	SE	2.267	2.231	2.229

The results from the 2 x 3 ANOVA for self-esteem are presented in Table 2. Between subjects examines for differences between the Explorations II and the control group and within subjects tests for changes within the group over time. The analysis revealed a significant main effect of treatment ($F_{1, 230}$=5.034, p=0.026) indicating that there was a difference between the two groups for self-esteem. There was also a significant interaction of time by treatment ($F_{2, 460}$=6.398, p=0.002). This indicates that the Explorations II and control groups changed in different ways over time.

Table 2

Analysis of Variance of Self-Esteem Over Time for the Explorations II and Control Groups.

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Square	F	p
Between subjects					
Treatment	5276.216	1	5276.216	5.034	0.026
Error	241055.646	230	1048.068		
Within Subjects					
Time	138.701	2	69.351	1.221	0.296
Time by Treatment	726.655	2	363.328	6.398	0.002
Error	26123.138	460	56.789		

T-tests were performed to locate the significant differences indicated by the ANOVA. The paired sample t-tests on self-esteem for the Explorations II group showed that there was a significant change from the beginning of the semester to post outing ($p=0.001$) and from the beginning of the semester to the end of the semester ($p=0.0001$). The difference between post outing and end of semester was not significant ($p=0.415$). This indicates that self-esteem increased as a result of the adventure experience weekend and that the increase was maintained until the end of the semester for the Exploration II students.

The analysis of self-esteem for the control group showed no significant changes among times. This indicates that students in a regular social science program remained at a constant level of self-esteem throughout the semester.

From the independent t-tests for self-esteem examining the difference between Explorations II and the control groups, it is evident that there was not a significant difference at the beginning of the semester ($p=0.325$). However, post outing ($p=0.021$) and at the end of semester ($p=0.010$) the Explorations II students showed significantly greater levels of self-esteem.

Perceived Problem Solving Ability

Means and standard errors of perceived problem solving ability for the Explorations II and control groups at three administration times are displayed in Table 3. There appears to be a slight improvement in perceived problem solving ability from the beginning of the semester to after the outing and again to the end of the semester in the Explorations II group. The control group appears to quite considerably decrease in perceived problem solving ability over the same period. The two groups appear not to differ upon initial assessment.

Table 3

Perceived Problem Solving Ability Means and Standard Errors for Explorations II and Control Groups at Three Times.

		Time		
		Beginning of Semester	Post Outing	End of Semester
Explorations II	M	93.471	91.548	90.432
n=155	SE	1.531	1.539	1.576
Control	M	93.714	94.675	97.506
n=77	SE	2.173	2.183	2.236

Note: The lower the score, the greater the perceived problem solving ability.

The results from the (2 x 3) ANOVA for perceived problem solving ability are presented in Table 4. The main effect of treatment that examined differences of perceived problem solving ability between the Explorations II and the control group was not significant ($F_{1,230}$ =1.867, p=0.173). The main effect of time was also not significant ($F_{1,230}$=0.670, p=0.512). The ANOVA did show a significant interaction of time by treatment ($F_{2,460}$=10.658, p=0.0001). This indicates that the change over time was different for the Explorations II than the control group.

Table 4

Analysis of Variance of Perceived Problem Solving Ability Over Time for the Explorations II and Control Groups.

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Square	F	p
Between subjects					
Treatment	1870.629	1	1870.629	1.867	0.173
Error	230459.852	230	1001.999		
Within subjects					
Time	76.029	2	38.014	0.670	0.512
Time by Treatment	1209.925	2	604.963	10.658	0.0001
Error	26111.037	460	56.763		

In order to interpret the significant interaction indicated by the ANOVA, t-tests were performed. The paired sample t-tests on perceived problem solving ability for the Explorations II group showed that there was a significant change from the beginning of the semester to post outing ($p=0.027$) and from the beginning of the semester to the end of the semester ($p=0.001$). The difference between post outing and end of semester was not significant ($p=0.141$). This indicates that perceived problem solving ability increased after the adventure experience weekend and that the increase was maintained until the end of the semester for the Explorations II students.

The paired sample t-tests on perceived problem solving ability for the control group showed a significant decrease from the beginning of the semester to the end of the semester ($p=0.007$) and from post outing to the end of the semester ($p=0.037$). There was not a significant difference from the beginning of the semester to post outing ($p=0.410$). This points out that the control group students perceived less ability to solve problem after half way through the semester.

From the independent sample t-tests examining differences between the Explorations II and the control group for perceived problem solving ability, it was found that there was not a significant difference at the beginning of the semester ($p=0.929$) nor at post outing ($p=0.266$), however, by the end of the semester there was a significant difference between the two groups ($p=0.019$). The Explorations II group students perceived themselves better able to solve problems at the end of the semester than did the control group.

Self-Esteem and Perceived Problem Solving Ability Relationship

The correlations between self-esteem and perceived problem solving ability for the Explorations II and control groups at three times throughout the semester are shown in Table 5. All correlations are significant although, the relationship between self-esteem and perceived problem solving ability are stronger for the control group than it is for the Explorations II group. Within the Explorations II group the relationship appeared to be strongest at the end of the semester but was still not as strong as the relationship in the control group.

Table 5

Correlations Between Self-Esteem and Perceived Problem Solving Ability for Explorations II and Control Group Students at Three Times of Assessment.

		Time		
		Beginning of Semester	Post Outing	End of Semester
Explorations II	r	-0.268	-0.356	-0.369
n=155	p	0.001	0.0001	0.0001
Control	r	-0.540	-0.553	-0.480
n=77	p	0.0001	0.0001	0.0001

Summary

The statistical analysis performed on the self-esteem and perceived problem solving ability scores demonstrated some significant differences. There were no differences between the groups on either measure at the beginning of the semester. Students that participated in the Explorations II program showed an increase in both self-esteem and perceived problem solving ability after the adventure experience weekend and these increases were maintained until the end of the semester. The control group students maintained a constant level of self-esteem throughout the semester. However, these students showed a significant decrease in perception of their ability to solve problems over the same time period. The Explorations II group were significantly superior to the control group on both measures at the end of the semester.

There was a significant relationship between self-esteem and perceived problem solving ability for both groups throughout the semester. The relationship was stronger for the control group students than for the Explorations II students at all three times. The relationship was strengthened after the adventure experience outing for the Explorations II group however, it was still less than for the control group students.

CHAPTER V

DISCUSSION

The objective of this study was to determine if there were any changes in students' self-esteem and perceived problem solving ability after participation in the Science of Survival course and other parts of the Explorations II program at Vanier College. Measures of self-esteem and perceived problem solving ability were taken at three times throughout the semester and analysis performed on these scores to determine if there were any changes. Analysis was also performed to examine the relationship between self-esteem and perceived problem solving ability. The four hypotheses proposed are discussed in this chapter in light of the results.

Self-Esteem in Explorations II Students

Hypothesis #1, which stated that self-esteem would be improved through participation in the Science of Survival and the rest of the Explorations II program was supported by the results. The Explorations II students showed a significant increase in self-esteem from the beginning of the semester to after the adventure experience weekend and this increase was maintained until the end of the semester. Figure 1 represents the changes in self-esteem over time for the Explorations II and control groups.

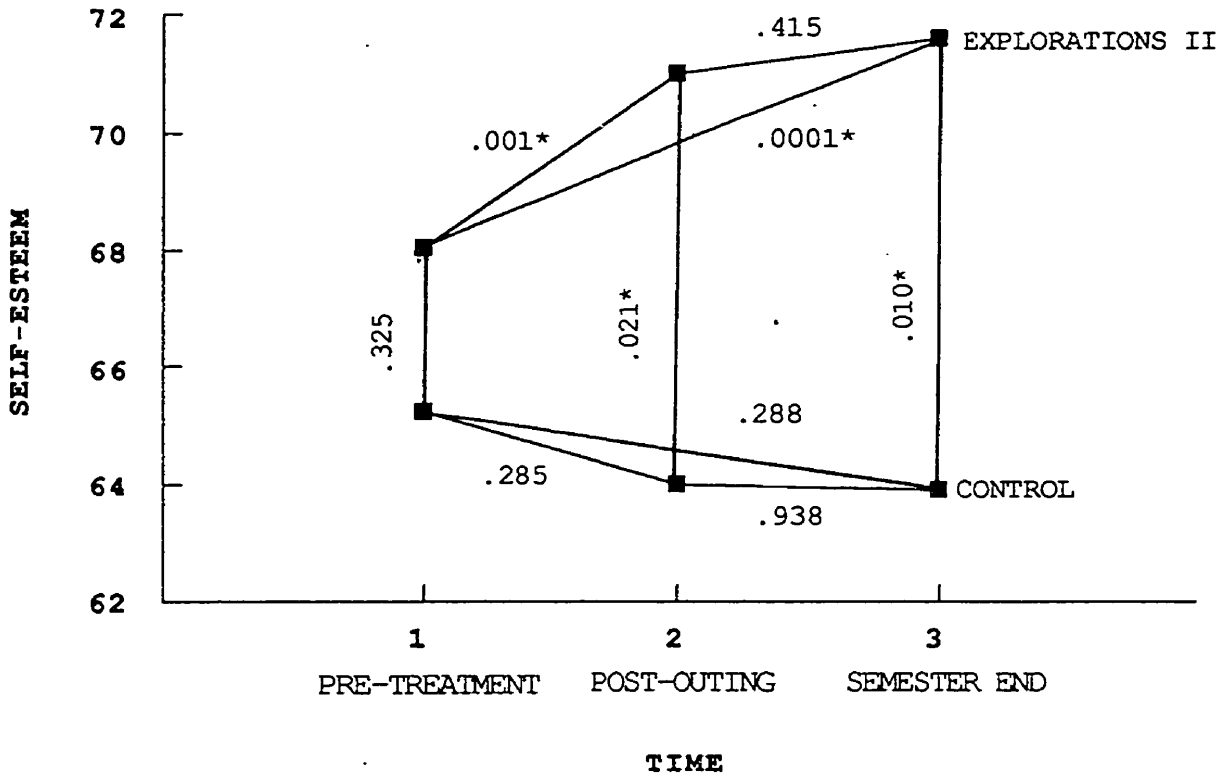

Figure 1: Summary of Changes in Self-Esteem of Explorations II and Control Groups Across Assessment Periods.

Note: The values shown are p values of differences between the two points indicated. Values marked by * are significant at the .05 level.

Science of Survival combined two components that could have been responsible for the increase in self-esteem. These two components were adventure education and problem-based learning. Each component could have worked on its own or in combination with the other to increase self-esteem.

Research has examined the use of adventure education to increase positive self perceptions in Outward Bound (Clifford and Clifford, 1967) and summer camp settings (Hazelworth and Wilson, 1990), as well as in combination with academic programs (Fersch and Smith, 1972; Lambert, Segger, Staley, Spencer, and Nelson, 1978). Each situation used adventure education in a different way, but all were effective in increasing positive self perceptions. The results of this study lend support to these previous research findings. Science of Survival incorporated adventure education with an academic program and self-esteem increased in the participants.

In addition to adventure education, the literature suggested that increasing problem solving skills would increase self-esteem (Mruk, 1995). Science of Survival taught the PHARC problem solving technique in an outdoor setting, then taught the transfer of this skill into the academic environment. The increase in self-esteem of the participating students provides support for the use of problem solving techniques to increase self-esteem.

A significant increase in self-esteem was only observed from the beginning of the semester to after the adventure experience outing and from the beginning of the semester to the end of the semester. There was not a significant change from post-outing to the end of the semester despite the follow-up portion of the Science of Survival. In the follow-up,

the skills learned in the outdoors were reinforced and applied to the academic environment. It would be expected that during the follow-up, self-esteem would continue to increase. However, a significant change in self-esteem was not observed in this time period. In spite of the efforts of the program, there were other factors that had the potential to negatively effect all students and counteract the positive effects. During this time, the Quebec government was threatening financial cutbacks to college programs. It was proposed that if students failed more than one course, they would have to pay a significant course fee. The consequence of this unfavorable news upon students had the possibility of moderating to some extent the positive effects of the Explorations II program.

From the results obtained, the first hypothesis was supported. Science of Survival and the rest of the Explorations II program was an effective means of increasing self-esteem of its participants. The increase in self-esteem was observed after the adventure education outing and was maintained until the end of the semester. The lack of increase from post-outing to the end of the semester could have been the result of negative factors counteracting the benefits. This finding together with previous research supports the use of adventure education and problem solving to enhance self-esteem.

Perceived Problem Solving Ability in Explorations II Students

The second hypothesis of this study proposed that perceived problem solving ability would be improved through participation in Science of Survival and the rest of the Explorations II program. The results obtained support this hypothesis. Perceived

problem solving ability increased from the beginning of the semester to after the adventure experience outing and the increase was maintained until the end of the semester. Figure 2 represents the changes in perceived problem solving ability over time for the Explorations II and control groups.

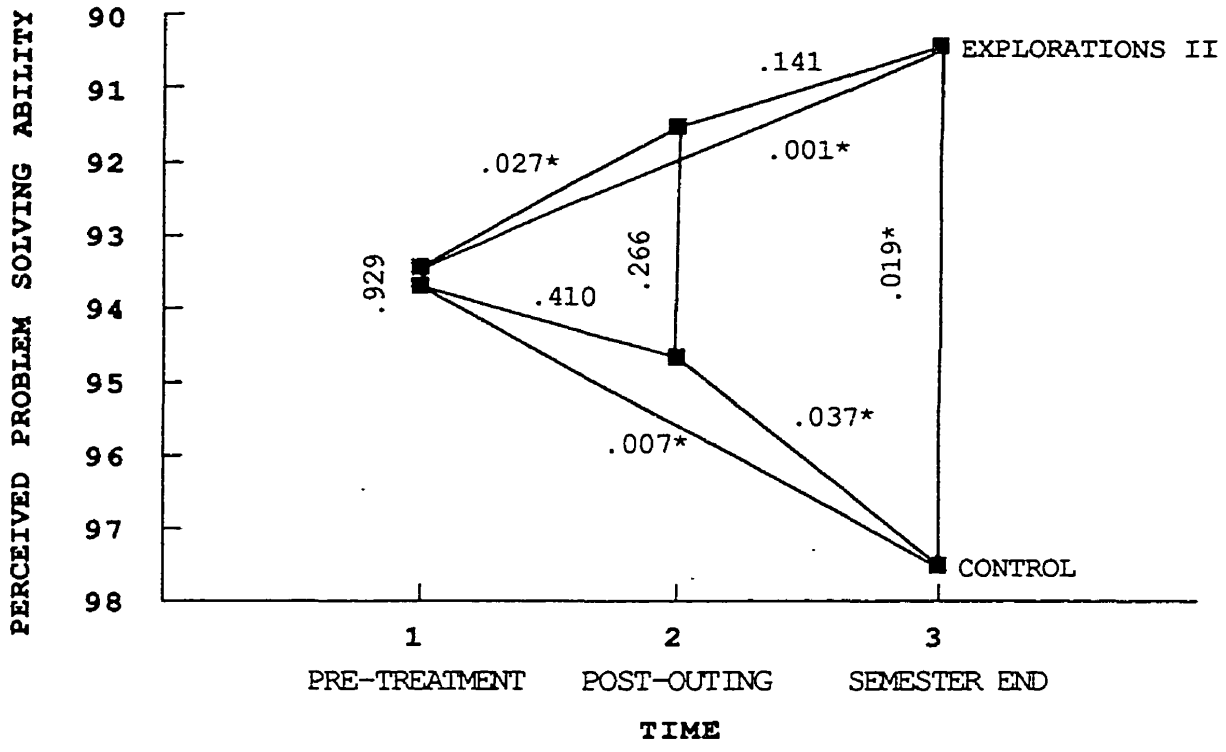

Figure 2: Summary of Changes in Perceived Problem Solving Ability of Explorations II and Control Groups Across Assessment Periods.

Note: The values shown are p values of differences between the two points indicated. Values marked by * are significant at the .05 level.

In the past, training in solving well-structured problems was not found to adequately prepare students in solving ill-structured problems typically encountered in real life (Spiro, Coulson, Feltovich, and Anderson, 1988 as cited in Gallagher, Stepien, and Rosenthal, 1992) Science of Survival uses problem-based learning (PBL), which guides students through the process of solving ill-structured problems (Gallagher et al., 1992) with the PHARC problem solving method. Other treatment studies have documented that persons can learn problem solving skills with corresponding elevations in appraisal of ability (Nezu, 1986; Nezu and Perri, 1989). This study found that students who participated in the program increased in their perceived problem solving ability, supporting previous findings.

Although there was an increase in perceived problem solving ability from the beginning of the semester to after the adventure experience outing, there was not a significant increase from post-outing to the end of the semester. In the follow-up to the outing, problem solving skills were transferred from the outdoors to the classroom. As the skills were strengthened and application expanded, it was anticipated that perceived problem solving ability would continue to increase, yet it was only maintained. The lack of increase during the follow-up could be explained in the same way as the significant decrease in the control group during that time. The cause of the decrease in the control group could also have overpowered what should have been a continued increase in perceived problem solving ability in the Explorations II students. The possible causes are discussed in the next section regarding the control group.

In summary concerning hypothesis #2, there was an increase in perceived problem solving ability in students participating in the Science of Survival and the rest of the Explorations II program. The increase was only significant from the beginning of the semester to post outing and from the beginning of the semester to the end of the semester. The follow-up may not have produced a continued increase due to the same factors that brought about a decrease in perceived problem solving ability among the control students. Programs that develop problem solving skills produce an associated increase in perceived problem solving ability.

Control Group Students

Hypothesis #3 proposed that the improvements in self-esteem and perceived problem solving ability observed in those participating in the Science of Survival and the rest of the Explorations II program would not be seen in a sample of other first year Vanier College students in a social science program. Not only were there no improvements, but there was a decrease in perceived problem solving ability. In the control group, self-esteem remained constant for the entire semester with no significant differences among the three measurement times. However, for perceived problem solving ability there was a decrease in the control group. There was a significant decrease from the beginning of the semester to the end of the semester and from mid-semester to the end of the semester.

Both the Self-Esteem Inventory and the Problem Solving Inventory have been reported to have good stability (Coopersmith, 1981; Heppner and Petersen, 1982). Without a pertinent intervention, there should not be any significant differences in the measures.

This would explain why there were not any changes observed in self-esteem for the control group. It was also expected that perceived problem solving ability would remain constant. However, if the college freshman experience is more closely examined in conjunction with the research design, a decrease in perceived problem solving might be expected in the control subjects. In a study examining the college freshman experience, Lokitz and Sprandel (1976) found that most freshman are concerned with academic performance during their first semester. Blankstein, Flett and Batten (1989) found that test anxiety was associated significantly with decreased problem solving confidence and personal control over one's problems. The final administration of the Problem Solving Inventory in this study was before final exams. Students were probably concerned about their performance on these upcoming exams. An increase in test anxiety at the time of the final administration of the PSI might be the cause of a corresponding decrease in perceived problem solving ability.

Many students will experience test anxiety before exams. In this situation, anxiety had the potential to be heightened. The government was proposing that students would have to pay significant fees if they failed more than one course. This should have had the biggest effect upon marginal students who had the greatest risk of failing courses and having to pay extra fees in order to repeat them. In most cases, test anxiety may not have had such a dramatic effect, but the threat of a financial penalty as well may have been enough to bring about the observed negative effects on perceived problem solving ability in these students.

As regards the third hypothesis, the sample of first year social science students maintained a stable level of self-esteem, but showed a significant decrease in perceived

problem solving ability over the semester. Although both are expected to be stable characteristics of an individual, it appears that perceived problem solving ability can be effected by situational factors such as test anxiety.

Relationship Between Self-Esteem and Perceived Problem Solving Ability

The fourth and final hypothesis of this study stated that there would be a significant relationship between self-esteem and perceived problem solving ability for the Explorations II group and the control group and that this relationship would be maintained throughout the semester. The findings support, with qualifications, this hypothesis. The relationship for both groups, at all three measurement times was significant. However, the relationship showed an increased in strength for the Explorations II group not seen in the control group. Also, the relationship between self-esteem and perceived problem solving ability was somewhat stronger in the control group. The relationship in the control group marginally decreased with a deterioration of its mean perceived problem solving ability score.

Heppner, Reeder, and Larson (1983) demonstrated that people who perceived themselves as effective problem solvers had higher self-concepts. Heppner et al. used an ANOVA to identify significant differences between self perceived effective and ineffective problem solvers. The study by Heppner et al. did not examine differences among various populations or at different times. This study found similar results with self-esteem and perceived problem solving ability using a correlation. This analysis identified a significant relationship between the two variables and also revealed that the relationship can vary in

strength between groups and after an intervention. These results suggest that self-esteem and perceived problem solving ability may be more closely related for regular academic students than for academically at-risk students and that an intervention for academically at-risk students can strengthen the relationship making these students, in these respects, more like regular academic students.

The results also suggest that as perceived problem solving ability and self-esteem improve, as a result of appropriate experience, the relationship between the two also improves. It should be noted that in the control subjects as the perceived problem solving ability decreased from the post-outing time to the final assessment, so at least marginally did the relationship between self-esteem and perceived problem solving ability. This is a fact not found mentioned in previous research reports. The results here not only support past findings, but provide some additional information on the way in which the relationship may vary.

In summary concerning hypothesis #4, there was a significant relationship between self-esteem and perceived problem solving ability for both groups and at all three times. The relationship was stronger in the control group and there was an increase in strength of the relationship in the Explorations II group after the adventure experience weekend, that remained the same until the completion of the first semester. These differences may be attributed to the degree to which students are academically prepared. Also, the increase in the magnitude of the positive relationship between perceived problem solving ability and self-esteem as a result of an appropriate intervention and the significant improvement in both and the decrease in the relationship with a decrease in one, adds new information

about the relationship between these two variables. This study demonstrates that there is not only a positive relationship between self-esteem and perceived problem solving ability, but that there are predictable variations in the strength of that relationship as scores on each change.

Summary of Discussion

The hypotheses proposed in this study involved changes in self-esteem and perceived problem solving ability of students who participated in a program that was thought to enhance these two characteristics – Science of Survival and the rest of the Explorations II program. A group of control students who were similar except for academic qualifications did not participate in this program or receive any special treatment. It was predicted that for these students self-esteem and perceived problem solving ability would remain constant. The relationship between the two measures was predicted to be significant for both groups, at all three times. These hypotheses were either partially or completely supported by the results of this study.

The Explorations II students showed significant increases in self-esteem and perceived problem solving ability from the beginning of the semester to after the adventure experience outing and these increases were maintained until the end of the semester. There was not a significant increase from post-outing to the end of the semester. This may have been due to circumstances outside the Science of Survival and the Explorations II program having a negative effect on the students. The positive and negative effects may have balanced one another out to only maintain the levels obtained after the adventure

outing. This finding supports the use of adventure education and problem-based learning as effective means of enhancing students' self-esteem and perceived problem solving ability.

Self-esteem remained constant in the control group as predicted and supporting past self-esteem research findings. However, these students had a significant decrease in perceived problem solving ability. The decrease may be attributed to the timing of the last administration of the Problem Solving Inventory just before exams. To avoid negative self-perceptions, all college students could perhaps benefit from a program that enhances self-esteem and perceived problem solving ability.

The relationship between self-esteem and perceived problem solving ability was significant in all cases as predicted. The relationship appeared to increase in strength after the adventure experience outing for the Explorations II students. However, it was still not as strong as for the control group students. The main difference between the two groups was their previous academic performance. It is possible that the this relationship is stronger in students with strong academic performance and that a program designed to improve academic performance can strengthen this relationship.

The relationship between self-esteem and perceived problem solving ability seemed to change in a predictable way. When there was an increase in the two variables, there appeared to be an increase in the strength of the relationship for the Explorations II students. When there was a decrease in perceived problem solving ability, there seemed to be a decrease in the strength of the relationship for the control group students.

In addition to the hypotheses stated, the results provide general support for the use of programs that use adventure education and problem-based learning, in courses such as the Science of Survival and the rest of the Explorations II program. These programs are a demonstrated effective means of enhancing self-esteem and perceived problem solving ability. The results also indicate a strong theoretical relationship between the two constructs. This was not only revealed through the significant correlations, but also the patterns of change in the Explorations II students. Self-esteem and perceived problem solving ability both showed an increase from the beginning of the semester to post-outing, but from post-outing to the end of the semester there were no significant changes in either measure. The factors that influenced change in one, produced a similar effect in the other. The relationship appeared to improve as the scores on each improved and deteriorate as the score on one went down. This alludes to at the reciprocal relationship between self-esteem and perceived problem solving ability, with a change in one associated with a corresponding change in the other and the added idea of, the higher the score, the greater the relationship.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

As individual needs are recognized, it is apparent that educational institutions must provide a range of programs to meet the various needs of their students. Vanier College in Montreal, Quebec developed a program for academically at-risk students. Leaving high school, these students have an academic average below 65% and would not normally be accepted into college. The program is called Explorations II and its primary objective is to keep its students in school and to integrate them into a regular academic program in the following semester.

Students are enrolled in the Explorations II program as a whole, but the course of specific interest was Science of Survival. It combines adventure education and problem based learning to teach students problem solving skills first in an outdoor setting and then in an academic setting.

A review of the literature revealed that a program that combines adventure education and problem solving skills should benefit the participants with regard to their self perceptions. Adventure education has been shown to increase self-esteem. Problem based learning improves problem solving skills as well as the perception of this ability. Self-esteem and perceived problem solving ability have been found to be associated in a interdependent relationship. It has been suggested that enhancing one will benefit the other.

The teachers of the Explorations II program had observed positive changes in the students, however, an objective measure was desired The purpose of this study was to

examine changes in self-esteem and perceived problem solving ability of students participating in the Science of Survival and the rest of the Explorations II program.

Summary of Procedures

The Explorations II program consists of three courses. They are: Science of Survival, Skills for the 21st Century, and Work, Future, and Yourself. The purpose of Science of Survival is to bring students to a college level of proficiency in the area of problem solving. It teaches students how to solve problems in the outdoors and then transfer this skill to the academic environment. Skills for the 21st Century helps to develop study skills in the context of another course. Work, Future, and Yourself provides students with information in order to choose their academic and career direction. In addition to these three courses, students take two to four other academic courses.

The Coopersmith Self-Esteem Inventory (SEI) was used to measure self-esteem and the Problem Solving Inventory (PSI) was used to measure perceived problem solving ability. One-hundred and fifty-five Explorations II students and seventy-seven first year social science students completed the SEI and the PSI three times during the semester. The first administration was at the beginning of the semester for both groups of students. The second administration was following an adventure experience outing for the Explorations II group and mid-semester for the control group. All students completed the inventories for the third time at the end of the semester.

The scores form the SEI and the PSI were analyzed in two one-way (Explorations II versus control) repeated measures (three assessment times) ANOVAs. Significant

interactions were found for both self-esteem and perceived problem solving ability. To interpret the interactions, independent t-tests were performed to identify differences between groups at each assessment time and paired t-tests were performed to identify within group differences among the three times. Correlations were computed between self-esteem and perceived problem solving ability for each group and at each time to determine if there was a significant relationship between the two variables.

Summary of Results and Discussion

The first and second hypotheses of this study stated that self-esteem and perceived problem solving ability would be improved through participation in Science of Survival and the rest of the Explorations II program. Both of these hypotheses were supported. The Explorations II group showed an increase in self-esteem and perceived problem solving ability from the beginning of the semester to after the adventure experience weekend and the increases were maintained until the end of the semester. There were not significant increases from post-outing to the end of the semester. This may be attributed to counteracting factors outside of the program that had a potential negative effect on both Explorations II and control group students. This study as well as past research show that programs that combine adventure education and problem solving skills are an effective means of increasing self-esteem and perceived problem solving ability of the participants.

Hypothesis #3 stated that the improvements in self-esteem and perceived problem solving ability observed in those participating in the Science of Survival and the rest of the

Explorations II program would not be seen in a sample of other first year Vanier College students in a social science. The control group maintained a constant level of self-esteem for the entire semester but revealed a significant decrease in perceived problem solving ability from the beginning of the semester to the end of the semester and from post outing to the end of the semester. The decrease may be attributed to the fact that the last administration of the Problem Solving Inventory was just before exams. Test anxiety has been associated with decreased levels in perceived problem solving ability (Blankstein, Flett, and Batten, 1989) and test anxiety could have been elevated just before exams. Test anxiety may have been increased due to the provincial government threat of a financial penalty for failed courses. Past research has demonstrated self-esteem and perceived problem solving ability to be stable characteristics. However, this study shows that perceived problem solving ability may be influenced by situational factors.

The last hypothesis of this study predicted that there would be a significant relationship between self-esteem and perceived problem solving ability for the Explorations II and the control groups and that this relationship would be maintained throughout the semester. The results supported, with qualifications, this hypothesis. For the Explorations II group the strength of the relationship appeared to increase but did not obtain as high a coefficient as the control group. This suggests that the relationship between self-esteem and perceived problem solving ability is strongest for students with strong academic performance. A program that improves academic performance may also strengthen this relationship.

The strength of the relationship between self-esteem and perceived problem solving ability appears to be effected by changes in the levels of these constructs. When there was an increase in either or the two measures, there is an increase in the strength of the relationship. When there is a decrease in one, there was a deterioration in the relationship.

Conclusions

Based on the findings of this study, the following conclusions seem justified:

1. Self-esteem can be increased through a curriculum such as the Science of Survival and the rest of the Explorations II program that employs adventure education and problem-based learning.

2. Perceived problem solving ability can be increased through a curriculum such as the Science of Survival and the rest of the Explorations II program that employs adventure education and problem-based learning.

3. There is a positive relationship between self-esteem and perceived problem solving ability. Enhancing one, is associated with corresponding changes in the other.

4. The relationship between self-esteem and perceived problem solving ability is not constant. Increasing the levels of either, strengthens the relationship, whereas decreasing one, appears to weaken the relationship.

Implications of the Research

The findings of this study provide support for innovative teaching methods. Where traditional methods have failed some students, adventure education and problem-based

learning could help them. Whether adventure education is used in a summer camp or academic setting, there is usually an increase in self-esteem. This indicates that increases in self-esteem are a predictable result of an adventure education experience.

Problem-based learning is an effective means of increasing perceived problem solving ability. Students that need confidence to meet academic challenges, would benefit from increases in their perception of ability in this skill. The control group students showed a significant decrease in their perceived problem solving ability, which suggests that they may not be adjusting to the new demands of college life. This indicates that both students with a previously weak academic performance and other college freshmen could benefit from a problem-based learning program.

The effects of the follow-up portion of the Science of Survival course and other parts of Explorations II need to be more closely examined. The significant increases occurred from the beginning of the semester to after the adventure experience outing. From post-outing to the end of the semester, the levels of self-esteem and perceived problem solving ability were only maintained. The effects of the follow-up could fall into at least any of four categories. The first is that the follow-up was not necessary to achieve the desired results and could be excluded from the program. The second is that there could have been continued increases in self-esteem and perceived problem solving ability if the follow-up was changed to be more effective in these regards. The third is that the follow-up is necessary to maintain the changes, and that without the follow-up there would have been a decrease in these self-perceptions. Forth is that the follow-up portion of the program be seen more to achieve ends other than enhancing perceived problem solving ability and self-

esteem. Further research would be able to determine if changes to the follow-up are warranted.

This study also provides some insight into the nature of the relationship between self-esteem and perceived problem solving ability. Heppner, Reeder, and Larson (1983) suggested that until a person has a positive self-concept, specific skills training would not significantly effect their problem solving behaviour. Hence, there would first have to be an increase in self-esteem before there could be an increase in perceived problem solving ability. On the other hand, Mruk (1995) believes that increasing problem solving skills, increases the chances of being successful, which increases self-esteem through feelings of competence. In this study, changes in self-esteem and perceived problem solving ability were observed simultaneously. An increase in the first resulted in a corresponding increase in the second, which in turn could have caused an increase in the first. An increase or decrease in one or both of the measures also resulted in a corresponding increase or decrease in the strength of the relationship. A theory that improves our understanding of one of these concepts, will need to demonstrate the reciprocal relationship of self-esteem and perceived problem solving ability.

Recommendations for Further Research

Recommendations for further research include:

1. Replicate the current study and include a follow-up at the end of the second semester, and in a year to determine the lasting effects of Science of Survival and the rest of the Explorations II program.

2. Replicate the current study with an experimental group whose treatment ends immediately after the adventure experience outing, but continues with the assessments. This would determine the effect of the follow-up program.

3. Replicate the study with regular academic students in the Science of Survival and the rest of the Explorations II program and a control group to determine if differences were related to prior academic performance.

4. Conduct a study that examines the effects of similar programs with other special populations (i.e. abused women) to see if adventure education and problem-based learning programs can enhance their self-esteem and perceived problem solving ability or other desired psychological characteristics.

5. Conduct a study to examine changes in self-esteem and perceived problem solving ability after a problem-based learning program that does not include adventure education. If similar results are found, it would provide further evidence for the reciprocal relationship between self-esteem and perceived problem solving ability.

6. Conduct similarly designed studies to examine the effect of the present program on others of its specific objectives (achievement measures or psychological qualities).

7. Design research to re-examine this study's findings of variations in the relationship between perceived problem solving ability and self-esteem as the scores in one or both increase or decrease.

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APPENDIX A

THE COOPERSMITH SELF-ESTEEM INVENTORY

Student # _____ Date _____

Directions

Below, you will find a list of statements about feelings. If a statement describes how you usually feel, put an X in the column "Like Me". If a statement does not describe how you usually feel, put an X in the column "Unlike Me". There are no right or wrong answers. Begin at the top of the page and mark all 25 statements.

Like Me	Unlike Me	
___	___	1. Things usually don't bother me.
___	___	2. I find it very hard to talk in front of a group.
___	___	3. There are lots of things about myself I'd change if I could.
___	___	4. I can make up my mind without too much trouble.
___	___	5. I'm a lot of fun to be with.
___	___	6. I get upset easily at home.
___	___	7. It takes me a long time to get used to anything new.
___	___	8. I'm popular with person's my own age.
___	___	9. My family usually considers my feelings.
___	___	10. I give in very easily.
___	___	11. My family expects too much of me.
___	___	12. It's pretty tough to be me.
___	___	13. Things are all mixed up in my life.
___	___	14. People usually follow my ideas.
___	___	15. I have a low opinion of myself.
___	___	16. There are times when I would like to leave home.
___	___	17. I often feel upset with my work.
___	___	18. I'm not as nice looking as most people.
___	___	19. If I have something nice to say, I usually say it.
___	___	20. My family understands me.
___	___	21. Most people are better liked than me.
___	___	22. I usually as if my family is pushing me.
___	___	23. I often get discouraged with what I am doing.
___	___	24. I often wish I were someone else.
___	___	25. I can't be depended on.

APPENDIX B

THE PROBLEM SOLVING INVENTORY

Students # _____ Date _____

Directions

Read each statement, and indicate the extent to which you agree or disagree with that statement , using the following options:

1 = Strongly agree
2 = Moderately agree
3 = Slightly agree
4 = Slightly disagree
5 = Moderately disagree
6 = Strongly disagree

___ 1. When a solution to a problem was unsuccessful, I did not examine why it didn't work.
___ 2. When I am confronted with a complex problem, I do not bother to develop a strategy to collect information so I can define exactly what the problem is.
___ 3. When my first efforts to solve a problem fail, I become uneasy about my ability to handle the situation.
___ 4. After I have solved a problem, I do not analyze what went right or what went wrong.
___ 5. I am usually able to think up creative and effective alternatives to solve a problem.
___ 6. After I have tried to solve a problem with a certain course of action, I take time and compare the actual outcome to what I think should have happened.
___ 7. When I have a problem, I think up as many possible ways to handle it as I can until I can't come up with any more ideas.
___ 8. When confronted with a problem, I consistently examine my feelings to find out what is going on in a problem situation.
___ 9. When I am confused with a problem, I do not try to define vague ideas or feelings into concrete or specific terms.
___ 10. I have the ability to solve most problems even though initially no solution is immediately apparent.
___ 11. Many problems I face are too complex to solve.
___ 12. I make decisions and am happy with them later.
___ 13. When confronted with a problem, I tend to do the first thing that I can think to solve it.
___ 14. Sometimes I do not stop and take time to deal with my problems, but just kind of muddle ahead.

___ 15. When deciding on an idea or possible solution to a problem, I do not take time to consider the chances of each alternative being successful.
___ 16. When confronted with a problem, I stop and think about it before deciding on a next step.
___ 17. I generally go with the first good idea that comes to my mind.
___ 18. When making a decision, I weigh the consequences of each alternative and compare them against each other.
___ 19. When I make plans to solve a problem, I am almost certain that I can make them work.
___ 20. I try to predict the overall result of carrying out a particular course of action.
___ 21. When I try to think up possible solutions to a problem, I do not come up with very many alternatives.
___ 22. In trying to solve a problem, one strategy I often use is to think of past problems that have been similar.
___ 23. Given enough time and effort, I believe I can solve most problems that confront me.
___ 24. When faced with a novel situation I have confidence that I can handle problems that may arise.
___ 25. Even though I work on a problem, sometimes I feel like I am groping or wandering, and am not getting down to the real issue.
___ 26. I make snap judgments and later regret them.
___ 27. I trust my ability to solve new and difficult problems.
___ 28. I have a systematic method for comparing alternatives and making decisions.
___ 29. When trying to think of ways to handle a problem, I do not try to combine different ideas together.
___ 30. When confronted with a problem, I don't usually examine what sort of external things in my environment may be contributing to my problem.
___ 31. When I am confronted by a problem, one of the first things I do is survey the situation and consider all the relevant pieces of information.
___ 32. Sometimes I get so charged up emotionally that I am unable to consider many ways of dealing with my problem.
___ 33. After making a decision, the outcome I expected usually matches the actual outcome.
___ 34. When confronted with a problem, I am unsure of whether I can handle the situation.
___ 35. When I become aware of a problem, one of the first things I do is to try to find out exactly what the problem is.

APPENDIX C

LETTER OF INFORMED CONSENT

Dear Student,

We at Vanier College, with the assistance of researchers at McGill University are interested in changes that may occur in students over the course of their first year in college. For this reason you are being asked to complete two questionnaires three, or at most four times during the year. Each questionnaire will take approximately 15 minutes of your time. You will need to answer them as honestly as possible.

All data will be dealt with confidentially and will be made available to you at your request. Student identification numbers will be used throughout the study, but will not be used in any report. Group averages only, will be used for data analysis and presentation. Your personal responses will not be identifiable. While we value greatly your involvement in this study, your participation is strictly voluntary and you may withdraw at any time.

If you are willing to participate, please sign this form below. Thank-you for your time and consideration. You are helping to improve the education of present and future college students.

Sincerely,

Arthur Tucker
Dean, Social Science, Commerce, Arts & Letters
Vanier College

Dr. G. Neil
Associate Professor
Dept. of P.E., McGill University

I understand the procedures to be used and consent to the participation in this research project.

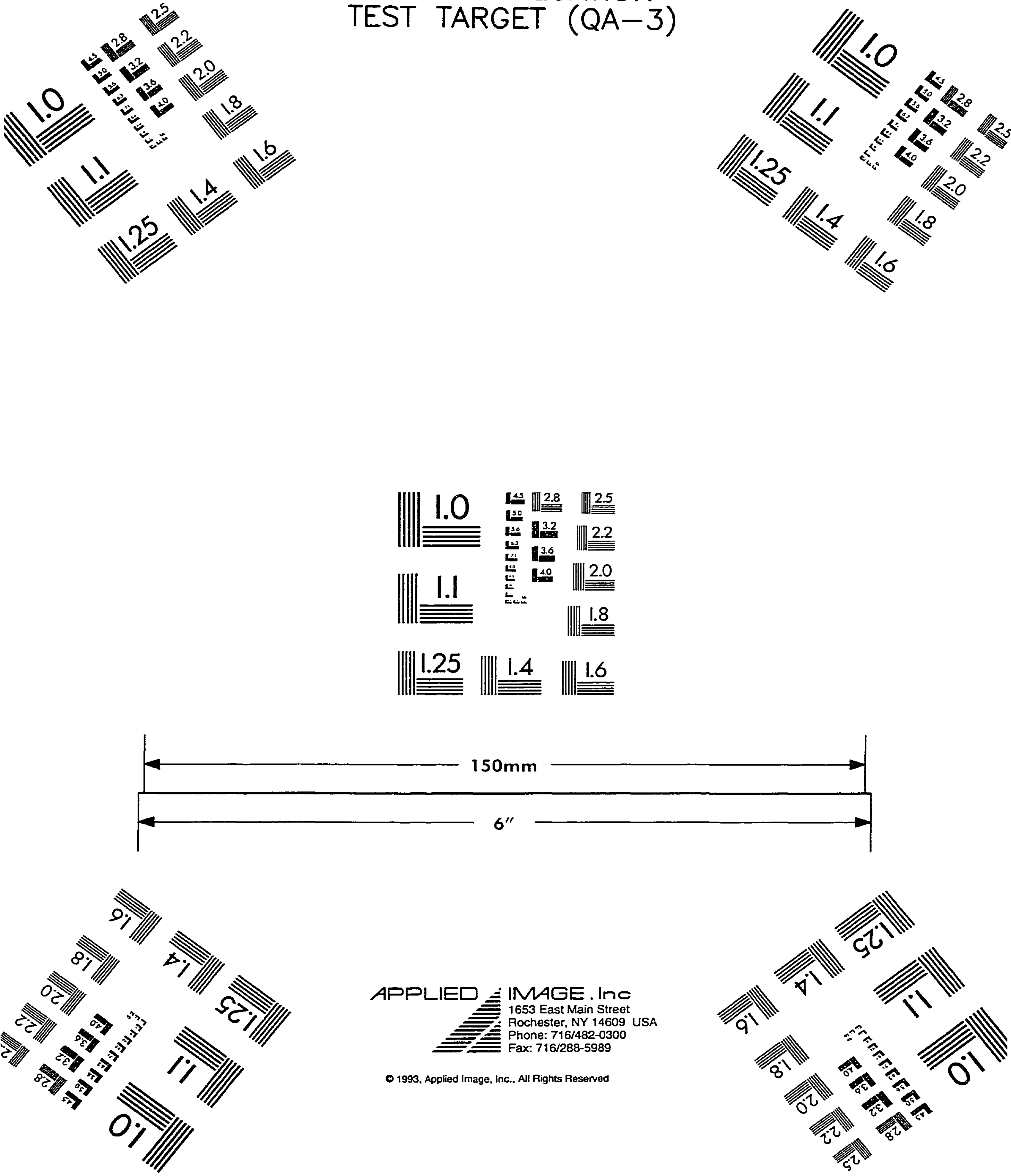
_____ _____

Date Participant's Name (please print)

_____

Participant's Signature

IMAGE EVALUATION TEST TARGET (QA-3)



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