FOSTERING CRITICAL THINKING THROUGH PROBLEM SOLVING IN HOME ECONOMICS

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ABSTRACT

This study investigated whether critical thinking can be fostered in home economics through teaching a problem solving approach in Family Management. Secondarily, it investigated teacher behaviours which may foster critical thinking abilities, the moral and ethical issues which the teaching of critical thinking addresses, and whether the students were able to use problem solving in real life situations.

The research involved the students and teacher in a Family Management eleven class in rural British Columbia. All students in the class chose to participate in the study. The study was conducted during twenty-six classroom hours.

The study used action research as the research methodology. The research included action/research cycles with time between for analysis and reflection. The phase of data analysis and reflection was called the reconnaissance. Data was collected through audio tapes of the classes, entries in the teacher's journal, a checklist, and collected student work. The data collected in the first reconnaissance phase established a description which served as a point of reference for comparing and analyzing later observations.

Two cycles of action/research followed. Observations were made and data collected as the critical thinking concepts were introduced. The introduction of the macro-thinking skill of problem solving was combined with the micro-

thinking skills of avoiding fallacies, observing, reporting and summarizing.

The research found that there was an increase in critical thinking activities at the end of the study. Factors that were found to have effected this change were: the teaching of a problem solving process, the teaching of micro-thinking skills, certain teacher behaviours, and the classroom atmosphere. Home economics was found to play a unique role in providing practice in real life problem solving.

Further research is needed to determine if the skills the students learned while problem solving in Family Management will carry over to everyday life.

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CHAPTER I

INTRODUCTION

Critical thinking is a thinking process that goes beyond recall and comprehension. It requires judgment and evaluation. It is an emancipating process that encourages one to question the status quo and look beyond it for possible answers. Fedje and Holcombe assert that our highly technological society demands that we are able to process large amounts of data, facts, opinions and values (1986). As our students will most likely be expected to deal with an ever expanding body of information, it is our responsibility as educators to help them develop critical thinking skills that will enable them to effectively process this information. By teaching our students critical thinking we enable them to utilize information to solve problems and make sound judgments rather than contributing to a powerlessness that comes with the overloading of meaningless information.

Critical thinking is receiving much attention in education today. Sternberg states "probably never before in the history of educational practice has there

been a greater push to teach children to think critically" (1985a p.194). How one "thinks" critically; how one teaches critical thinking; indeed, even if critical thinking can be taught are matters for great debate in the educational literature. Certainly, many authors believe that critical thinking can be taught (Ennis, 1962; de Bono, 1983; Wassermann, 1987; Sternberg, 1987). Bloom and others developed a taxonomy in the cognitive domain that categorized the levels of thinking (1971). The top three levels are regarded as the higher order thinking skills: analysis, synthesis, and evaluation. Bloom proposed that higher order thinking skills can be taught to pupils if teachers use the taxonomy to develop their questions and assignments. Ennis elaborated these levels in terms of critical thinking skills:

1) ability to define and clarify such things as problems, issues, conclusions,reasons, assumptions.
2) ability to judge the credibility, relevance, and consistency of information.
3) ability to infer or to solve problems and draw reasonable conclusions (1985, p.45).

Ennis also claims that these skills can be taught, and that they are indicators of critical thinking.

Of those who argue that teaching critical thinking is possible, some see problem solving as a means for critical thinking (Sternberg, 1985a; Quellmalz, 1985; Paul, 1985). By working their way through the steps to solving everyday problems, students can be encouraged to think critically. The first step in problem solving, identifying the problem, is probably the most difficult and

requires the most critical thinking (Sternberg, 1985a). The students solve problems with the use of micro-thinking skills such as detecting bias, identifying assumptions and finding fallacies (Beyer, 1984a).

The home economics curriculum in British Columbia, especially the Family Management curriculum has a strong emphasis on the problem solving process. A review of the intended learning outcomes in the Family Management curriculum shows an emphasis on encouraging the development of problem solving skills (Curriculum Development Branch, 1986). Although this focus is promising, it seems to be limited by the tradition of teaching problem solving as a linear five step process (see appendix A) where the teacher supplies the problem and the students go through the steps without necessarily thinking critically about possible solutions, or evaluating these solutions to choose the best one. Sternberg states "in the everyday world, the first and sometimes most difficult step in problem solving is the recognition that a problem exists (1985a p. 195). In order for the students to become critical thinkers they need to practice identifying the problem; brainstorming a thorough and diverse list of possible solutions; evaluating the solutions instead of choosing their favourite or relying on fallacious information. It seems that evaluation can occur only after the student has considered the positive and negative aspects of each solution. This focus on critical thinking within the problem solving process can appropriately be integrated into the current Family Management curriculum.

The Purpose of the Study

The purpose of this research is to explore whether critical thinking can be fostered through a problem solving approach to teaching home economics, specifically Family Management. Beyer states that critical thinking should be part of a district wide plan that incorporates thinking skills into all content areas (1983). Home economics is no exception. "If we are to strengthen individual and family life, we must not forget one of the basic skills that can be used in everyday life -- thinking" (Fedje and Holcombe, 1986, p. 96).

Statement of the Problem

In exploring the major question of whether critical thinking can be fostered through a problem solving approach to teaching Family Management 11, the following specific questions will guide the research:

1. Do students show an increased ability to think critically after the problem solving process is introduced?
2. Does the teaching of micro-thinking skills along with the problem solving process encourage the students to be critical thinkers while problem solving?
3. What teacher behaviours foster the development of critical thinking?
4. What moral and ethical issues does the teaching of critical thinking address?
5. Will the students be able to use problem solving in real life situations?

The Justification for the Study

As mentioned earlier, Beyer states that critical thinking should be part of a district wide plan that includes all grade levels and all subjects areas (1983). Home economics with its focus on the family provides a unique opportunity for teaching thinking skills within the context of everyday family situations. The students will be able to practice critical thinking while solving real life problems. With a focus on real life problems the students may find the concept of problem solving more interesting and learn it more quickly. They may also be more able to apply their knowledge later in life. While teachers have been encouraged to teach critical thinking (Sternberg, 1985a,b; Beyer, 1984a,b; Wassermann, 1987) specific examples of how this might be addressed has not yet been done. This study will contribute to the body of knowledge in this area. The theoretical significance of the study will be to discover if home economics has a role in teaching critical thinking. The practical significance will be to discover which teaching practices promote critical thinking in home economics students.

Definition of Terms

Critical Thinking

The terms thinking, critical thinking, thinking skills, creative thinking, and higher order thinking are often used to describe the same group of behaviours. Ennis defined critical thinking as "reflective and reasonable thinking that is focused on deciding what to believe or do" (1962, p.45). de Bono claims that thinking is "the operating skill with which intelligence acts upon experience" (1983, p.703). The list of definitions goes on, but, as Beyer suggests there does seem to be consensus that "most educators agree that thinking skills...are essentially mental techniques or abilities that enable human beings to formulate thoughts, to reason about, or to judge" (1984a, p.486). In this study students will be regarded as thinking critically when they use higher order thinking skills such as analysis and evaluation to identify problems from a real life scenario; and when they take that problem, propose possible solutions, and evaluate these solutions.

Problem Solving

Problem solving is commonly seen as a five step process: 1) identifying the problem, 2) listing possible solutions to the problem, 3) evaluating the strengths and weaknesses of each solution, 4) choosing the best solution, and

acting on it, and 5) re-evaluating the choice (see appendix A). However, as noted earlier this five step problem solving process suggests a linear form of problem solving. The student can provide seemingly correct information without ever using higher order thinking skills. It can be a rote exercise where for example, every time the problem is stated as "teen pregnancy" the student lists the standard solutions of adoption, abortion, marriage or single parenthood. In this study, problem solving is taken beyond the linear form and considered as a reflective, circular process (see Figure 1). That is, the steps of problem solving will not need to be completed in a particular linear order. Rather, it is recognized that one might work on all parts of the process at the same time. For example, after brainstorming for possible solutions to a problem, a person may realize that the problem has not been clearly identified and may at this point move back to an earlier step of clarifying the problem. Problem solving is also not intended to lead to one right and final answer. Rather, it is valued as a process which helps an individual to direct one's thinking, and which should produce a number of solutions to any particular problem. It is expected that the solution chosen will be based on an individual's circumstances at a particular time and that a chosen solution will continue to be re-evaluated.

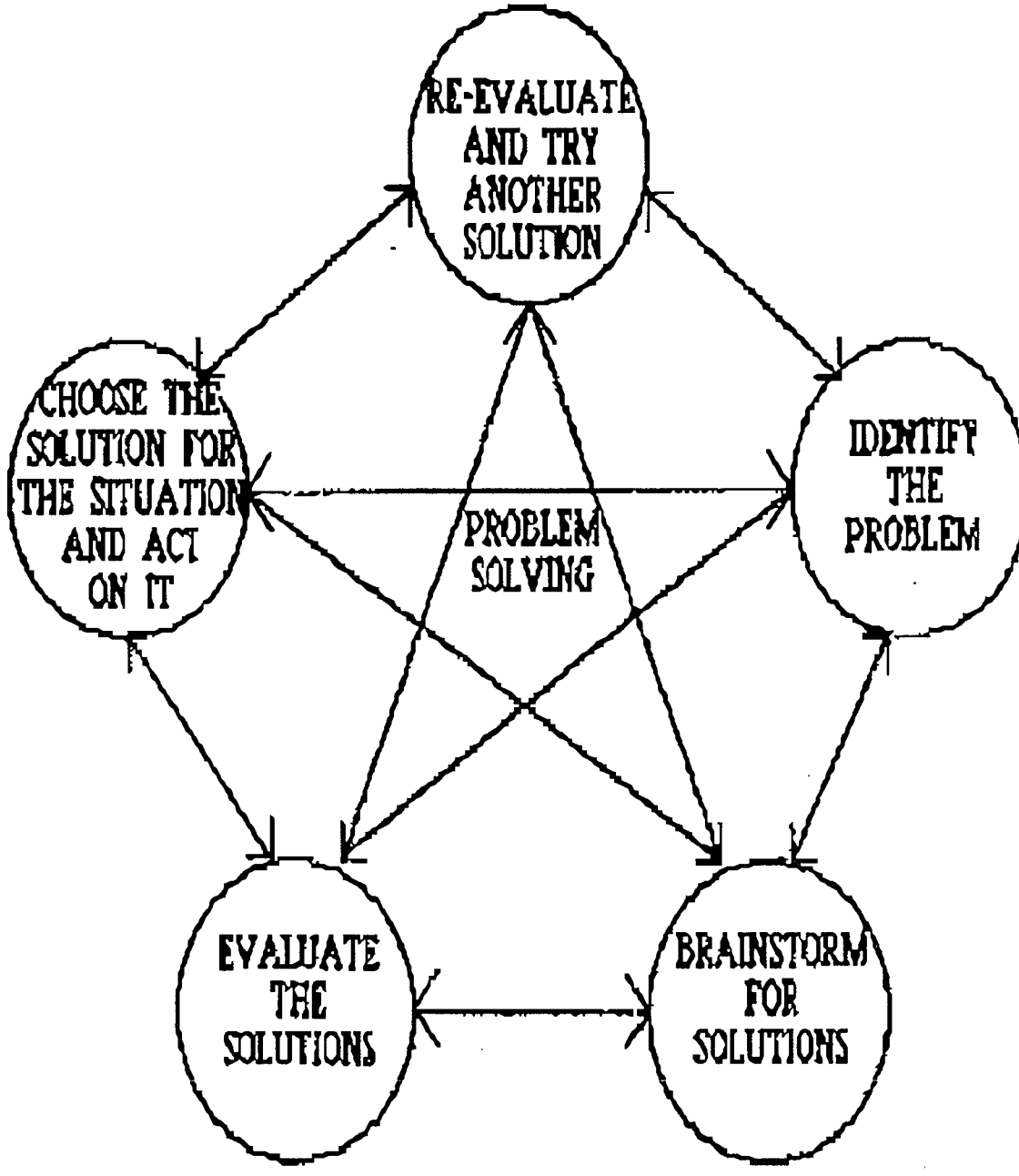


FIGURE 1 PROBLEM SOLVING MODEL

Beyer suggests that problem solving is a broader, all-encompassing thinking process in comparison to the micro-thinking operations such as recall, extrapolation and synthesis (1984b). He also claims that critical thinking is a combination of micro-thinking skills with broader thinking processes such as problem solving. For the purposes of this study, critical thinking is fostered through the use of micro-thinking skills in the context of solving real life practical problems.

Action Research

The method of research used in this study is action research. Action research is also known as teacher research, classroom inquiry and naturalistic research. In this study the definition formulated by Ebbutt is appropriate. He defines educational action research as:

> The systematic study of attempts to change and improve educational practice by groups of participants by means of their own practical actions and by means of their own reflection upon the effects of those actions.(1985, p.156).

Family Management

Family Management is a course offered within the British Columbia home economics curriculum. It was first offered at the grade eleven level in 1986. The Family Management course is designed from an ecological perspective, that is, it focuses on individuals, families, and other groups in society and their

interdependence on each other and the natural world. The emphasis in the grade eleven course is on the growth and development of the individual in relationship to other individuals, one's families and the broader society. The goals of Family Management are:

a) to develop an understanding of self in relation to others;

b) to recognize the interdependence of self, family, and the environment;

c) to develop skills and knowledge for effective life management; and

d) to become active and contributing members of the community and society (Curriculum Development Branch, 1986 p.5).

Limitations

Certain limitations are evident in this research. The study uses a small sample of students and a single teacher. The study is done with a Family Management eleven class made up entirely of young women. The class takes place in a school in a small town in rural British Columbia. The study may not be generalizable to other classes in other areas.

It cannot be claimed that this research is objective in the sense of a study using statistically quantifiable data. As with any phenomenological research there is a challenge to the researcher to remain objective. The best way to approach this concern is to face the subjectivity of the study directly. Alan Peshkin states that regardless of the type of research, quantitative or

qualitative there is always a degree of subjectivity (1988). He compels the researcher to identify his or her subjectivity throughout the course of the research, and to disclose to the reader where self and subject become joined. Action research addresses the concern of objectivity by including a reflective phase. During this time the teacher looks back on what has happened. She may listen to audio or video tapes of the class, look at student work and discuss her impressions with colleagues. By doing this one is able to distance oneself from the data. This enables a viewing of the data in a more objective manner.

Assumptions

It is assumed that the development of thinking skills can, at least in part, be evident through observing student behaviour. It is expected that improved thinking skills will be exhibited in behaviours during class discussions, and evident in written assignments and evaluative tests.

The Organization of the Thesis

This chapter has described the purpose of the study, its general focus, its limitations and the definition of relevant terms. Chapter two presents a review of relevant literature in critical thinking, problem solving, and teaching critical thinking in home economics. Chapter three describes action research and the design of the study. Chapter four discusses the reflection and action cycles in

relation to the data. Chapter five concludes the thesis and presents a summary of major findings, implications, and recommendations together with some suggestions for further research.

CHAPTER II

LITERATURE REVIEW

This section reviews literature relevant to the study. It includes three areas of review:

1. Defining critical thinking
2. Critical thinking in the classroom
3. Critical thinking in home economics education

Defining Critical Thinking

Teaching for thinking is not a new concept. John Dewey referred to it in 1933 when he talked about "reflective thinking" in teaching. In 1940 Glaser and Watson developed the Watson-Glaser Critical Thinking Test (Paul, 1984). It was intended to measure the subjects' ability for drawing inference, identifying assumptions, reasoning deductively, drawing conclusions and evaluating arguments. Smith emphasized the judgmental component of critical thinking (1953). He wrote that critical thinking meant understanding what was meant and being able to judge the value of it. In 1962 when Ennis wrote "A Concept of

Critical Thinking" he said he was "filling the gap" on the subject. He discussed the research done on critical thinking in psychology, education and philosophy and listed what he saw as twelve aspects of critical thinking:

1. Grasping the meaning of a statement.
2. Judging whether there is ambiguity in a line of reasoning.
3. Judging whether certain statements contradict each other.
4. Judging whether a conclusion follows necessarily.
5. Judging whether a statement is specific enough.
6. Judging whether a statement is actually the application of a certain principle.
7. Judging whether an observation statement is reliable.
8. Judging whether an inductive conclusion is warranted.
9. Judging whether the problem has been identified.
10. Judging whether something is an assumption.
11. Judging whether a definition is adequate.
12. Judging whether a statement made by an alleged authority is acceptable (p. 84).

There are competing ways in which critical thinking is presented in the literature. Edward de Bono has devoted much of his professional life to developing curriculum that will teach children how to think critically. He believes that thinking skills should be taught in isolation as a distinct discipline. De Bono claims that when thinking skills are taught within a subject area children can be distracted from the thinking skill they are supposed to be learning by the subject content. The students are not thinking about thinking (metacognition) they are thinking about the subject. De Bono states that we cannot teach generalizable thinking skills through specific course content, instead we must teach them thinking tools in isolation and then apply them to

other subjects. He introduced the CoRT program (Cognitive Research Trust) which is being used in schools in Venezuela, Australia, the United States, Canada, Great Britain, Malaysia and Israel (de Bono, 1983). "By law, Venezuelan school children in every grade must have two hours of direct instruction per week in thinking skills" (p. 705). The CoRT program consists of a series of thinking skills or "tools" which any teacher with a minimum of training can teach to her students.

On the other hand Richard Paul is opposed to conceiving of thinking skills as discrete "micro-logical" skills, which he calls critical thinking skills in the weak sense. He writes that thinking skills are integrated into the person and are "...ultimately intrinsic to the character of the person and to insight into one's own cognitive and affective processes" (1984, p.5). Raths, Wassermann, Jonas and Rothstein would agree. They wrote that "thinking is associated with the whole man. It is not restricted to the cognitive domain alone. It embraces imagination...values, attitudes, feelings, beliefs, and aspirations" (1986, p.xxiii). Eisner would also agree. He states that we cannot separate the cognitive and affective domains and in fact that the two domains are interwoven and one cannot take place without the other (1985). Paul claims that only with this understanding of critical thinking can we develop technical and emancipatory reasoning. Technical reason being "...skills that do not transform one's grasp of one's basic cognitive and affective process..." and emancipatory reason

"...generate not only fundamental insight into but also some command of one's own cognitive and affective processes" (1984, p.5).

While de Bono claims that his tools for thinking can be taught by any teacher with little or no training, Paul states that we should put a great deal of effort into training teachers to teach thinking skills within established subject areas. He suggests that teachers should have access to university level courses in critical thinking, critical thinking tests, a full range of resources and on going support in the classroom.

Sadler and Whimbey (1985) claim that thinking skills should not be broken down into discrete units. "Teaching people to think is like teaching them to swing a golf club: its the whole action that counts" (p.199). They, like Paul (1984) write that thinking skills must be incorporated into all levels and in all subjects.

Although the debate for teaching thinking skills in isolation and for integrating thinking into all subjects continues, the question this research addresses is supported by the positions of Paul (1984), Raths, Wassermann, Jonas and Rothstein (1986) and Eisner (1985) who claim that thinking skills must be taught within the context of all subjects. One major problem with trying to teach thinking skills as a distinct subject is that the educational system has to support the concept, as does Venezuela with its compulsory two hours of direct instruction per week in thinking skills. If the system does not

support the idea of teaching thinking in isolation, the classroom teacher will have difficulty in trying to find the time in an already crowded curriculum. Another concern with teaching thinking skills in isolation is the transferability or lack of transferability to other areas. If thinking skills are taught in isolation will the student be able to apply them to all subjects and everyday problem solving? Thinking skills need to be taught within the context of all subject areas. This can be done by any teacher at all levels in all subjects, whether it is mandated by the system or not. It can become a process that is shown to the students as a means of processing the content in the same way that a teacher might instruct the class how to conduct a science experiment. The issue of isolation versus integration arises from the question of whether thinking skills are generic and generalizable to all areas of thinking or whether thinking skills are specific to each subject area. This reseach assumes that some thinking abilities are generalizable and some unique. Therefore, a question of concern is the specific nature of critical thinking that can be fostered in home economics.

Critical Thinking in the Classroom

Recent writers see some problems with the way thinking has been taught in schools to date (Beyer, 1984a; Sternberg, 1987a; Wasserman, 1987). Beyer writes that there are five major reasons why educators are not doing a good job

of teaching thinking skills. First, he says there is not consensus on what thinking is and what skills are involved. Second, the developers of the instructional materials do not clearly state the skills they mean to teach. Third, most teachers do not use teaching methods that are conducive to critical thinking. Fourth, schools are skill oriented. Finally, the emphasis on achievement tests in most schools inhibit the teaching of thinking skills.

Sternberg agrees that there are problems with the way that thinking is being taught (1987). He says that the programs are doomed to failure before they even begin because of some of our ideas about teaching and learning. Sternberg writes that we operate under eight fallacies that obstruct the teaching of critical thinking before we even begin. First, "the teacher is the teacher and the student is the learner"(p.456). He says in order to foster critical thinking both the teacher and the students must take on the dual roles of teacher and learner. Certainly in a world where we realize that each person has something to contribute to the body of knowledge this should not be difficult. A thinking person should realize that in our school community we all learn together. Second, "critical thinking is the students job and only the students job"(p.457). This fallacy assumes that critical thinking can take place without the teacher modeling the behaviour. This would be like a teacher teaching mathematics without showing the students how to do the problems on the board. Third, "the most important thing is to decide on the correct program"(p.457). Sternberg says

that we must first decide on our goals and then decide how to go about accomplishing them. Fourth, "our choice of a program must be preceded by a complex set of binary choices, such as infused versus separate instruction or process-based versus holistic instruction"(p.458). Here Sternberg is criticizing school boards and teachers who see only two ways of teaching thinking, and see the two ways as being mutually exclusive. He would prefer that we look at a variety of ways of teaching critical thinking, that we accept there are several methods, and each has its own strengths. The "best" way to teach critical thinking may be to use some of each theory. Fifth, "what really counts is the right answer"(p.458). In critical thinking, rather than the right answer, it is the thought process that counts. Sixth, "class discussion is primarily a means to an end" (p.458). Again, in critical thinking the process of discussing is the most important part. Seventh, "mastery-learning principles can be applied to critical thinking, just as they can be applied to anything else" (p.459). The concept of mastery learning does not apply. How can one say that one's thinking is 90% correct? There is no ceiling on the level of performance. Finally, "the job of a course in critical thinking is to teach critical thinking" (p.459). Sternberg says that we cannot teach children to think, they must teach themselves. Our task as teachers is to provide them with the opportunity. Encouraging students to think critically is not just desirable it is a responsibility. If we want our next generation to be thoughtful citizens who can contribute to the welfare of the

world, we must be sure they have the ability to think critically. Hopefully with a new generation of thinkers old ideas of the impossible will be replaced with the inspirations of the possible.

Selma Wassermann concurs that there have been problems with the implementation of critical thinking in the schools (1987). One problem comes from our misunderstanding of what teaching thinking entails. Often teachers try to introduce thinking exercises and are frustrated by the outcome, not taking into account that students have gone through a system that stresses facts and achievement on tests. She also stresses the importance of teaching style and classroom atmosphere to the enhancement of thinking.

Hultgren (1989) states that sometimes in our rush to teach thinking skills we do not sufficiently reflect on our own thinking. She claims that many teachers feel pressure to teach for thinking without understanding the essence of critical thinking. This pressure causes teachers to develop "...quick-fix solutions in the form of techniques that are applied to content, and applied to students, in the hopes that with practice, these skills will be learned" (p.11). Hultgren is also critical about educators who apply the same techniques to the teachers, giving them workshops and "how-to" resources and specifying "...what skills should be taught, where and when" (p.11). Hultgren suggests that students and teachers need to experience critical thinking rather than rushing to learn thinking skills.

These criticisms highlight the concerns of several authors with the current state of critical thinking education today (Beyer, 1984a; Sternberg, 1987; Wassermann, 1987; Hultgren, 1989). Keeping these criticisms in mind we have a need to study how we can best foster critical thinking.

Most agree that the teaching of thinking is complex (de Bono,1983; Sternberg, 1987; Beyer, 1983; Wassermann, 1987; Raths, 1986; Paul, 1984). There is not a single method of teaching or a single issue to consider. de Bono argues the need to have separate instruction in thinking as well as incorporating it into all subject areas (1983). Others argue that teaching thinking must be integrated into the curriculum (Paul, 1984; Beyer, 1983; Sternberg, 1987). Sternberg states that students need to learn how to solve real life problems which includes being able to identify that there is a problem (1985a). Others stress the importance of classroom atmosphere, saying that a proper classroom atmosphere can promote intuitive understanding and motivate learning (Beyer, 1983; Sadler and Whimbey, 1985). Hultgren states that the teacher is the most important part of the thinking process in the classroom (1989). She is the catalyst that encourages the new knowledge and behaviours. The teacher must understand critical thinking, think critically and espouse critical thinking. "...if you playact being a thinker, you will become one" (de Bono, 1985 p. 6).

Another way to teach critical thinking is through processes such as decision making and problem solving. Beyer claims that we teach critical

thinking by combining the broader thinking processes such as problem solving with the micro-thinking operations such as extrapolation and synthesis (1984). Others agree that problem solving is a method for teaching critical thinking (Sternberg, 1985; Paul, 1985).

Some authors are concerned that the typical lessons for teaching problem solving, and therefore critical thinking are unrealistic (Beyer, 1984; Sternberg, 1984; Paul, 1985; Shor, 1980; Laster, 1987). They believe that the teaching we do in thinking should prepare the students to handle real life problems. Sternberg, Beyer and Laster agree that one of the most difficult stages in the problem solving process is defining the problem or even admitting that there is a problem in the first place. Often in classroom exercises the first step is skipped over by the teacher when she supplies the problem for the students. Students need to learn how to recognize problems, not just how to solve them. Everyday problems tend to be ill-structured and the information that is needed to solve them is not clear (Laster, 1987). Everyday problems do not have a "best solution", there are usually a variety of solutions and often the final choice is a value judgment (Brown and Paolucci, 1979). As Sternberg states "solutions to important everyday problems have consequences that matter" (1985a, p.198).

A second issue in the teaching of critical thinking is what is sufficient evidence to indicate that students are critically thinking? Lipman states that students are thinking when they can use good judgment that is based on criteria,

is self-correcting, and is sensitive to context (1988). He says that critical thinking must be based on criteria in order to be legitimate, that we must be able to back up our claims with reasons and criteria for the reasons. Other criteria used are validity, evidential warrant and consistency. He also claims that critical thinking is evident when the person can discover their own weaknesses and correct what is at fault. In the area of self-correction Lipman speaks about the advantage of turning the classroom into a community of inquiry. In such a community the members are not only responsible for their own thinking, but also for other members of the community. In this way both the individual and the community become self-correcting. The final aspect that Lipman discusses is that thinking must be sensitive to context. The thinker must be able to consider each event and behaviour as unique within its own context, and must consider that context when thinking.

Critical Thinking in Home Economics Education

Problem solving can be fostered in any subject area, and home economics is no exception. Problem solving is an integral part of home economics education philosophy. In 1954 Williamson and Stewart Lyle wrote "life is one problem following another... problem solving experiences are important in learning, are important in pupil development" (p. 128).

> Making inferences. Detecting bias. Identifying stated and unstated assumptions. Distinguishing between reliable and unreliable sources of information. Old process? New process? A part of home economics? Absolutely! These processes, along with other thinking skills, are part of our past (Fedje & Holcombe, 1986, p.94).

The philosophy of teaching critical thinking in home economics is not new. Home economics has always had a potential to be a subject in which students are asked to analyze, synthesize and evaluate as well as reason, judge and conclude. The teacher must adopt teaching for thinking as a personal philosophy if she is to be effective.

> In relation to the recognition of critical thinking as a way of being, the insight came forward that to become a critical teacher is to have the courage to enter into a common search with students, such that the distinction between student and teacher becomes blurred (Hultgren, 1989, p.33).

In home economics, problem solving can be taught in the context of or in reference to real life situations. In his list of eight fallacies about teaching critical thinking, Sternberg states that one problem is teachers who believe that the teacher teaches and the student learns. In home economics there has always been a place for a "learning together" attitude. The students often bring problems to class that the teacher was not prepared for, but the teacher and student work together, both learning.

Another concern of Sternberg's is the teacher who sees thinking as the students job. As discussed earlier, the teacher and the student must work together in their pursuit of critical thought. Home economics provides the

teacher the opportunity to be a thinker. The nature of home economics is such that it is closely linked to the individual and the family. As the class tackles problems that come out of families they are asked to reason, judge and draw conclusions. This process involves the entire class as a community taking on a challenge (Hultgren, 1989).

Sternberg asserts that another problem with most classrooms is the "correct" answer attitude (1987). Brown and Paolucci point out that home economics should have a moral reasoning emphasis. There is rarely a "correct" answer in family conflicts. The exercises in class should ask students to clarify their beliefs and help them to express and support their point of view (1979). Process should be the emphasis in home economics classes. Learning how to do things, how to find information, how to decide which information is useful, how to solve problems and how to incorporate these decisions into real life is what home economics education should be about (Laster, 1987).

Janet Laster talks about the kinds of problems we ask students to solve in home economics (1987). She claims problems fit along a continuum from well-structured to ill-structured. She agrees with Sternberg that most of the problems posed in school are well-structured problems that come complete with a recipe to solve them. Laster agrees with other writers that the problems most students will face in real life are the ill-defined ones (Sternberg, 1985a; Paul, 1985; Beyer, 1984b). Laster goes on to discuss the special role of home

economics in teaching students "practical" problem solving. She states that problem solving skills are an essential area of home economics education content. She suggests that real life problems are "messy" because they lack clear formulation, yet they are important because they are most likely to affect the students and their families. "Through reasoned problem solving home economics concepts are integrated and directed toward improving the lives of individuals, families, and society as a whole" (1987, p.1).

There has been research on the teaching of critical thinking in home economics. One study by Tabbada showed that the teaching of critical thinking skills in a foods class increased the students' mastery of the content, but did not foster critical thinking as measured by a critical thinking test (1987). In her conclusion Tabbada suggested that further studies in the area should include classroom observations and video recordings to determine better if critical thinking was occurring.

Other teachers reflecting on their experience as educators suggest that teacher behaviour is linked to the success of teaching critical thinking (Roe, 1987; Kowalczyk, 1987; Stark, 1987). A flexible attitude, an open and honest classroom atmosphere and even "bizarre" teacher behaviour was found to increase student participation and thinking. When the teacher behaved in "bizarre" ways by role playing and making nonrational statements the students were more willing to take risks themselves. Each stresses the importance of

classroom discussion in fostering of critical thinking. However, such discussions must be more that just talking. They must have an underlying learning process whereby the students learn how to critically examine a topic. Stark found that as some students discussed their values and beliefs, the other students realized how many possible solutions a problem could have (1987). As classroom discussions continued, the students were able to generate more alternate solutions. Roe concluded, although she used no measurement tool, that after introducing critical thinking, her students not only asked more questions in class, but more higher order thinking questions (1987).

Summary

This chapter discussed the research on critical thinking, beginning with definitions of critical thinking. Next,competing ways of viewing critical thinking were discussed. deBono says that any teacher can teach critical thinking through a series of thinking skills. Paul and others claim that critical thinking is best taught by trained teachers who incorporate thinking skills in every subject. Hultgren states that it goes much deeper than either of these. She says that critical thinking is a philosophy that the teacher internalizes and shares with her students as they embark on a "thinking voyage" through the course content.

Next, a discussion of the problems with the way critical thinking is currently being taught was presented. Teachers have operated under the

fallacies that the teacher teaches and the students learn, critical thinking is the students job, the most important thing is to decide on the correct program, that there is only one good program, what really counts is the right answer, class discussion is primarily a means to an end, mastery-learning principles can be applied to critical thinking and that we can teach children to think critically. Thus, it is suggested that to foster critical thinking may require profound changes in teaching beliefs and practices.

A discussion followed about some possibly better ways to address the teaching of critical thinking. Many who believe that critical thinking can be taught see problem solving an effective way of teaching it. Problem solving though must be taught differently than it has been in the past. There must be an emphasis on defining and identifying problems; and the problems should simulate real life problems.

The chapter concluded with a discussion of the role home economics has to play in critical thinking education. Critical thinking and problem solving have always been a part of home economics education. Home economics with its emphasis on daily living in families offers an opportunity for "practical" problem solving.

The intent of this study is to explore whether home economics, specifically Family Management, can foster critical thinking through problem solving. The study will be conducted using action research as the method for

data collection and interpretation.

CHAPTER III

METHODOLOGY

Action Research

The research methodology chosen for this study was influenced by the subject of the research, critical thinking. Although there have been tests devised for measuring critical thinking there is evidence that critical thinking and the approaches that may foster it in the classroom need to be studied by other methods (Wassermann, 1989; Tabbada, 1987). Wassermann argues that we have become besotted with trying to measure critical thinking with standardized tests. She fears that we will find ourselves assigning higher order thinking skills (HOTS) scores to our students and saying things such as "she is not thinking at her grade level". Wassermann goes on to say:

> One of the most valuable yet rarely acknowledged assessment tools in educational practice is the sustained, thoughtful, day-to-day observation of student behaviour by a competent, professional teacher (p.369).

What is Action Research?

Action research provides a methodological frame for this study. Action research which itself involves critical thinking particularly in the reflective phases is a particularly appropriate research methodology. "Over the past few years, an alternate research tradition has been evolving in this country. It goes by various names: teacher research, classroom inquiry, naturalistic research, action research" (Goswami & Stillman, 1987 p.I). Action research involves the collection of data from students and the teacher in the form of notes, audio and video tape recordings, journal entries, student interviews, parent interviews, classroom artifacts and so on (Bassey, 1986). After the data is collected, the researcher, usually the teacher herself, reflects on the data, often with the aid of colleagues. The teacher then analyses the data and draws conclusions.

Michael Bassey sees action research as having three components: 1) the person seeks improvement in his or her action, 2) the process is democratic in that its participants are involved in the process (not 'research subjects') and 3) it must be reflective (1986). Action research is reflective, and is often conducted with the intention of improving the teacher's actions. A crucial aspect of action research is reflection by the teacher during the research event. Reflection is itself a part of critical thinking. Reflection implies a looking back at what has been done, how it has been done; and evaluating or judging the effectiveness. Reflection on a particular plan and action may be done shortly

after or during the action (Bassey, 1986). Activities which facilitate reflections include the teacher recording perceptions and events in a journal and discussions with the students. Action research includes the students so that the teacher and students learn together. Discussion with a colleague is a third means of facilitating reflection. The teacher can use her journal to facilitate reflections with a colleague. This process of reflecting with a colleague provides the teacher another perspective on her effectiveness and through critical questions and dialogue facilitates more objective analysis and reflection.

Some authors on action research have diagrammed the process of planning, action and reflection (Kemmis et al, 1981; Elliot, 1981; Ebbutt, 1985). All three models start with a general idea which through a stage of reconnaissance lead to formulating a general plan, taking action, observing the implementation of the action, evaluating which includes reflection, and then either continuing with a second research cycle, or a revising of the original plan. Ebbutt's model (see appendix B) unlike the other two is not a spiral. Ebbutt criticizes the others because "if in moving along a spiral (or spiral staircase) one wishes to return to an original starting point, then one must retrace or repeat one's steps back up or down the spiral" (1985, p.164). Ebbutt claims that his model is "...a series of successive cycles, each incorporating the possibility for the feedback of information within and between cycles" (p.164). Because of this more flexible nature of Ebbutt's model, it was used in this study to guide the action research.

Why Use Action Research?

Rowland is concerned that teachers often do not take the time to reflect on their own teaching (1986). He believes that it is vital that teachers investigate the meaning of children's activities and take the time to reflect and develop insights. The proponents of action research say that teachers have been doing their own research in their own classes all along (Goswami & Stillman, 1987; Boomer, 1987; Britton, 1987; Martin, 1987; Berthoff, 1987). Cummings and Hustler stress the importance of teachers uncovering problems or matters that they perceive as important, not what an outside source thinks is important (1986). Teachers observe and question what goes on in their classrooms, hypothesize about what they observe and develop skills that help them address problems. Then they step back and analyze and interpret what they have seen. Action research does not take place in laboratories and it does not treat the classroom as though it was a laboratory. Teachers ask the questions themselves, they observe, document and draw conclusions with the help of their students and other staff members. Action research has to do with ownership. The research is owned by the teacher and her class.

In this study through an action research process, I will research my own teaching of a Family Management 11 class with the intent of exploring the research question "can we teach critical thinking through a problem solving approach to home economics, specifically Family Management?

Planning For Researching

I used Ebbutt's model,"Educational Action Research", to conduct this study (1985). The model begins with a statement of the general idea, which guides the subsequent research. After the general idea has been established the researcher does the first reconnaissance. The reconnaissance is conducted many times during the research/action cycles and includes observation and data gathering as well as reflecting through "discussing, negotiating, exploring opportunities, assessing possibilities and examining constraints" (Ebbutt, 1985 p.164).

After the first reconnaissance has been done the researcher formulates an overall plan, which is more detailed and precise than the general idea. It includes specific information about how the research will progress. The researcher then decides what action to take based on the overall plan and moves into the Action 1 phase. While the Action 1 phase progresses the researcher implements her plan. A second reconnaissance is conducted and the researcher then decides whether to continue into Action 2, revise her overall plan, or amend the general idea. Thus, the cycles continue until the research is ended.

Data Collection

The data was collected for all the reconnaissance phases from the behaviours of both myself and the students. Audio tapes were made of the lessons in such a way that both the students and I could be heard. The tapes were

used to verify information that was recorded in my journal. The tapes also allowed me to later listen to the class from a more objective stand point. Student assignments were collected and photocopied. I kept a daily reflective journal to record my impressions and data that were missed by the tapes. The journal included such things as passing comments heard while students worked on assignments, my reaction to techniques tried in the class, and my feelings about the process. I also used a "Self-Reflection" checklist (see appendix C) developed by John Barell that helped me identify teaching behaviours in myself that encouraged or hindered critical thinking (1985).

Reflection

The reconnaissance phases included time for reflection, an essential component of action research. Reflection as it was done in this study included many things. First, the collected data was studied. The reseacher looked for trends, evidence of learning, progress in the students' work, and so on. At the same time the researcher asked herself questions about the data: Why did this happen? What does it mean? What could I do differently next time? Is this evidence of thinking? A third part of the reflection was less concrete. The researcher asked herself how she felt at the time or how her students felt. She attempted to draw an intuitive picture of the class and its nature.

The General Idea

The first step of the action/research cycle was to establish the general idea. In the case of this research, the general idea was fostered first by a curiosity and more specifically after a review of literature on the topic of critical thinking. The general idea for this study was to question whether critical thinking could be fostered through a problem solving approach to home economics, specifically Family Management. The general idea included a method for integrating critical thinking into the course material.

The first concept introduced in Action 1 was problem solving. Not the traditional, linear form, but the more flexible model (figure 1). The second concept introduced was one recommended by Louis Raths and his colleagues (1986). The students were shown how to discuss and make decisions without the use of fallacies.

The Action 2 cycle included the introduction of other micro-thinking skills: 1) comparing, that is teaching students to compare things by looking at all their similarities and differences; 2) classifying, an extension of comparing, grouping according to similarities and differences; 3) summarizing, involving the selection of what counts; 4) observing and reporting, learning how to pick out important events; 5) interpreting, drawing inferences; 6) finding assumptions, for the main conclusion to be accepted, the underlying assumptions must be accepted; and 7) inquiring, seeing how knowledge is constructed (Raths et. al.

1986).

A third component of the general idea was that certain teacher behaviours were more likely to foster critical thinking. The teacher behaviours that were observed were some of those recommended by Barell (1985):

1. When the student asks an unexpected question, the teacher should say "what made you think of that?"
2. The answer in the text book is not the only correct answer.
3. The teacher should be flexible in allowing discussions to include ideas and values, not just content.
4. The teacher should encourage the students to seek alternate answers.
5. The students should be asked their reasons for giving cetain answers.
6. The teacher should ask higher-order thinking questions.
7. The students should be encouraged to critique each other's thinking.
8. The students and teacher should relate the course content to their own life.
9. The teacher should stress how to think, not what.
10. The teacher should encourage the students to listen to each other.

The Reconnaissance

Reconnaissance is part of all the phases in Ebbutt's action research model. The first reconnaissance is done after establishing the general idea (1985). In this study the general idea is that we can discover if critical thinking is

fostered through classroom problem solving, using micro-thinking skills, and certain teacher behaviours. Reconnaissance is fact finding. It includes "...discussing, negotiating, exploring opportunities, assessing possibilities and examining constraints" (p.164). The reconnaissance for this study involved observing the classroom, students and myself so that an overall plan could be formulated and action could be taken. The data collected in this phase established a description which served as a point of reference for comparing and analyzing later observations.

The Timeline

The first reconnaissance began on November 25, 1988 and continued through December 14. During this time I taped the class for six hours, recorded impressions in my journal, used the checklist and collected student work. I taped only six of the nine classes that took place during this time because one class was spent reviewing a concept from the previous unit, during one class the tape broke and for one class I was absent.

The Course Content

The course content covered during this phase was problem solving in the traditional, linear manner; the human reproductive system and how pregnancy occurs; the health hazards associated with pregnancy; childbirth and the stages

of labour; a father's viewpoint on being in the delivery room; nutrition and pregnancy; and food guides for pregnant women.

The Students

At the time my reconnaissance began the class had been meeting for two months. As is typical in secondary schools, students transferred in and out of the class, but it was stable during most of the previous months. The class consisted of twelve female students in grades ten, eleven and twelve. Two of the students had previously been in "special" classes and were being integrated back into the mainstream; three were doing a career preparation program in Hospitality/Tourism; and the rest were in the general program. None of the students were enrolled in a highly academic program.

All members of the class participated in this study. In addition, I focused on two students throughout the study in order to understand certain changes and experiences at an individual level. I chose two students that were very different. Tara is an average to above average student. She is very vocal in class, participates in every class discussion and expresses thoughtful questions. She has definite values and attitudes that are reflected in her discussions. She does tend to think that she is right and others are wrong. I am hoping that I might encourage her to empathize more with others. This would make her a more valuable part of class discussions, and if she could carry that attitude onto later

life, so much the better. Barb is quiet, and has spent much of her schooling in "special class" and is now being integrated into the mainstream. She does not contribute to class discussions often but appears to be very interested in the class. She does ask some questions and these show that she is listening and involved in the subject matter. I am hoping that the class will give her more confidence socially and academically. Another reason I chose her is because of the common assumption that critical thinking is enrichment that is particularly relevant to advanced students, not "regular" students in regular classrooms, and certainly not to the learning disabled.

The Classroom

The classroom in which Family Management 11 was taught had previously been a computer lab. There were massive cubicles covered with dark brown carpeting down each side of the room which gave the whole room a gloomy tone. The third wall was covered by a chalkboard and the fourth wall was mostly windows. I taught only Family Management 11 in this room, and the three small bulletin boards available were used by the regular teacher and were not available to me. This made it difficult to establish the type of creative, stimulating atmosphere I wanted. At least the room had tables instead of desks, so it was conducive to small group work.

The Class

By November, the students had become a cohesive group. I always start the course with units on The Self and Communication. In the unit on self I emphasize self concept. We discuss how a person's self concept is created by those around them. Put downs are not allowed in this class because it interferes with the person's right to express themselves and with effective communication. This helps to draw the students together and foster trust. In such a climate the students are open and willing to discuss most topics. They are more willing to take risks in such a warm and supportive environment. They are willing to share personal experiences that relate to the topic being discussed.

It was during the class on November 30 that I came to realize what a innate sense of curiosity the students possessed. We were watching a video on the human reproductive system. The video was made using fibre optic cameras, showing the inside of the human body as it traced the path of the sperm and ova. I do not think the students were too interested in the information because all their questions during and after the video revolved around how the filming was done. For example:

"I sure hope they put that guy out"

"Who would volunteer to do something like that?"

"How could they do it with all that stuff around?"

I wondered how I could nurture this sense of curiosity and encourage the

students to apply it to all areas of the curriculum. This kind of curiosity is vital to critical thinking. As I listened to the tapes I noted that I answered the questions and treated them with the same respect as questions relevant to the topic. Perhaps this is one way to encourage their curiosity.

The students often ask pertinent questions, assuming the role of questioners and critics. For example, in discussions about child birth they asked:

"What would happen if the baby started to go back in?"

"I know someone who has a normal baby and she smoked -

How come?"

These questions exhibit that the students are not always willing to accept the textbook information. Their life experience and their intuition has given them different information. In this instance they are critically looking at the information being presented to them instead of just absorbing it. On the other hand, the students are not so narrow minded that they will not accept the information. They are willing to listen to more information. When I began to lecture, I was often interrupted by questions or challenges. This was not a disruption because the questions were relevant. The questions were usually generated by six students, especially Tara. In fact, only 50% of the students participated verbally on a regular basis. I think this freedom to question must be encouraged. I had to find a way to encourage the other students to ask questions in class. Barb would sometimes ask me questions after class in private. I always

treated her questions with respect, hoping she would be more willing to ask her questions in class. Perhaps I needed to tell her to ask her questions in class.

I believe that the students enjoyed the class and were interested in the content. I realized this most when I listened to the tapes. When I announced the topic for the lesson, or asked them to do an assignment, only once in the six hours did I hear them groan. I was quite surprised to hear how much laughter was in the classroom. Another factor that made me believe that the students enjoyed the class was that I very seldom had to discipline them for not listening or talking to others. Not once in the six hours of taping did I speak to a student about the above infractions. All this made it a promising class to work with. If they enjoy being here and learning the course content they should be willing to learn new ideas as well.

One concern I had was the narrow minded nature of some of the students. The students tend to see issues too much as black and white. For example, when the topic of tubal pregnancy was discussed the students who were against abortion in general were still opposed to it in this case where both mother and child would die if the abortion was not carried out. Will teaching them critical thinking help them to see the gray areas? I think that teaching them about fallacies and how to avoid using them will help them learn how to form arguments.

Problem Solving

On November 25, the first day of the reconnaissance, I introduced the problem solving in the traditional linear manner (see appendix A). I wanted to teach the problem solving process as I had always done to see if there was a difference between this and the more flexible way I was planning to teach later. After I had gone through the problem solving process on the board, the students were asked to form groups and I gave them a problem to work through. The problems were: 1) A teenage girl gets pregnant, 2) a teenage couple decides they are not going to have sex, 3) a teenage couple decide that they will have sex, and 4) a teenage boy finds out that his girl friend is pregnant. I taught the process in isolation at this point so the problems were not related to the content we were learning. Instead, I chose Family Management related topics. The students generated several possible solutions to the problems. The first group had the problem of the teenage girl that got pregnant, their solutions were: she could give it up for adoption, she could have an abortion, she could give the baby over to a family member, she could give it to the father, or she could put it into a foster home until she was able to care for it. The second group had the problem of the teenage couple who decided that they did not want to have sex. Their solutions were: they could avoid intimate situations eg. keep the lights on, they could date in public places with lots of people around, and they could talk about it. The third group had the teenage couple that wanted to be sexually active.

Their solutions were: they could discuss the consequences of their actions, they could discuss it with their parents, and they could find out about contraceptives. The fourth group had the problem of the teenage father. Their solutions were: he could marry her, he could leave her, he could support her and the baby, he could adopt the baby, he could give her money for an abortion, or he could make her have a miscarriage. The next step of the process was to evaluate each solution.

The evaluation step is where I sensed one problem with the five step model. The students were expected to look at the positive and negative aspects of each solution in isolation. They did this by discussing the possible consequences of each solution. Groups like the fourth who had generated a long list of possible solutions soon bogged down with the amount of work and did not finish the assignment. They took a short cut and picked their favourite solution. Another problem arose with the finality of the decision. There was no flexibility in this model to go back and revise the possible solutions or question whether the problem was properly identified in the first place. I decided that when I introduce the new problem solving model I will stress the flexibility of the model. The "new" model was not the direct result of this problem solving exercise. It was something I had envisioned as I read from Sternberg and others, regarding the unsatisfactory problem solving that went on in classrooms. I wanted a model that would address the concern that the students needed practice identifying the problem. It seemed to me that a flexible model would allow the

students to go back to the problem statement and change it to another answer.

The Teacher

In order to become aware of my actions as a teacher, I analyzed the tapes and filled out the checklist (see appendix C). From this analysis, I distinguished actions I was taking which were likely to foster critical thinking from those actions which could be changed to encourage better critical thinking. I observed teacher behaviours in myself that were conducive to the fostering of critical thinking in students. 1) I gave the students time to think about their answers when I asked questions and only moved onto another student after I had asked the question in a different way and the student had told me that they were not prepared to answer the question. 2) I integrated my personal experiences into the lesson and encouraged the students to do the same. 3) I modeled thoughtfulness. For example, if a student asked me a question that I could not answer I asked the students to help me and we speculated as to what the answer could be. At the end we sometimes agreed that we do not know the answer.

The actions which could be worked on to foster better critical thinking in the classroom were: 1) I lectured too much. In fact I discovered that during the six hours of class time I lectured, lead a discussion, or showed a video 82% of the time. From this information I concluded that more time needs to be spent on student problem solving. 2) When the students answer questions or provide

information I tended to accept the answer too quickly thereby shutting off the thinking of the other students. As I listened to the tapes I heard myself judging some of the students answers by my response to them. For example, I heard myself say "great" to an answer from a student. I think this may have misled the others students to think that it was the "right" answer. From this information I concluded that I needed to give a more neutral response to student answers. 3) I needed to ask more probing questions which would encourage students to examine their own reasoning and beliefs. The tapes revealed that I did not ask enough probing questions. This information lead me to conclude that I must train myself to make a conscious effort to ask probing questions. 4) I needed also to increase the amount of higher order thinking questions. I discovered that I asked some higher order thinking questions, especially evaluation questions, but I believed I could ask more. I practiced asking more higher order questions. 5) While I challenged students to generate original and creative ideas, I allowed them to give up too easily. For example, when I asked them to adapt the Canada Food Guide so that it applied to pregnant women most of the students complained that they could not think of anything to do, so I allowed them to just copy the original guide and put in the changes for pregnant women. I should have asked them questions to stimulate their thinking so they could develop an idea. The three students who did create a poster with their own ideas produced excellent results. One student drew a pregnant woman with a huge round stomach. Within

the circle of the stomach she drew a fetus surrounded by food from the four food groups. The second student (Tara) drew food inside of a refrigerator with each shelf representing a food group. The third student laid out four tables with table cloths and signs that identified each group. The food was beautifully presented on the tables. From this experience I concluded that I had made some progress towards creating a thinking classroom, but that there was much more I could be doing.

Summary

These observations indicated the state of the class before intervention began. As each of the next three phases are discussed they will be discussed in reference to this base line data. From this reconnaissance I formulated an overall plan that dictated the action in the next phase. The plan is to teach the flexible model of problem solving, stressing the flexibility of the model and making the evaluation simpler. I will teach about fallacies and how to avoid using them. The reconnaissance generated questions that will guide the monitoring and reflections in the next phase:

1) Will the flexible problem solving model encourage critical thinking?

2) How can I channel the student's curiosity and enthusiasm and channel it to all areas of the curriculum?

3) How can I encourage all students to ask questions?

4) Will teaching them not to use fallacies encourage them into thinking critically?

5) Can I lecture less and spend more time on student centred activities?

6) Can I avoid acknowledging a student when they give an answer that I consider to be correct so that the other students continue to generate answers?

7) Can I ask more probing questions?

8) Can I ask more higher order thinking questions?

9) How can I challenge the students to be more creative?

CHAPTER IV

THE RESEARCH /ACTION CYCLES

After the first reconnaissance, it was time to move into the action phase of the action research cycle. The reconnaissance ended just before the Christmas holiday and I used the holiday to reflect on the class and generate the questions listed at the end of the previous chapter. This part of the study began on January 3 and went through twelve classes up to and including January 27. The curriculum content during this time included problem solving, birth and birth defects. The critical thinking skills I introduced at the same time were problem solving and fallacies.

Problem Solving

In the first class we reviewed the problem solving model used in November (see appendix A). I stood at the chalkboard and asked the students to recall the five steps of the problem solving process. Tara was able to remember and list the five steps. As she called them out I wrote them on the board in a circular

rather than linear form. At this point I introduced them to the flexible, circular problem solving model (figure 1). I explained to the students that problem solving should be a reflective, circular process. That is, the steps of problem solving will not need to be completed in a particular linear order. Rather, one might work on all parts of the process at the same time. For example, after brainstorming for possible solutions to a problem, a person may realize that the problem had not been clearly identified earlier and may at this point move back to an earlier step of clarifying the problem. I explained that the model should cover the page, allowing room to go back and add to their answers. I encouraged messiness. I explained that changing their mind and crossing out old ideas was an indication of thinking.

After we had gone over the model, we applied it to a case study. I wanted the students to practice identifying the problem as part of learning the process, so I read a letter written to an advice column. A girl had a friend who was a little overweight and the girl's boyfriend teased her about it in front of his friends. The girl was very hurt by this and asked her friend for advice. I asked the students what the problem was.

Tara: Lack of love (I wrote it on the board)

Teacher: Do most of you agree that this is the problem?

O.K., Lack of self confidence could be another way of saying it. (I wrote it on the board)

From this the students brainstormed eight possible solutions including:

Liz: She should drop him.

Tara: She should talk to him about her feelings.

Debbie: She should lose weight.

Mary: She should see her boyfriend only when his friends are not around.

When we had exhausted our list, I reminded the students about the flexibility of the model. We went back to the problem statement and debated if it was the problem. This time they decided that the problem was definitely that the girl had a poor self concept. We then went on to evaluate each of the possible solutions. As we went on Liz decided that we needed to go back and add another possible solution (great!). She wanted to add:

"Her friend could tell the boyfriend how much he hurts her when he teases her."

We evaluated the possible solutions by discussing whether the solutions were practical and whether they truly addressed the problem . For example we decided that "she should lose weight" was a poor choice because it had nothing to do with the real problem. As a matter of fact, we began a lengthy discussion about body image and self esteem. We decided that three of the solutions were the best:

"the girl's friend should talk to the boyfriend"

"she should work on her self concept"

"she should drop him"

I explained that we needed to choose a solution and work it through the model. I picked "she should drop him" as an example and worked it through the process. Sally pointed out:

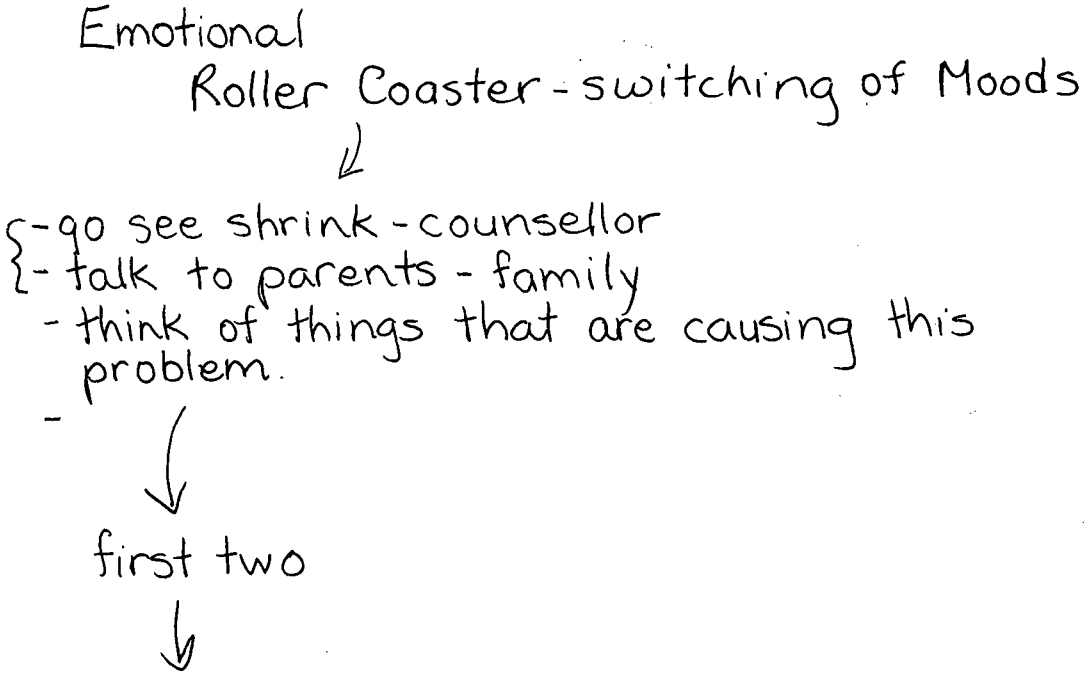
"If she drops him she would not have a boyfriend and that could make her feel even worse about herself".

We decided this was not the best solution so we went back and said it would be best for her to work on her self concept first (with her friend's help). Then drop him.

I was pleased with the way the students worked through the model. I was glad that they saw the flexibility of the model and went back to add to their answers. Next, I wanted them to work through the model on their own. In pairs they were given more advice column letters to work through: 1) A thirteen year old girl hates food and is a picky eater. She is afraid that she's going to stunt her growth. 2) A fifteen year old girl is on an emotional roller coaster. Fighting with her brother one minute and getting along the next. 3) A seventeen year old boy has a friend who drinks a lot, the friend's father is an alcoholic and he's afraid that his friend may be too. 4) A young girl sees a bag lady on her way to school each day, she wants to help the lady but does not know how. These problem were

chosen because they were all issues that effect families, and at the same time they had many possible solutions. Each of these problems had obvious superficial solutions, but the students can peel away the levels like an onion and look deeper and deeper into the problem. The challenge is to encourage the students to peel away the surface to get to the real problems underneath.

Each pair worked through one of the problems on their own. I did not want to interfere, so I sat at my desk and did some other work. At the end of the class I collected the students assignments. I could see that the students were still thinking linearly. They still wanted to write out their ideas one after another in a line. Three of the five groups did show some movement in their model. I did not see anything crossed out, indicating that they had gone back to change their minds. I wondered if they would be more flexible with unlined paper.



If can't go to parents should try and talk to counsellors, and someone could probably help her find what is really wrong and discover them the things that would lead her to her moods. Look at her problem from the family point of view.

Figure 2. Mary and Robin's Model

Figure 3. Sherry, Liz and Tara's Model

I am not ready to draw any conclusions as to whether the more flexible model encourages critical thinking. I am watching for signs of the students using analysis and evaluation to identify problems. I am also looking for evidence of critical thought when they made judgments about the solutions. The students did seem to understand how the model worked. I had originally planned to spend more time on the model in isolation, but I decided that it would make more sense to introduce a micro-thinking skill and integrate the two together.

Fallacies

The micro-thinking skill that was introduced first was one recommended by Louis Raths and his colleagues (1986). The students were taught how to discuss and make decisions without the use of fallacies. The fallacies that were addressed were: 1) attributions, attributing certain behaviours to certain causes; 2) extremes, using extreme terms that permit no exceptions such as none, always or never; 3) either-or's, a fallacy of accent, that there are only two possibilities; 4) qualifications, the idea of saying anything you want as long as you qualify it; 5) analogies, saying that something is like another; 6) if-then, a causal relationship is being expressed; and 7) evaluative statements, such as a "good" presentation. Helping students to be aware of the fallacies that are used in everyday discussion and helping them to look deeper for the truth should help them to think at a higher level.

I decided to take time out to teach about fallacies in isolation because I believe it is an important concept. In the past I have always criticized student assignments for using faulty logic but I have never taken the time to teach about fallacies. I explained to the students that by not using fallacies in their arguments they would be forced to look deeper for the truth and to go beyond mere opinion. I explained that using fallacies is a "cop out" and it interferes with the ability to think critically. The avoidance of the use of fallacies is one of the micro-thinking skills that should help them to reason better when problem solving. I believe that this is one of the moral issues addressed in the research question: What moral and ethical issues does the teaching of critical thinking address. The use of fallacies to win a debate or make a point is not moral. If you are discussing an issue with a person who is not as knowledgeable as you about an issue it puts the person at a disadvantage. For example, a person who is losing an argument on a controversial topic may use the phrase "I read somewhere..." . The other person may back down thinking that their opponent has read the information in a reliable source when the truth is they read it in a pamphlet they were given on a street corner. Using fallacies is also a substitute for rational thought. Allowing this to go on is not encouraging the students to think critically and that is not ethical.

I spent three classes teaching the students about fallacies. At the beginning of the first class I had them write a position paper on a controversial

topic. They had to chose a Family Management topic such as abortion or smoking while pregnant, that they felt strongly about and take a side in the argument. I gave these guidelines because I wanted to show them later how often we fall back on fallacies to form arguments, especially when it is a topic with which we are emotionally involved. When the students finished a one page position statement I collected them and put them away until a later time. I then went on to teach about the seven types of fallacies: attributions, extremes, either-ors, qualifications, analogies, if-thens, and evaluative statements (Raths et al, 1986). The students showed that they understood by writing three examples of each type. Each student scored 100% on this assignment, so I was sure they understood.

The next day I had the students go through magazines and find examples of fallacies in the advertisements. At first they asked me about most of the advertisements, and I fell into the trap of answering them. Then when I realized what I was doing I decided that rather than just telling them, I would go through my thought processes aloud. For Example:

Barb: What's this?

Teacher: What message do you think that is giving you?

Barb: (Shrug)

Teacher: OK, its saying that people who drink that kind of liquor are what kind of people?

Barb: I don't know

Teacher: This guy here - I think he looks adventurous - like

he's off in another country - maybe Morocco

So that ad is saying....

Barb: (Shrug)

Teacher: That people who drink this liquor are adventurous

That would be an example off..... probably attribution.

As the students worked along they asked my opinion less often. They began to evaluate by themselves according to a set of criteria. For example:

Tara: Mrs. Raynor, could you use this one - Kindergund?

And before I could answer - "That's not really anything."

The students discussed with each other as they evaluated:

Sally: Tara, this is like home cooking - that is an analogy.

Tara: Is that analogy?

Liz: This is like home - HOME COOKING - that IS analogy"

Sally: Yeah!

As I walked around the room I was confident that the students understood what fallacies were, but I wanted to be sure they could find them in another medium.

The next day I showed the students television commercials and we orally identified the fallacies in them. After the first eight I was sure the students had a firm grasp of the concept. I sent the students back to write another one page

position paper on the same topic they had written on the first day. This time without fallacies. I think I have made them paranoid! Their one page arguments have been reduced to a few cryptic lines. The arguments the students wrote were much shorter, but they did not use fallacies. I am certain they will relax with the concept as they use it more. I returned both papers to the students so they could compare them and identify the fallacies in their first draft.

The next day I introduced them to the next part of the assignment, to write a research essay without using fallacies. I explained about citing their sources and using a bibliography to back up their arguments. The students could choose their own topics as long as they dealt with birth, or birth defects such as twins, Spina Bifida, Down's Syndrome, and Sudden Infant Death Syndrome (SIDS). The students worked in the library for the next three classes preparing their assignment. I did not tape these classes because it was impossible in the library with the students spread all over. The following class the students did oral presentations of their essays. Unfortunately the classroom was being painted and we had to do the presentations in the library and once again, I could not tape them. The oral reports were not impressive. Most of the students just read parts of their reports. One exception was Tara and Liz, they did a report on SIDS using puppets. Next time I give this assignment to students I will change it. I allowed them to simply recite the information they had found. I did not give them the opportunity to do anything with the information. Next time I will ask them to do

their presentation as a debate or a speech from one point of view. This would give the students an opportunity to act on the information instead of just repeating it.

When I graded the papers I coded the fallacies in the papers. I used the coding system developed by Raths and his colleagues (1986): Attributions, A; extremes, X; either-ors, E-O; qualifications, Q; analogies, An; if-then, I-T; and evaluative statements, +/-. I was very impressed! Some students such as Tara used no fallacies at all and the greatest number was seven. The students had relied heavily on cited resource material . Once again I believe I could have developed an assignment that would have given the students an opportunity to use the information to think critically. Writing a research essay is in itself an exercise in critical thinking. The students must judge the validity of the information they read and decide what information they should include in order to form their argument. Even so, if I had asked the students to take a certain stand and write a position paper to support their argument it would have been a better assignment.

Most of the students chose topics dealing with birth defects, so I showed a video about a boy with Down's Syndrome. The movie dramatized what it was like for one family to have and raise a child with Down's Syndrome. I showed this video partly because of the information in it, but mostly so the students could empathize with parents of disabled children.

Problem Solving

The following class was the last one in the cycle. I wanted to do another problem solving exercise at the end of the fallacy unit to see if students were problem solving differently from the beginning of the unit. Students worked through the following scenario in pairs: A pregnant woman goes into the hospital and has an amniocentesis. The doctor tells her that the baby has Down's Syndrome (this time I gave them blank paper and coloured pens to work with). The results were interesting. Two groups diagrammed a problem solving model that looked more like a mind map. They put the problem in the centre and radiated out with possible solutions and then radiated out again to evaluate each of the solutions.

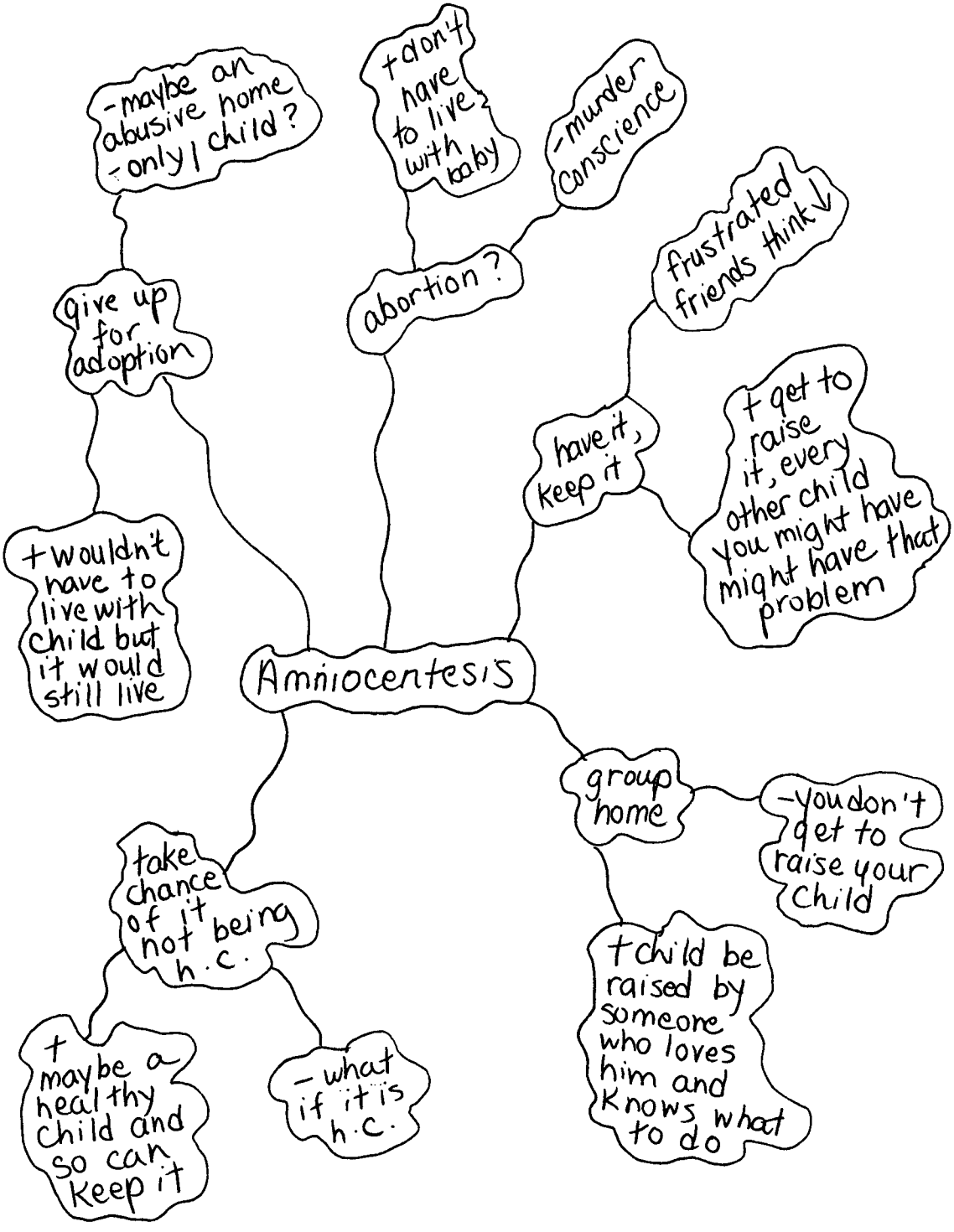


Figure 4. Liz and Tara's Model

Another group used a circular model, but each circle just contained possible solutions. No evaluation here! I decided to watch for this next time and remind them to evaluate.

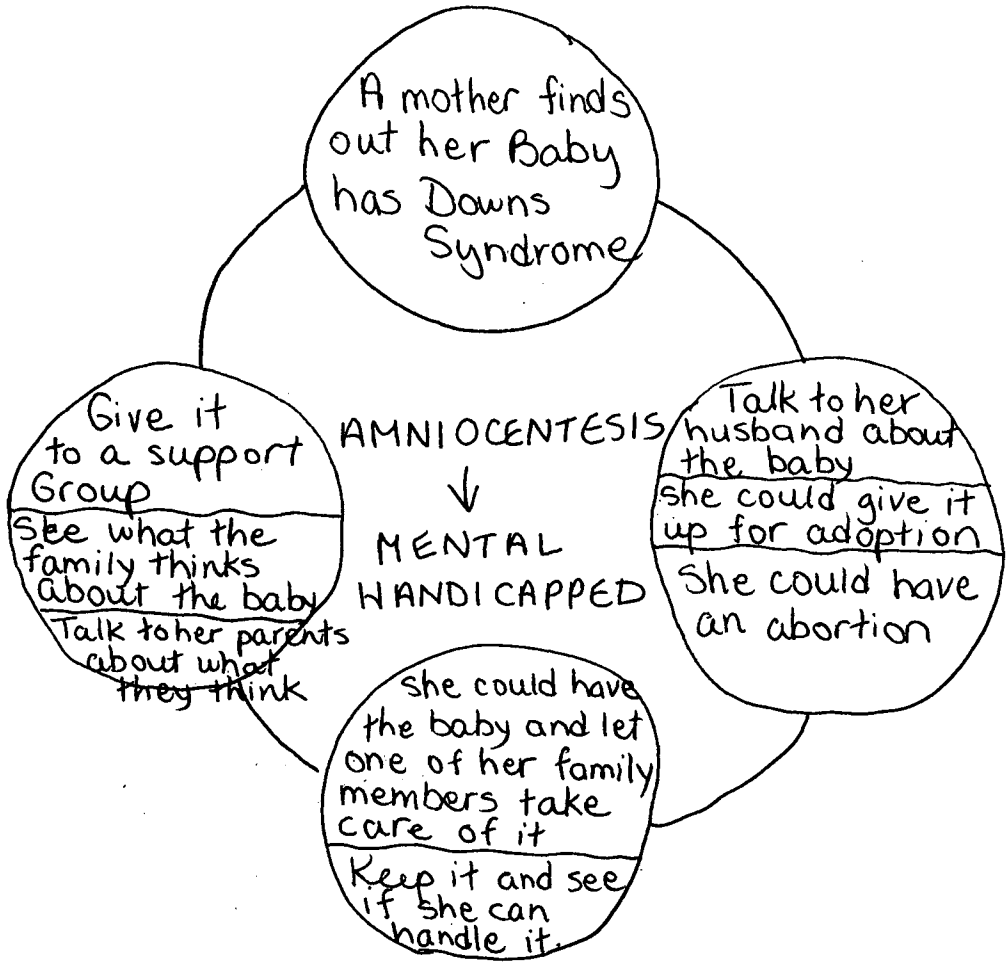


Figure 5. Barb's Model

One group did a chain of circles with a solution, an evaluation, a decision, and back to a decision.

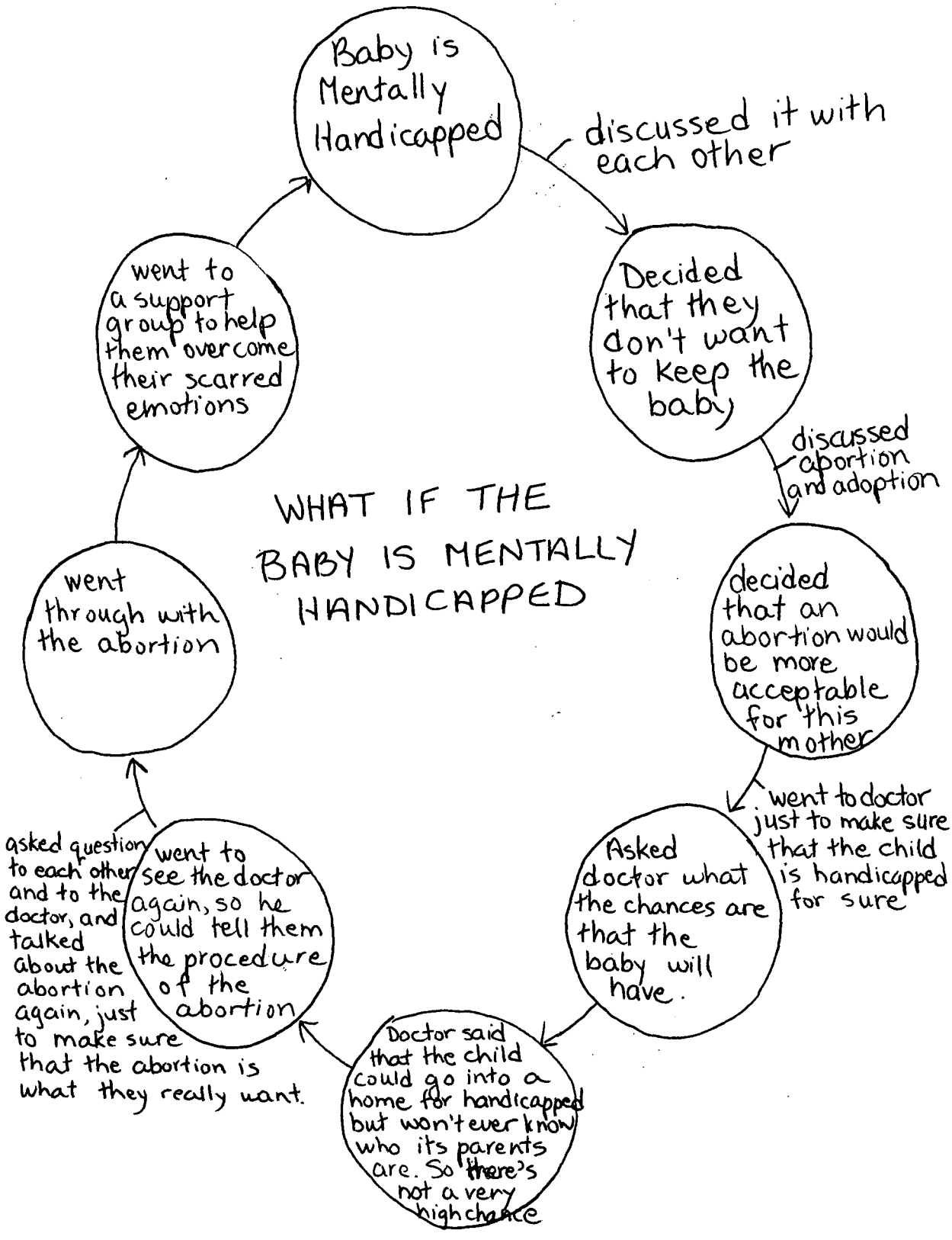


Figure 6. Debbie and Jane's Model

I see progress! The blank paper helped. At first I was disappointed that they did not reproduce "my" model, but then I realized that some of them had found a different way to get to the same place. They were thinking! The two groups that went to a mind map model had found a way that made it easier to show their brainstorming and evaluation process. Although all groups identified the problem and brainstormed for solutions and most had evaluated their solutions, not one group picked a solution and worked through the consequences. Perhaps it is not reasonable to expect them to chose a solution when it is a fictitious situation. This leads me to wonder if they solve their own problems this way!

I did not know of any way I could determine if they used problem solving in their day to day life, so I decided (at the suggestion of my advisor) to ask them. I asked them if they thought the problem solving process was useful and if they had been using it outside of class. I was surprised by their response. Not so much by what they said, but the enthusiasm with which they said it. The response was overwhelmingly positive. For example:

Barb: Yes

Tara: Yeah

Debbie: I used it lots of times.

Wendy: I think I used it unconsciously before, but now I think about what I am doing.

Discussion With Colleagues

When I reflected back on this cycle I discussed the results of the class with some colleagues who all teach critical thinking in their classes. These colleagues and I are members of a society that meet and discuss "thinking" on a regular basis. We have different teaching backgrounds but agree that thinking is something we can teach to our students. I was feeling a little disappointed that I could not see more change. They assured me that it takes time and the students progress slowly. After all, the students have been taught very little critical thinking in school. They encouraged me to continue with what I was doing.

Teaching Style

I listened to the tapes of the class to analyze my teaching during the action 1 phase. The classes were much less teacher centred this session, 36% of the class time compared to 82% in the first reconnaissance phase. I am still working on Barb's confidence so she will ask questions in class. I notice I still often answer the students' questions rather than asking them to reflect on their questions or to find their own answer. I have heard some improvement in the way I acknowledge a student when they give an answer that I considered to be correct. I did not judge answers with an enthusiastic response as often this time as during the first reconnaissance. I still need to work on asking more probing questions and more higher order questions. All these things can continue

to be worked on more in Action 2.

Summary of Action 1

As I entered Action 1, I had questions to guide my observations. I have not found answers to these questions yet, but I have gathered evidence to help me answer them later. I also generated some new questions to add to the list as I move into Action 2:

1) How can I encourage the students to understand that choosing a solution and imagining the consequences is an equally important part of the problem solving model?

2) Does it matter if the students use "my" problem solving model as long as they use a method that generates thoughtfulness?

3) Will teaching other micro-thinking skills encourage the students to think critically?

At this time I am not prepared to amend the general idea of this study that critical thinking can be fostered through a problem solving approach to teaching Family Management 11. Neither am I going to revise my overall plan. I am going onto the next step of my plan which is to introduce other micro-thinking skills and at the same time continue to problem solve with the class. I am therefore ready to move into Action 2 and begin my monitoring and reconnaissance again.

Action 2

The general plan included introducing the students to other micro-thinking skills: Originally I had planned to teach these skills in isolation and then incorporate them into the curriculum content. After introducing fallacies during Action 1, I decided that this task was too onerous. It would take a great deal of class time to introduce each of these skills in isolation and then have the students apply them. In fact, Beyer suggests that we should teach only three to five new skills per grade (1983). I decided then to work on observing and reporting, and summarizing.

The curriculum content during this action was human growth and development. It seemed appropriate to focus on skills of observing, reporting and summarizing while teaching child development since the observation of children is commonly included in this topic.

Time Frame

Action 2 as discussed above occurred during the unit on human growth and development. This unit began on February 14 and continued through March 16. From March 6 to 16 the students worked on a toy making project that enabled them to apply what they had learned about child development.

The Content

I started the unit on child development on February 14. I lectured and wrote notes about child development on the board while the students copied the notes. During these three classes the students and I interjected with stories to illustrate the information.

Listening to the tapes of these three classes I was appalled at how much I talked. I decided there must be another way to get the same information to the students. One day when I was absent I left questions for the students to answer that required them to use their notes.

The following day the lesson was to be on how to observe and record the actions of a baby. I had arranged for a mother to bring her baby to class on the following day. I planned to teach the students what to look for while observing the baby. I photocopied an observation worksheet from a teacher's resource book for the students to use. As I walked down the hall to the classroom, I was thinking about my research questions and was feeling guilty about the last four classes being so teacher centred. I decided that rather than my giving an observation worksheet, the students could develop their own guide.

I explained to the students that observing and recording what the baby did meant using precise language. I explained that saying the baby was "cute" was not descriptive. I suggested that we make up a list of questions that we could ask ourselves while we watched the baby, or we could ask the mother. The class

worked together and generated a long list of questions, such as:

Wendy: What is she fascinated by?

Tara: Does she like music?

Janet: Who is the baby most attached to?

Liz: What are her eating habits?

Barb: How many diapers does she use each day?

When we had over a page of questions (the original checklist only had 15) I finally had to stop them. I was pleased to notice that Barb had contributed to the list with three questions.

Observing

The baby and mother arrived the next day. In all the excitement I forgot to turn on the tape, so I made sure I noted things in my journal right away. The students had their questions. They watched for what they could and asked the mother about things they could not observe such as how many diapers the baby used in a day. The class was very successful. The students asked their questions willingly. I did not have to prod the students to participate. The students asked questions for a full fifty minutes.

The next day I had the students take their notes and write a paragraph about the baby. This exercise gave the students an opportunity to practice summarizing information. I reminded them that summarizing meant looking at all

the material they had observed and recording the things that were significant. After they wrote their paragraphs I had them read them out to the class. It was interesting to see how the students summarized the same body of information. There were some things that everyone listed such as her name, age, and how many diapers she used in a day. Almost everyone mentioned her weight at birth. There were only two facts that were listed by only one student. One student reported on a story about the baby not recognizing her newly bearded father and crying. Another student wrote about the baby's problem with blocked tear ducts. I asked the class why they thought each of these stories was discussed by only one student. It turned out that each of the students had had a similar personal experience with a baby they knew. I used the opportunity to discuss how a person's perspective affects what they see when they observe something and what they include in a summary. For example, they were all surprised by the number of diapers the baby used in a day, so they all wrote it down and they all included it in their summary.

We went on to generate a checklist for our visit to the primary school next day. This time the students worked in pairs to make the list. Then I called the students together and we compiled the information from all checklists. We discussed the importance of using descriptive phrases and I supplied words for observation such as: willingly, calm, nervous, eager, dreamy, erect.

The next day we went to the primary school for a two hour visit. The

primary school in our town includes Kindergarten to grade two. The principal had arranged for the students to drop in and out of each classroom as they pleased. We were there over recess so the students had an opportunity to go outside with the children and watch them play. The students enjoyed their visit. As I walked around the school I found them reading to kindergarten children, helping a grade 2 student with her seat work and the basketball player in the class was found in the gym with the grade one class teaching them how to shoot baskets. It was interesting to see how different students reacted with the children. Tara was strangely distant. She went to every class and took notes carefully, but she did not get involved. Barb, on the other hand, was swept up by the children. Every time I saw her she was playing with, reading to or talking with a child.

The next day we discussed our visit to the school. When I asked for general impressions I was told:

> Mary: They were animals!
>
> Wendy: I thought the kindergarten kids would be shy, but they all crowded around.

I could see they had a lot to share so I divided the chalk board into three sections: kindergarten, grade one, and grade two. I had the students write their observations on the board in the appropriate column. Some of their observations were:

Kindergarten

-could print their name

-could print the alphabet

-not shy

-good manners

-content

-good imagination

-played with opposite sex

-shared well

-open and honest

-memorized the storybooks

Grade One

-liked to play

-enjoy music

-bored easily

-eager to give the answer

-no slouches

-put up their hands

-some still write letters backwards

Grade Two

-liked math

-worked well together

-ask for help with their work

-more coordinated

-liked music

-like to show off their work

-more concerned about appearance

The students had observed the students and recorded the information. As can be seen, they did a good job of summarizing the information. They were also

able to classify the observations and note the differences between the different grade levels. We discussed how different and similar the students were at different grade levels.

The next six classes were spent applying the knowledge they had to make a child's toy. This in itself was an exercise in problem solving. The students were given a problem: to make a toy that would meet the developmental and safety levels of a child of a particular age. The toy had to be educational and had to be inexpensive to make. The students had to hand in a short report with their project. They had to explain how to use the toy, what age group it was for, safety features they had thought of for a child of that age, the cost, and what the toy taught the child and how that related to the childs's development. Tara made a large fabric block. The block was soft and could be rolled on as well as pushed around. Each side of the block had an activity on it such as counting, fastening snaps, a zipper, velcro fasteners. Liz made a soft fabric book. It contained dressing aids such as zippers, buttons, snaps etc. She was careful not to include anything tiny that could be pulled off and swallowed. Sally made the same type of book, but she stuffed it so it could double as a pillow. Barb made a puppet. She said it could be used to teach face parts and could help the child pretend.

Discussion With Colleagues

Reflecting back on this cycle I discussed the results with colleagues. We

celebrated the students' development of their own checklists for observing children. We agreed that the students need more practical exposure such as our trip to the elementary school. We agreed that the micro-thinking skills I taught in class needed to be taught over many years in many courses in order for the students to become well versed in using them.

Teaching Style

The class had become less teacher centred in this cycle. Despite the first three classes in child development only 27% of the class time consisted of teacher- centred activities compared to 82% in the reconnaissance and 36% in Action 1.

Barb has become more confident about speaking up in class. When we created the checklist for the baby observation she contributed three ideas to it. It was interesting to watch Barb at the primary school. She was the most confident student in the entire class with the children. I am not surprised by Barb's behaviour since I know she spends a great deal of time with her young cousins. She seems to be more comfortable with younger children than her peers. Tara continues to be very opinionated but she does not "put down" the ideas of others. This is a change for her. At the beginning of the year she was certain that she was right and others were wrong.

I am aware that I still answer the students questions too often instead of

turning the question back to them. This is something I still need to work on. I did ask more higher order questions in Action 2, but I know I still have to work on this as well.

Summary of Action 2

As I worked through Action 1 and Action 2 I had questions to guide my observations. Although these questions will be discussed in Chapter V as I draw conclusions from the study there were some observations I was able to make after Action 2.

The students became better problem solvers. They showed more flexibility in the process and generated more possible solutions. When they brainstormed for possible solutions, their ideas were less predictable and more outlandish.

By the end of Action 2 a larger number of students asked questions and provided answers in class discussions. This could have been the result of my attitude towards the questions. I tried to accept all questions as equally valid.

I was able to lecture less and spend more time on student centred activities. The project of making a toy appeared to be a method of promoting creativity amongst the students. This was a student centred activity and the students produced excellent results. Not only did they produce toys that were appropriate for the age they chose, they were able to explain why.

My questioning technique improved. I was less judgemental when receiving answers, I asked more probing questions, and I asked more higher order questions.

The conclusion of Action 2 is not the end of critical thinking in my class. It will continue through the rest of the year, continuing to build on these two action research cycles.

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This study investigated whether critical thinking can be fostered in home economics through teaching a problem solving approach in Family Management. Secondarily, it investigated teacher behaviours which may foster critical thinking abilities, the moral and ethical issues which the teaching of critical thinking addresses, and whether the students are able to use problem solving in real life situations.

The study was conducted using Ebbutt's model,"Educational Action Research" (1985). The research involved the students and teacher in a Family Management class in rural British Columbia. The study began with a reconnaissance, which included data gathering and reflection during nine classes. The reconnaissance established a description of the the students involved in the study, the classroom atmosphere, teacher behaviours and how students approached the problem solving process. Data was collected through audio tapes, entries in the teacher's journal, a checklist, and collected student work. The data collected in the first reconnaissance phase established a description which served as a point of reference for comparing and analyzing later observations.

The remainder of the study, lasting for another twenty hours, included two cycles of observation and data gathering with time between each cycle for analysis and reflection, and the development of new guiding questions for the next research cycle.

Summary of Major Findings

One of the questions of this research was whether the students would show an increased ability to think critically after the problem solving process was introduced. When the students' early problem solving was compared to that done later in the course, there was evidence of more flexibility in the students' approach as they worked through the process. The students moved away from the one directional linear form to the more cyclical. For example, during the Action 1 phase, the class was using the problem solving process to work through a problem that a young girl was having with her boyfriend (see p. 51). At one point Liz decided that we needed to go back in our model and add to an earlier step. This demonstrated that the students did not see the process as a linear, one direction model as they had in the past. Rather, they approached problem solving as a reflective, circular process that need not be completed in a particular linear order. They were able to work on different sections at the same time.

Another change that occurred after the problem solving model was introduced was that the students generated a larger number of possible solutions

to problems. When using the traditional model of problem solving, they would typically generate three responses because that was the way the model was designed. With the new model the students generated between four and twelve possible solutions. Never once did the students ask how many possible solutions they must write down.

The possible solutions generated were not only larger in number, but also more imaginative. In the past when the students generated three possible solutions, they tended to be the three most obvious. With the new model the students listed the obvious solutions, and ones that were more novel. They listed solutions that required them to analyze the situation first in order to generate the solution.

This evidence demonstrated to me that the students had become better problem solvers because they generated more ideas, were more flexible in that they were willing to change direction in the process in midstream, and their answers were more varied. It is possible the model helped the students generate more ideas because the term "brainstorm for possible solutions" was used. The students were accustomed to brainstorming and they knew the goal was to list as many ideas as possible. I know the flexibility was the result of the model. The model was multi-directional and was meant to be used in that way. The students were beginning to hold the whole process in mind while moving among its various parts. They were critically re-assessing earlier interpretations and

going back to change or add on to the process. The form of the model was also a consideration. When using the linear form there is no room to go back and add answers. The flexible model was more conducive to adding information later.

I do not know if these changes, generating more and varied responses, and changing direction indicated that the students' ability to think critically was increased. I do know that their problem solving process improved and that critical thinking skills such as analysis and evaluation were necessary for that to happen. Looking at the question now, I realize that I should have asked if the students would be encouraged to think critically, not if they were more able to. It is not possible to say from my research if there was a change in the students ability to think critically. The answer to that question would require empirical data and my evidence is descriptive of the kind of thinking the students did.

The students did show, however, an inceased willingness to think critically. They used micro-thinking skills such as analysis when asked to find the problem in a real life scenario. They used evaluation when they were asked to evaluate the possible consequences of the solutions they generated, and when they were asked to give their opinion of an idea. They used critical thinking when they questioned the answer from the teacher, another student, or the book. They showed skills of analysis when they could give an answer and explain why. They used the skills of observing, reporting and summarizing as we studied children. They were able to apply their knowledge about child development to the

creation of a child's toy. Overall, they demonstated critical thinking daily.

I wonder now if my definition of critical thinking was appropriate. Earlier I stated that in this study students will be regarded as thinking critically when they use higher order thinking skills such as analysis and evaluation to identify problems from a real life scenario, and when they take that problem, propose possible solutions, and evaluate these solutions. As I am now at the end of my action/research cycles for this study, I see this definition as simplistic. Now I see critical thinking as something much more complex than students performing skills. Richard Paul (1984) is opposed to conceiving of thinking skills as discrete "micro-logical" skills which he calls critical thinking in the weak sense. I agree with Paul when he writes that thinking skills are integrated into the person and are "...ultimately intrinsic to the character of the person and to insight into one's own cognitive and affective process" (1984, p.5). I must add that the students not only demonstrated the skills listed above, but they also showed that they have internalized these skills. They were beginning to become critical thinkers. I began to realize that demonstrating skills was a small part of what I was looking for. I listened to their questions, heard their answers and watched them solve problems. They were thinking.

Another research question asked if the teaching of micro-thinking skills along with the problem solving process encouraged the students to be critical thinkers while problem solving. I saw no evidence that the micro-thinking skills

introduced in Action 2; observing, reporting, and summarizing, had any immediate effect on the students' ability to problem solve, probably because the problem solving exercises we completed did not require observing, reporting or summarizing. Now I realize that these skills should not have been expected to influence the student's problem solving. They may however, have added to the students' internalizing of thinking skills thereby helping them to become more thoughtful people. For example, asking students to observe a baby will teach them how to observe babies. Perhaps it will also teach them that observation is a function that requires attention and perhaps the next time they are asked to observe something they may be more aware of the purpose of observation and the need to establish criteria. They may also be aware of how their own situation influences what they see when they observe, and be able to compensate for their own bias.

The teaching of fallacies in Action 1 however, did appear to have some effect on the students' problem solving. I know the students used few fallacies in their revised one page position papers and in their research essays. I believe they used fewer fallacies in their class discussions. During one discussion Liz made a statement and then withdrew it saying "I guess that's a fallacy isn't it?". The students did not use fallacies in their problem solving in Action 2. During the linear problem solving activities taught earlier in the course, there was no evidence of students using fallacies either. However, the earlier topics were not

as value ladened as those during the research cycles and may have been less likely to generate fallicious statements.

Throughout the research the problem solving model evolved. It began as the same linear model that I learned as a student and taught to my students. As I changed and began to internalize critical thinking I grew dissatisfied with the model. I taught "my model" to the students but as they applied the model, they changed it again. The model became one of evolution to meet the changing needs of the persons using it. I am sure the model will continue to change and evolve as the needs of the users change.

A third research question addressed was what teacher behaviours fostered critical thinking. I tried to address this issue by creating an atmosphere of thinking. I encouraged the students to think. For example, I always tried to ask the students "why" when they answered or asked a question in class. I wanted them to explain their reasoning and thereby their thinking that took them to their answer. I tried to validate their curiosity. When a student asked a question that appeared to be off topic, I accepted their curiosity if not the content of their question. I tried to ask the student "what made you think of that?" to help me and themselves understand their reasoning. I believe that the classroom became a supportive, thinking classroom where the students were not afraid to take risks.

The teacher's attitude towards questions is also important in developing a

thinking classroom atmosphere. For example, at the beginning of the year, Barb asked no questions in class, yet I knew she was very interested in the course because she would wait and ask her questions after class. I encouraged her by always treating her questions with respect, and by taking the time to talk with her. As her confidence and the classroom atmosphere of trust was built she began to occasionally answer and ask a few questions. Brainstorming helped to build her confidence because all students call out several ideas and all ideas are written down. By the time we developed our observation/question chart for the baby's visit, she had grown enough to add three ideas to the list the class generated. The students who asked several questions at the beginning of the study continued to do so.

As the study progressed I tried to spend less time on teacher centred activities and more time on student centred activities. During the first reconnaissance phase the class was teacher centred 82% of the time. During the Action 1 phase I reduced teacher centred time to 36% and in the Action 2 phase I reduced it again to 27%. Making the class less teacher centred encourages the students to develop their own ideas. It also makes them more accountable for their own learning.

The way a teacher responds to a question or answer provided by a student affects the way that student and other students provide answers in the future. At the beginning of the study, I discovered that when the class was

brainstorming they would take their cues from me. When a student called out an answer that I was waiting for I would respond more enthusiastically as I wrote it down. The result was the students thought it was the "right" answer and slowed down or stopped their responses. As the study continued I improved my responses and our brainstorming improved.

I wanted to ask more higher order and probing questions. I improved somewhat during the course of the study, but reached no where near my goal. I think trying to address too many concerns was the cause of this short fall.

At the end of the first reconnaissance, one of the questions I asked myself was whether I could challange the students to be more creative. This came out of my frustration over trying to have the students produce alternate food guides for pregnant women. One assignment designed to encourage creativity was the baby's toy assignment. The students had to design and make a toy that was appropriate for a child of a certain age. After they created the toy, they had to explain to the rest of the class why their toy was appropriate for the developmental age of the child they chose. Another creative assignment that took place during a reflection stage of the study and therefore was not recorded was the egg baby assignment. The students are given an egg to treat as a baby for one week. The students were very imaginative with this assignment. While I handed out the eggs, one student called out the exact time so each "new mother" had a birth time to record on a baby announcement. The students named, clothed

and decorated their baby eggs. Reports from other staff members showed that some students took their role playing very seriously.

I hoped that creativity would be integrated into their problem solving process. Creativity would help them generate more diverse, possible solutions. Another way creativity could be effective is when the students are asked to re-evaluate as part of the problem solving process. Part of the process is to choose a solution, and then pretend to look back and to re-evaluate that choice. The students found this very difficult to do and would usually do it only when I insisted. Perhaps teaching the students visualization would also help the students with tasks like this.

In summary, there is evidence that the following teaching behaviours do foster critical thinking: asking the students "why" when they ask or answer a question, spending less classroom time on teacher centred activities, responding to answers in a non-judgmental manner and asking probing questions. Some behaviours that may foster critcal thinking are: accepting curiosity and questioning as valuable in its own right, not just as it pertains to content, giving creative assignments, encouraging creativity, and creating a classroom atmosphere that encourages the students to be risk takers.

Another research question addressed the moral and ethical issues involved with teaching critical thinking. I turned the class from being mostly teacher centred to being mostly student centred. Ideally I hope that one day students

will be self- directed and the teachers' role will become more of mentor. It is the moral responsibility of teachers to help students become self- directed learners, who will be better able to deal with a future of information overload. At the same time it is a struggle. Most people who become teachers do so because they have an innate desire to help children. Teachers, like most adults, tend to think they know the best way to do things and they must teach the children. It is difficult to let children learn for themselves. We are afraid they will fail and even if they do, we do not realize the valuable lessons that are learned by failure. It is also difficult for the teacher to let go of her role as expert and join the students in a learning community where the teacher and students learn together and become more self- directed.

There is risk involved in fostering a student centred classroom. Parents may not like students being asked to grade their own work; principals may not like students not sitting in their desk quietly learning; colleagues may not like the noise an active class produces; and students may not like the strain of creating their own goals and assignments. Even so, if the teacher believes in her moral responsibility to foster thinking students, she must take these risks. She needs to create a supportive classroom atmosphere where the students are not afraid to take risks either. Thus, the moral and ethical issues which venturing into critical thinking gives rise to are: We need to decide what we are doing as teachers. If our role in a democracy is to help develop students who are

independent, thoughtful citizens, then surely we must have a classroom where the teacher and students learn together in a democratic, thinking classroom. The experience of critical thinking affects the way the students approach the course content. It encourages them to ask moral and ethical questions regarding the content, rather than simply memorizing facts.

The final question of this research asked whether students would be able to transfer the problem solving process taught in Family Management into real life situations. There was no way to test this question in this study, but I did ask the students if they had tried to use the process in their everyday life. Most of the students said they had. One student said she had always used a similar process, but now she had names to attach to each of the steps, which implied that she had become more conscious of the process.

The above five research questions were asked in reference to the larger question of whether critical thinking can be fostered through a problem solving approach to teaching home economics, specifically Family Management. At this time it is appropriate to look at the definition of critical thinking that was used for this study: students will be regarded as thinking critically when they use higher order thinking skills such as analysis and evaluation to identify problems from a real life scenario, and when they take that problem, work out possible solutions and evaluate the solutions. As I stated earlier this definition is no longer appropriate. Now I would define critical thinking as an internalization of

a variety of skills and attitudes that are exibited by the students through curiosity, problem solving, questioning, decision making, valuing and a move towards independent thinking and a feeling of empowerment.

The students were able to identify problems from real life scenarios. They used the skills of analysis and evaluation to identify the problem. For example, when we used the problem solving model to discuss the problem of the girl who was having trouble with her boyfriend (see p. 51) the students did not state the problem as "she is having trouble with her boyfriend", instead they analyzed the situation and looked for the reason behind the problem. The students said that her problem was lack of love and a poor self concept.

The students used evaluation when they considered the positive and negative aspects of each of the possible solutions. They discussed each alternative by discussing the possible consequences each action might have. From this information they were able to make a choice. There is evidence that the students were thinking critically. The students were thinking critically because it was encouraged in this class. Critical thinking was expected of them and they demonstrated it.

Thus, in conclusion this study found that critical thinking can be fostered in Family Management. Teaching a problem solving approach was one of many factors that fostered critical thinking. Other factors included using micro-thinking skills, teacher behaviours that encouraged the use of critical thinking,

and the course content itself.

The students could be observed to be thinking. They applied their knowledge, they analyzed situations, they evaluated solutions. They questioned the teacher, the textbook and each other. They asked "why" and were able to explain "why". Some of these behaviours were observed during the reconnaissance, before the research/action cycles began, but as the year progressed they grew more frequent and were generated from a larger number of students.

The thinking was stimulated by all the factors listed above but also by the course content. The course content of Family Management invites thinking. It is easy to ask students to analyze a situation when it is "real" to them because they are more willing to approach the assignment. The event you are discussing may have happened to them or a friend of theirs, or could happen to them or a friend of theirs. Topics studied during the research were the human reproductive system, pregnancy, childbirth, and child development. When the students were given a problem to work through such as "the doctor has just told you that your unborn child has Down's Syndrome" they willingly approach it, because it had personal meaning for them. Even doing a research project is more interesting if the topic is "real". Therefore, Family Management does play a unique role of giving students the opportunity to practice solving real life problems.

The original research question: can critical thinking be fostered through a

problem solving approach to teaching Family Management 11? has evolved through this action research. Now I realize in addition to asking "can" I also must ask "in what ways". Perhaps I should have assumed that critical thinking can be fostered in every class and that home economics had a role in fostering critical thinking in certain ways. The action research process led me to see my question differently.

Discussion

The literature review discussed competing philosophies of the best way to foster critical thinking. de Bono (1983) states that we should take time to teach thinking as generic thinking skills, while Paul (1984) and others state that thinking must be integrated into the course content of each subject. Still others consider critical thinking to be a state of being where the person "lives" critical thinking (Hultgren, 1989).

In this research all three philosophies were in part, applicable. First, time was taken away from the course content to teach the skill in isolation. The students needed to learn the process before they could apply it. The skill was explained to them as a thinking skill that they would later be expected to apply to the course content. It is important to be overt in the teaching of a process. If the process and content are completely integrated, the student may have difficulty understanding how the process operates. I remember a few years ago

when I first used brainstorming. I asked the students to call out all the ideas thay could think of, but I was often unsatisfied with the results. I was focussing on the content and forgetting about the process. Looking back I realize that I never explained what the brainstorming process was, we just started listing ideas. Now, I take fifteen minutes away from the course content to explain the philosophy behind brainstorming and the rules. When problem solving was first introduced to the students, it was explained as a model. The first time they practiced applying the model they used topics that involved Family Management issues, but the content did not matter. This method of taking time out of course content to teach a process did take time away from the other course content, but the time was brief and well spent.

After the students had a firm grasp of the problem solving process, they then applied it to the course content for the remainder of the year. The process became fully integrated into the course content. In the case of the micro-thinking skills presented in Action 2, observing, reporting and summarizing, the course content was used the first time we practiced the process.

In this study, the attention to micro-thinking skills and process alone were considered insufficient. It became necessary to focus on teacher behaviours and consider ways of being a teacher. The third way of viewing the teaching of thinking, that it is a way of being that the teacher should adopt and share with her students, was also addressed. I have come to realize that this

third way of viewing the teaching of thinking should be the ultimate goal. It is only through the adoption of critical thinking as an orientation that students can become thinkers. Anyone can practice thinking skills, but until these skills become internalized and influence the person, they cannot become thinkers.

I have begun to assume this orientation. The process of this research and my teaching style have led me through the first steps into this way of being. I have joined a group of thinkers in my community. I use thinking skills to process information, I ask questions, I listen to answers, and I am beginning to see myself as a thinking person. de Bono (1985) compares a thinker to a cook. If you want to be a cook all you need to do is gather the ingredients and cook. If you are just starting you may not be a good cook, but no one can deny that you are cooking. I have gathered my ingredients and have begun to "cook". As I practice thinking, I will become a better thinker. If I spend my time with thinking people, their modelling will help me develop my own skills. As thinking becomes less of an activity and more of a lifestyle, I will take that attitude with me into the classroom, and share it with the students.

Sternberg related eight fallacies that people who teach thinking have operated under, thereby reducing the success of teaching thinking (1987). Support for some of his fallacies was shown during the course of this study. The first fallacy is that the teacher is the teacher and the student the learner. This is a fallacy. The teacher needs to create a learning atmosphere in the classroom.

The teacher must back away from the role of the one who knows all and move towards being one who learns. I found that I did learn from my students. Giving the students the opportunity to be the teacher helps everyone because the class becomes more open and honest as well as trusting. It also gives the students the opportunity to be the experts which helps build their self concept.

The second fallacy is that critical thinking is the students job and only the students job. I modelled thinking for my students. If they asked me a question I could not answer, I admitted to not knowing and talked aloud while I tried to think the answer through. This was my attempt to model thinking for them. Doing this research was an exercise in critical thinking for me. The action research model demanded that I reflect and think about my teaching. By being a thinker I encouraged the students to be thinkers too. Thus, action research which emphasizes the teacher as thinker and inquirer on her practice may have contributed more to "thinking" than the critical thinking methodology itself. Action research seems a particularily appropriate means for attempting to develop critical thinking since it demands the teacher be an enquirer, not just demand thinking of only students.

The fifth fallacy is that there is a right answer. It is easier in Family Management not to fall into this trap. The content of Family Management is largely studied within the context of attitudes and values, where there is no one right answer, but a variety of choices that depend on a number of circumstances.

The assignments become exercises to test the process and the content together. It is possible to evaluate the students understanding of the content and process by having them produce things such as journal entries, short stories, posters, role plays, class discussions, and mind maps.

The sixth fallacy is that class discussions are a means to an end. Class discussions are many things. They provide an opportunity for the students to demonstrate that they understand the process and content. They may provide the students and teacher a way of working out an idea or plan. Class discussions are also useful as an exercise in themselves. The students learn how to listen to others, analyze what the person intends and to formulate an answer. I encourage discussions. If the discussions appear to be "off topic" I usually allow them to continue for a while because I know the students are learning skills from the discussion itself.

The last fallacy is that the job of a course in critical thinking is to teach thinking. Students cannot be taught how to think. In order for the process to truly be thinking, the students must teach themselves. The most the teacher can do is to encourage and foster the thinking.

Thus, many of Sternberg's fallacies were supported by this research. It is best when teacher and students can learn together, critical thinking is not the students job alone, there is no one right answer, class discussions are a valuable process for students to master, and it is not the intention that classes which

teach critical thinking will make students think instead, they must teach themselves.

Some writers state that students need to learn how to solve real life problems, which includes being able to identify that there is a problem (Sternberg, 1987; Paul, 1985; Beyer, 1984; Laster, 1987). This study showed that the problem solving approach fostered critical thinking particularily application, analysis, and evaluation. The students defined problems, brainstormed and analyzed solutions, and evaluated choices, but I am not sure if a classroom can provide a true practice ground for solving real problems. In real life, the person involved cannot be as objective because they are emotionally involved. It is easy for the students to say that an imaginary girl should have an abortion, but when it is their body and their child, will they be able to calmly weigh the consequences? Nevertheless, it seems that problem solving in Family Management provided a context more "real" than generic thinking skills alone. Laster says that home economics has a special role to play in teaching students "practical" problem solving (1987). She suggests that real life problems are messy because they usually lack clear, objective information and the final decision really counts. Perhaps by giving the students many opportunities to practice problem solving they will develop skills that may help them in real life situations. It would be interesting to discover how much carry over there would be from problem solving in Family Management to real life. This could be an area

for further research.

Reflections on Action Research

When I first read about action reseach, it had a feeling of familiarity about it. I knew as I read that I had been an amateur action researcher all along. I am a curious person and I often wondered why certain things happened in my classroom. I would sometimes try different things just to see the outcome.

Once I decided on my reseach question, I was even more comfortable with action research. It seemed appropriate to measure critical thinking with a process that was an activity in critical thinking itself. As I worked through the study, the task appeared onerous at times. Remembering to write in my journal at the end of each class, remembering to bring the tape deck and turn it on, and remembering to take copies of the students' work were some of the demands I found challanging. Next time I will buy more expensive tapes. The machine eats the cheap ones!

Overall, I enjoyed it. I found I was a better teacher than I had thought. There were times I would walk away from a lesson feeling that I had done too much talking, but later when I listened to the tapes I would realize that it was not so. It was a growing experience. Instead of taking a still life picture of what happened in my class before and after, I had the opportunity to grow and change while the research was going on. The action/research process changed

my attitude towards teaching. I saw how important it was to create a learning environment where the students and I learn together. The teacher must become less of an "expert" and more of a mentor who leads the students on various learning journeys. The teacher must also be the follower part of the time so she can also learn. The students taught me a great deal during this research. They changed the problem solving model to one that worked better for them. They helped me to change my definition of critical thinking and brought me to realize that my original question was not sufficient.

Unfortunately the school system as it is now is not structured for a learning centred classroom. The system demands assignments and tests that can be graded according to the present methods. As a teacher who hopes to help students develop as independent thinkers this is frustrating. I continue to introduce critical thinking and use alternate forms of evaluation such as journal writing, student presentations and problem solving as much as possible, but there are still times when I must use written examinations to evaluate the students' mastery of content. Selma Wasserman (1989) stated: One of the most valuble yet rarely acknowledged assessment tools in educational practice is the sustained, thoughtful, day-to-day observation of student behaviour by a competent, professional teacher (p.369). I believe this statement to be true. I believe that I have become this thoughtful, competent teacher. The action research method I used to conduct this research helped me discover how to

evaluate the students and myself in a fair way. I do not use the word objective because objective is often not fair. Students must be evaluated independently according to their learning style and needs.

I am now an action reseacher. I still forget to write in my journal sometimes and I have not taped any classes lately, but I have joined a Program For Quality Teaching (PQT). The PQT is a peer support system where someone else sits in the back of my class and watches something for me, such as recording the questions I ask so later I can analyze them for higher order questions.

Action research is not easy to do while teaching full time. It demands a great deal of time, but it is worth it. I now content myself to work on one thing at a time. Right now, I am working on asking more higher order questions.

Ebbutts' model worked well for me. Having a model to follow helped to focus the study. It helped to remind me where I was and how I needed to continue. At the same time, it was a flexible model, because there was a system for changing focus and direction. I liked the cycles of action and reconnaissance. The reconnaissance gave the necessary time for reflection. I also liked the flexibility, because just like my problem solving model, you can jump around in it. The first step was to establish the general idea, but at anytime that general idea can be changed. Just like problem solving where the student starts with a problem statement, at any point in the cycle the student can return to the

problem and change it. When a researcher starts this kind of a study she may think she has a clear idea of what she is looking for, but as time progresses she may change her mind. This flexibility is important because I have now gone back and changed the general idea. I have changed my original question and would like to begin another study with this new guiding question: In what ways does teaching problem solving in Family Management 11 foster critical thinking? This would enable me to probe further the tentative questions and conclusions emerging from this research.

As the cycles progressed I generated many questions. I hoped that the answers would be found during the next cycle, but usually by the end I had found no answers and even more questions. The asking of questions is a thinking activity in itself. As you ponder why something might have happened, you break it down into parts, but each part usually generates another question. This continuous circle of questions is a necessary component of thinking. If you find the answers too easily, you are not asking the right questions.

I began this study considering critical thinking to be a variety of observable skills that could be observed as the students preformed them. As the study progressed I realized that critical thinking involved more that using certain prescribed skills. I realized that these skills could become internalized to the point where it was difficult to observe them. They could become a part of the person to the point that they could not necessarily be seen independently. As

I move on this continuum from seeing critical thinking as skills to seeing it as an orientation I imagine myself continuing to create methods of fostering critical thinking within the constraints of the current school system. I see myself being a thinking person and thereby creating a thinking classroom. I see myself as a pupil of my students and a leader to them as we embark on thinking journeys through the course content. I hope that the school system will adapt to the changes many educators are asking for. The schools must become less content centred and more concerned with the process.

Recommendations

One recommendation for other action researchers is not to study too many factors at once. I decided to implement the problem solving model and micro-thinking skills at the same time as changing some teaching behaviours. It would have been appropriate to have focussed on any one of these factors. I found myself with too many different things to observe, and sometimes it was difficult to determine if the change in behaviour was due to the micro-thinking skills or the problem solving process. It would be difficult to teach macro-thinking skills such as problem solving if the students did not have the micro-thinking skills to apply, but the students have learned enough micro-thinking skills through the rest of their schooling to be able to begin problem solving. A fine tuning of the micro-thinking skills could come later.

The teaching of thinking skills should be integrated into all subject areas. Micro-thinking skills should be introduced to the students as the course content requires it. For example, when the students need to "observe" as part of the course, the skill of observation should be overtly presented to them, so they can apply it to the content. By making thinking skills relevant to the course content the students will have the opportunity to practice the new skill immediately. I am not convinced that teaching generic thinking skills in isolation has the desired carry over effect into subjects courses. Therefore, the process must become joined to the content to such an extent that the two are inseperable. This would mean that the curriculum would have to change its focus away from content alone and towards process and content joined.

All teachers should not be required to take a course in critical thinking, instead, they should be instructed that critical thinking is a process that is used throughout each course to teach content. The courses should be designed so that thinking skills are part of a process that is used to learn the content. Teachers should be exposed to the philosophy of critical thinking and encouraged to take it up as their own philosophy, but training teachers to teach thinking skills and then giving the students tests to see how well they are thinking undermines the intent of critical thinking.

Evaluation is a concern for the teaching of thinking. As Selma Wassermann states, it is not appropriate to measure higher order thinking with standardized

tests (1989). Changes in evaluation should be made so that content and process can be evaluated together. This kind of evaluation would require training for teachers so they would know how to evalute more that just content. The evaluation tools could include student journal writing, projects, self- directed assignments, role playing, debates and so on.

All teachers should be exposed to action research as part of their teacher training. This would give teachers a powerful tool for being researchers in their own classrooms, and would encourage them to take responsibility for their own personal and professional development. I would recommend to anyone teaching in British Columbia who decides to use action research, whether for the implementation of critical thinking or for other issues, investigate if there is support available from the Program For Quality Teaching (PQT). This peer consultation program sponsored by the British Columbia Teachers' Federation trains teachers to gather data objectively in another teacher's classroom. It saves a great deal of time when someone else can gather data for you regarding a certain behaviour rather than you pouring over video or audio tapes of your class trying to pick them out yourself.

There is indication for a need for further research. As I progressed through my research I hoped the students were learning problem solving skills that they would take with them into their everyday life. An interesting study would be to discover if there is any relationship between taking home economics

courses in school and a later success in dealing with every day problems.

As teacher behaviours were studied in this research, it became apparent that teachers' attitudes towards thinking and the classroom atmosphere she created were major factors in the fostering of critical thinking in students. An interesting study would be to determine what teacher behaviours best foster critical thinking in the students and to determine if there are differences between these factors. For example, what forms would the teaching of critical thinking take in Foods and Nutrition or Clothing and Textiles?

This study demonstrated that a problem solving approach to teaching Family Management did foster critical thinking. A study could be done to determine if the course content of Family Management 11 had some influence on this development. More importantly, the content of Family Management could be adapted to encourage even more critical thinking. The focus could be move away from content and towards process. The students could use problem solving and decision making on a regular basis. The students should be asked what content needs to be covered. They should also be asked to chose the problems that need to be deliberated and the decisions that need to be discussed. In other words, the students should be moved towards more ownership for the learning that does on in the classroom.

Conclusion

This thesis has discussed the relationship between home economics and critical thinking. While critical thinking is a process that all students should learn in all subject areas, home economics provides a unique opportunity for students to learn critical thinking within the context of real life situations. While there is no evidence that the students will use problem solving skills they learned in Family Management when real life problems face them, and they are confused by emotions, it does seem that home economics with its focus on real life family situations can better prepare students to solve everyday problems.

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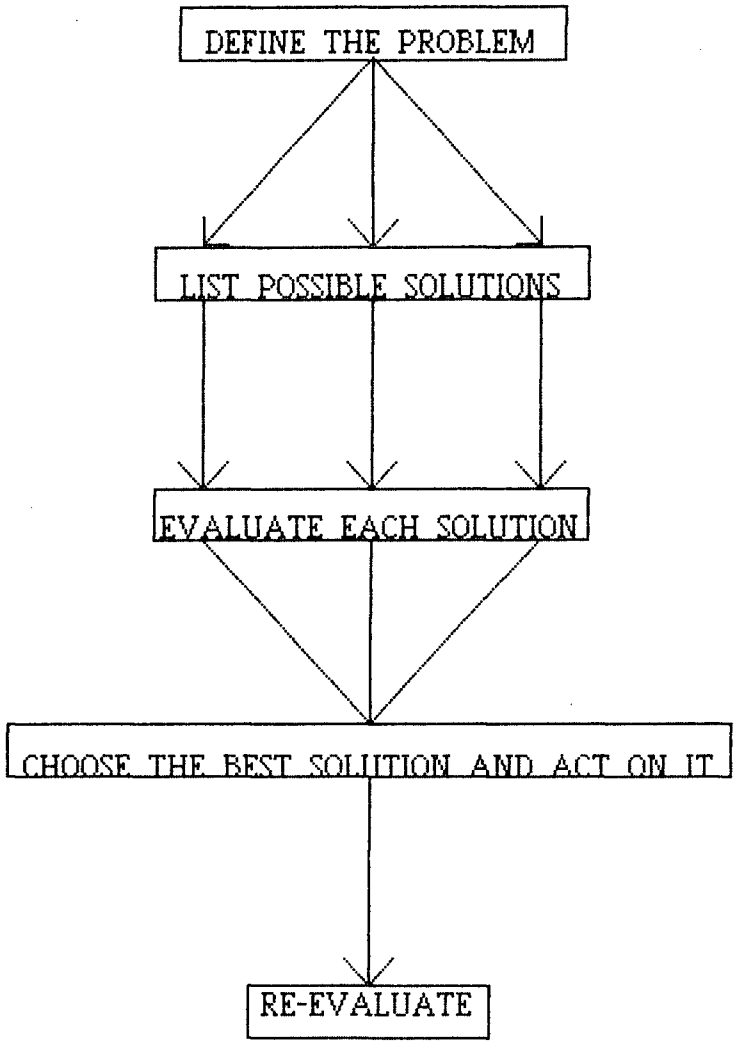
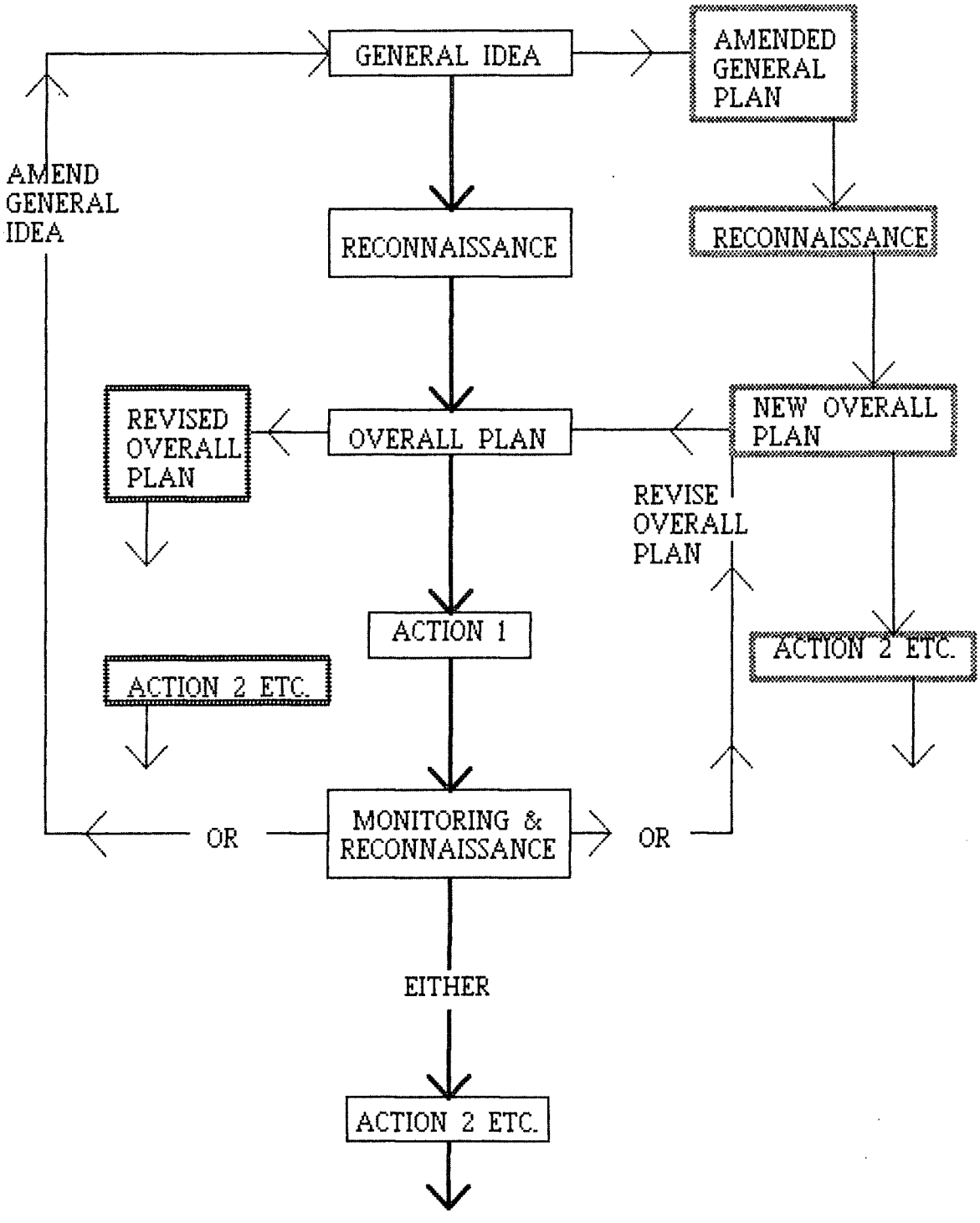
APPENDIX A

LINEAR PROBLEM SOLVING MODEL



APPENDIX B



Source: Ebbutt, J. (1985). Educational action research: some general concerns and specific quibbles. In R. Burgess (Ed.) Issues in Education Research: Qualitative Methods. London: The Falmer Press, p.166, figure 3.

APPENDIX C

Self-Reflection on Your Teaching: A Checklist

Using a scale of 1 to 5, rate your classroom and school according to the following items:

5= Very Often 4= Often 3=Sometimes
2= Seldom 1= Hardly Ever

1. When the students pose unusual or divergent questions, I ask, "What made you think of that?

2. Whatever the text says is accepted as the right answer.

3. When a decision has to be made between involving the class in a discussion of an intriguing student idea (topic related) or moving on to "cover" content, I choose the latter.

4. I encourage students to seek alternative answers.

5. Students give reasons for making statements.

6. I use subject matter as a means for students to generate their own questions (or problems), which we then seriously consider.

7. When teaching, I sit or stand behind my desk.

8. Most questions posed during class can be answered with short one-word answers.

9. Students spontaneously engage in critiquing each other's thinking.

10. Students relate subject matter to experiences in other subjects or in their personal lives.

11. I stress what to think, not how.

12. Students often set objectives for their own learning.

13. Students spend time working collaboratively to solve subject matter questions.

14. One focus in my classroom is trying to understand how and why people (mentioned in texts) created ideas, solutions, experiments, rules, principles, and so on.

15. My classroom mirrors the patterns of involvement practices in most faculty meetings.

16. Students actively listen to each other.

Source: Barrell, J. (1985). Self-reflection on your teaching: A checklist. In A.L. Costa (Ed.), Developing Minds (appendix C) Alexandia, Virginia: Association For Supervision and Curriculum Development.

APPENDIX D

CORRESPONDENCE

Barbara Raynor
Box 2198

September 9, 1988

Superintendent of Schools

Dear Mr.

As part of the requirements for a masters degree in education at the University of B.C. I am proposing to conduct research entitled "Fostering Critical Thinking Through Problem Solving in Home Economics." I hereby apply to your School District for permission to conduct the study in my Family Management 11 class. The proposal is for the year commencing September 1988, and the data will be collected from the class during 1988-89.

I am enclosing a brief summary of the proposal to outline the purpose and procedures. Enclosed also is a draft of a parental permission letter.

Thank you for your assistance with this request. If further information is needed or if you have any questions, please ask me.

Sincerely

Barbara Raynor

November 7, 1988

Dear Parent,

As part of the requirements for a masters degree in education at the University of B.C., I am proposing to conduct research entitled "Fostering Critical Thinking Through Problem Solving in Home Economics." The purpose of this research is to examine the ways in which teachers can encourage their students to think critically.

The research will not affect the material the students will learn, only the way in which it is taught. The same concepts will be covered in the same detail, but they will be taught with a problem solving emphasis. This study will involve audio taping of 26 hours of classes and looking at the students assignments for changes. The students will not be asked to commit any of their own time. The information gathered will be completely confidential and the anonymity of the students, school and classroom protected. The tapes will be erased as soon as my thesis is complete. The parent or student may withdraw from this project at any time by a statement orally or in writing. Refusal to cooperate will have no consequences for the student.

If you have any questions concerning any aspect of the project, the procedures to be used or the extent of your son's/daughter's involvement I would be happy to discuss these with you. I can be reached at

Sincerely,

Barbara Raynor

I consent/ I do not consent to my child's participation in this study.

_____

signature