

TEACHING FROM THE CRITICAL THINKING, PROBLEM-BASED CURRICULAR APPROACH: STRATEGIES, CHALLENGES, AND RECOMMENDATIONS

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This article describes professional development efforts in a large, Midwestern state that aimed to enhance teacher's use of a critical-thinking, problem-based curricular approach in family and consumer sciences (FCS). A total of 25 Teacher Leaders who self-selected to continue in a professional development Teacher Leader Institute for follow-up sessions in fall 2000 and spring 2001 and complete a mailed questionnaire in 2002 are the participants whose discussions and reflections are included in this study. Their perceptions of their success in using the techniques, and ongoing challenges are discussed. Recommendations include 1) teachers' need a solid understanding of the critical thinking, problem-solving approach and the value it has for themselves and their students; 2) teachers must learn to think critically and model and practice the techniques consistently with students; and 3) support and continued professional development for current and future teachers in the critical thinking, problem-solving approach is needed.

Critical thinking is an important life skill for people today. Teachers need to model critical thinking skills to their students and explicitly teach them to think critically. Teachers can be transformed in their teaching and students can be transformed in their learning through continued, consistent use and application of critical thinking skills. Family and Consumer Sciences (FCS) teachers have been learning, practicing, and modeling the critical thinking, problem-based curricular approach for some time. This study shares FCS teacher leaders' perceptions of their success in modeling and teaching from the critical thinking, problem-based perspective, examines their perceived challenges in implementing the new approach, makes recommendations for the future, and ties their perceptions to recent literature on critical thinking, transformative learning, and constructivism.

Purposes and Research Questions

This article describes professional development efforts in a large, Midwestern state that aimed to enhance teacher's use of a critical-thinking, problem-based curricular approach in family and consumer sciences. Questions that guided the study are

1. What are teachers' perceptions of their success in incorporating the critical thinking, problem based approach?
2. What are teachers' perceptions of the most important teacher behaviors in helping students develop critical thinking skills?
3. What are teachers' perceptions of the on-going challenges of implementing a critical thinking, problem-based curricular approach?

Related Literature

The study of thinking in education is still emerging, being developed and practiced by educators and students. According to Beyer (1987) critical thinking goes beyond problem-

solving, by using both “analysis and evaluation” when examining beliefs and making judgments. (p. 33). Kegan (2000) describes two kinds of learning as a development process, “Informative: Changes in *what* we know...and Transformative: Changes in *how* we know” (p. 50). Change in curricular approach requires a new pattern of thinking, a new means of instructional planning and delivery, and a new way of learning for students. Marlowe and Page, (1998) describe constructivist learning as a procedure that includes questioning, filtered through our experiences, that then modifies our comprehension.

Constructivist techniques require the use of critical thinking. Kauchak, Eggen, and Carter (2002) describe constructivism as a way for teachers to use a variety of different experiences for students that is in contrast to a more traditional philosophy of education, the teacher as all knowing. Constructivism involves a shift of ownership of the learning from the teacher to the student; the teacher no longer directs and feeds information to the students, but now opens the door so that students can discover information and construct their own learning. Marlowe and Page (1998) note, “Constructivism is about thinking and the thinking process rather than about the quantity of information a student can memorize and recite” (p. 11). The constructivist approach focuses on “real-world tasks and the central role of the individual in determining reality and promoting learning” (Kauchak, et al., p. 195).

Family and consumer sciences (FCS), itself an integrative discipline, supports use of critical thinking and a problem-solving perspective. FCS integrates content knowledge from the sciences, the issues of individuals, families, and the community, and the balance between work and family roles, all of which set the stage for multiple uses of critical thinking and problem solving techniques (Rowley, 1998). The ultimate goal is to have students use critical thinking by identifying problems, asking questions, examining problems in context, determining the consequences for themselves and others of possible actions to solving the problems, and transform their learning – be emancipated by it – to make sound decisions in their day to day activities in real life. It is important to understand adolescents, their behavior, and how they interact with their near environment. Rowley makes the connection between students’ sense of self worth and their social dimensions, and how that contributes to self value and motivation to use critical thinking skills to solve problems. FCS is unique in its approach and applicability as it focuses on issues of every day life, the context within which problem solving occurs, making learning relevant.

The three curriculum models in FCS are the technical skills model, interpretive communication model, and the critical thinking for ethical action model (Rowley, 1998). Fox and Laster (2000) describe practical reasoning as the foundational theory and thinking model for teaching FCS. In addition to scientific reasoning, practical reasoning includes a need to act on issues. It is more than observation, but includes participation in the solving of reoccurring problems and issues of life that are faced by individuals, families, and communities and is described as the reasoning for action standard. This is foundational to the new National Standards for Family and Consumer Sciences (NASAFACS, 1998).

Williams (2005) discusses the importance of pre-service teachers using critical thinking skills and teaching them to their students, and the larger potential this may have to “help us effectively address the challenges we are facing as a nation” (p. 164). As Ley (1998) writes, “By building our repertoire of thinking skills in the living of our daily lives, we are able to move beyond purely technical means to address life’s concerns toward emancipatory critical science action that transforms society for us all” (p. 252). Gabler and Schroeder (2003a) described the need for persons to have critical thinking skills as “vital to those living in a democratic society”

(p. 19). This movement towards a practical reasoning, critical thinking approach requires development of curriculum that fits this mode of inquiry.

Teaching critical thinking skills to students requires teachers themselves to be competent in using higher order thinking skills. Williams (2005) promotes this idea as essential for teacher educators to teach pre-service teachers who can then model critical thinking to their students. Williams further clarifies that there is a difference between having a disposition to be a critical thinker versus having the ability. Teachers in FCS are assisted in the development of these skills by using questioning skills and by teaching their students to write critical thinking questions. The National Standards for Family and Consumer Sciences (NASAFACS, 1998) uses process questions in four areas – thinking, communication, leadership, and management – and integrates these process questions with content areas. These questions “are based on three interrelated systems of action that individuals and families use to address the issues they face. Technical actions . . . interpretive actions . . . [and] reflective actions” (Fox, 2000, p. 15). Process questions guide the learner and encourage them to construct knowledge. Ashby, Conkin, and O’Connor (2000) are teachers who have implemented process questions in their FCS problem-based curriculum. They describe it this way

As a teacher, I begin to develop process curriculum by looking at the topic, theme, or concept of the curriculum and developing questions that will challenge the students to begin thinking about how this curriculum impacts them personally . . . Questions allow students to think about what they are learning and reflect on the information, making it relevant. This does not happen overnight. It evolves as the teacher consistently teaches using process curriculum. (p. 213)

A practical problems approach is developed throughout the planning and implementation of instruction and is constructivist oriented (Thomas, 1998a). Gabler & Schroeder (2003b) describe it as “an active process emphasizing purposeful interaction and the use of knowledge in real situations, otherwise known as authentic learning” (p. 4). Using practical everyday problems posed to students, along with process questions, FCS teachers engage students in critical higher order thinking as they examine the rich context of problems and address consequences of choices. This helps students make wise decisions and practice transferable critical thinking and problem-solving skills. The intent is to give students the tools wherewith they can then make responsible choices and take ethical action when dealing with practical problems within their own lives as individuals and members of families and communities.

Description

The Teacher Leader Institute was developed to prepare family and consumer sciences teachers in a large Midwestern state to incorporate critical thinking and process skills into their classrooms. This began with state wide in-services, summer conference sessions, and specialized training workshops starting in 1996 which developed into a Teacher Leader Institute. In 1996, the state purchased six of the different curriculum guides for their FCS teachers from the Ohio Work and Family Life resource guides.

A total of ten different workshops or sessions were conducted over this period of years focusing on authentic learning and assessment, use of higher order thinking skills, and practical problem solving techniques. Some of the topics for sessions included “Developing Curriculum for Family and Consumer Sciences,” “Assessment Using a Problem-Based Curriculum,” and “Implementing National Standards.” Modification of state curriculum guides and standards to

crosswalk to new National Standards of FCS, adopting of the Ohio curriculum guides built on the critical thinking problem solving perspective, and training to use the guides were all part of the state's in-service activities and Teacher Leader Institute. The Teacher Leader Institute is modeled after that used in Virginia and Ohio (Arendt, Boggs, & Glasscock, 2000).

Participants

The most recent Teacher Leader Institute workshop sessions held at a resort location, central in the state, included 25 teacher leaders from throughout the state's six regions who came together for two 2-day sessions in September 2000 and April 2001. Most of the teacher leaders that participated in these two sessions had attended the prior sessions since 1996, had a solid foundation in the theoretical knowledge and background, and had access to new curriculum guides and practice in implementing them. The workshop sessions were developed and implemented within a critical thinking problem-based curricular approach with input from state FCS director and staff. Techniques modeled in the sessions included authentic problem-based strategies, using critical thinking questioning, and reflective writing. These were practiced using a variety of individual, small and large group activities. Critical thinking was discussed from many perspectives, and teacher's examples of new materials were also examined and best practices shared.

In July 2000, through a reorientation, the teacher leaders self-selected to continue with the Institute, signed contracts with the state, and obtained the support of their school administrators to commit to the fall 2000 and spring 2001 sessions. Although the teacher leaders had been applying the new approaches in their classrooms, they admitted to inconsistency in their methods, struggles with getting the students engaged, some discomfort in modeling critical thinking, and expressed a need for updating. A concern expressed by a majority of the group was their discomfort with teaching thinking skills explicitly and separately rather than infusing or mixing them within content matter. The agenda for the fall session included the topics "Implementing Critical Thinking and National Standards," "Teaching Process Skills: The Foundation for Problem-Based Learning," and "Constructing Authentic Assessments for Problem-Based Learning in Family and Consumer Sciences."

The spring session focused on teachers' sharing their experiences using the techniques, their on-going challenges in teaching thinking to students, and their continued understanding through application as they integrated critical thinking and practical problem solving techniques. Teachers brought lesson plans, teaching activities, and ideas to share at both the fall and spring sessions. One of the key session topics for the spring session was "How to Make the Most of your Role as a Family and Consumer Sciences Teacher Leader."

The original purpose of the Institute included the intent that the teacher leaders would then teach what they have learned to others across the state. Developing goals for taking on their leadership role was an outcome of the spring session. Teacher leaders saw their leadership development as an integrated process with their own personal development. Their goals focused on three areas: provide training sessions for other teachers, network and mentor other teachers, and incorporate new curricular approaches in their classrooms. The leadership development of the teacher leaders from their participation in the Institute was reported separately (Mimbs, 2002). The 25 Teacher Leaders who self-selected to continue in the Institute for follow-up sessions in fall 2000 and spring 2001 are the participants whose discussions and reflections are included in this study. A brief follow-up questionnaire of these participants was mailed in June 2002 and is also summarized here.

Data Collection, Preparation, and Analysis

During the large group sessions of the workshops, the following were collected: teachers' perceptions of the reasons for teaching critical thinking; the roles, attributes, and challenges of the process; and the classroom environment and resources needed to be effective. The teachers' individual reflection activities that were used as transitions between and closures to workshop sessions focused on four open-ended prompts:

1. Why is it important to teach thinking skills?
2. What teacher behaviors seem to be the most important in helping students develop critical thinking skills?
3. Even with practice implementing a critical thinking skills curriculum and problem-based approach, I am still challenged with?
4. When I think about directly teaching a practical problem solving unit in my classroom, will I do it differently now? How?

Teacher leaders' responses to the open-ended prompts were tabulated based on their use of key words and phrases. This was accomplished by reading and rereading the sections of text for individual words and phrases to be examined for similar meanings and repetitive use. Themes became evident and are shared here for each reflective prompt. Finally, a follow-up questionnaire was mailed to all teacher leaders in June 2002, and its focus was to determine the teachers' perceptions on how well they met their goals which they set at the spring 2001 follow-up session for leadership, mentoring, and professional development.

Discussion of Teachers' Perceptions

A revisit to the literature to clarify the collected anecdotal data and the triangulation of several data collections points (workshop sessions notes, written responses to reflective prompts, and written responses on follow-up questionnaire) adds substance to the discussion of findings and implications for making recommendations and is included here.

Group Sessions Summary

The teacher leaders shared many reasons for teaching critical thinking, with an emphasis on how it benefits the students. Some of their thoughts include

helps students appreciate and value others and their opinions, and helps them defend and justify their positions; creates more independent thinking; empowers students and allows them to use their own learning style; creative and thought provoking; life-like; forces self evaluation; taking ownership in life.

Teacher leaders assigned the following roles and attributes to critical thinking: "Don't be passive; requires questioning; examine the evidence; specify, look for and consider alternatives; avoid oversimplification; look for errors in arguments; attempt to conquer biases and go beyond the obvious." Browne and Keeley (2001) illustrate critical thinking and the use of questioning as having an "awareness of a set of interrelated critical questions"; then to have the "ability to ask and answer critical questions at appropriate times"; and thirdly, the "desire to actively use the critical questions" (p. 2). Identifying the problem, issue, is at the heart of critical thinking. What is it that you need to know and how do you know the conclusion you come to is relevant, applicable, and appropriate? How can you then evaluate the information? It requires using critical questions (Browne and Keeley).

The environment for best practice experienced by the teacher leaders was described as “active, noisy, productive, with an informal structure, with more of a team approach that is student oriented driven and owned.” Gabler and Schroeder (2003b) agree. The constructivist classroom is an active environment that at first “may appear to lack structure” and some may wonder if learning is happening (p. 202). Problem-solving is by its nature an interactive approach. Sharing ideas with one another requires dialogue between and among students and teacher (Marlow and Page, 1998). The teacher’s role is more of facilitator and collaborator, to help channel and propose ideas, show the way(s), and evaluate success of students as well as to “provide direct instruction” (p. 57).

New textbooks that use problem-solving and critical thinking, extensive use of the internet, the new state implementation guide, national standards, and adopted curricular guides were all mentioned by the teacher leaders as resources for teaching from this perspective. Participants described the importance of adopting a problem-based curricula approach as a way to enhance life skills. They were concerned that for those who do not know how to problem solve, it will be more difficult for them to stay competitive in a global market. The teachers’ perceptions of the problem-based approach were that it “addresses different learning styles; is user friendly; generates enthusiasm for the curriculum; and is valuable to students for coping skills.” The constructivist classroom is a place where teachers can encourage students to consider topics that are relevant and important to them which help them use high order thinking skills (Gabler and Schroeder, 2003b).

Challenges of using critical thinking in the classroom created significant discussion among the teacher leaders. Some descriptions of the challenges in their own words include:

Students don’t buy into it; student fatigue; students interested in points only; takes time and effort; probe to go deep enough; lack of adequate resources; do we get the content in the process (teaching thinking explicitly rather than infused); teacher brain drain; taking various environment/home life situations into consideration; forces our creativity; assessment; access to resources; public opinion; brain block; negative resistance; changing paradigms for textbook/worksheet/questions; more effort (for teachers and students), alternative assessment; updating to critical thinking but has not changed impression others have of traditional technical skills based FCS.

Critical thinking skills require users to have multiple applications to be competent and as Beyer (1987) notes, students “must have repeated, instructive practice in it in a variety of contexts and media” (p. 178). Williams (2005) writes “critical thinking requires hard work; many students would prefer that teachers just give them answers to complex questions” (p. 182).

Open-ended Reflective Prompts

Why is it important to teach thinking skills? Four themes appeared as a result of analysis of the open-ended text responses to this prompt.

1. Developing critical thinking skills is a learning process.
2. Critical thinking is a necessary skill for life.
3. Critical thinking helps students solve problems and make decisions.
4. Students using critical thinking skills is not a given in today’s society.

These four themes discovered in the teachers’ responses to this open-ended individual reflective prompt can all be tied to the teacher leaders’ responses in the group sessions to the

questions about roles, attributes, strategies, environment and resources, and challenges. There seems to be no question as to the value of the critical thinking, problem solving approach, but it does require significant time, resources, practice, and patience. This may be further complicated by a long standing tradition in FCS of a more empirical, technical skills based curriculum. The teacher leaders may struggle with their comfort with the well known more product oriented skills approach as they challenge themselves and their students in implementing the critical thinking approach (Fedje, 1999).

What teacher behaviors seems to be the most important in helping students develop critical thinking skills? The two themes discovered in the collection of the responses to this prompt are modeling and flexibility. The word model/modeling was used a total of 11 times by the teacher leaders in response to this reflective prompt. Modeling critical thinking seems to be harder for some teachers than others. One wrote it is a challenge “being an exciting and consistent example of a thinking person.” Another wrote that there has to be “teacher belief in the process. They have to see that we believe in what we are doing.” Still another described the process as “practice what you preach; if we are not totally comfortable using critical thinking skills we cannot make our students confident users.” Gabler and Schroeder (2003b) wrote, “As you model for your students or set up modeling situations with students who model procedures for their peers, you are also teaching yourself what is required of you as a facilitator along with what is required of your students as active participants in learning” (p. 22). Teachers using the process skills of thinking, communication, leadership, and management through a problem-solving curricular approach know the importance of modeling.

The other key term used consistently was flexible/flexibility. Flexibility is a necessary part of the critical thinking approach in its constructivist nature, with teacher as facilitator, and student as active participant in the learning process. Flexibility is illustrated in these comments by the teacher leaders “willing to try new things, being open-minded, it takes time, not jumping in and giving too much help.” Ayers (1993) describes the importance of this flexibility and encourages teachers to allow “opportunities for discovery and surprise” (p. 94).

Even with practice implementing a critical thinking skills curriculum and problem-based approach, I am still challenged with? Challenges are an ongoing concern for the teacher leaders in using this approach. The theme most often expressed was motivating students. It is the most consistent challenge expressed by the teachers. Teaching thinking within the context of FCS subject matter that is important to students may improve their motivation. However, teaching the thinking skills explicitly is also important (Beyer, 1987). The constructivist approach is important in motivating students; they are taking responsibility for their learning. Gabler and Schroeder (2003a) wrote, “Authentic learning can motivate those students who are bored, disinterested, or lacking necessary skills- the very students you might think could never do this” (p. 202).

Way and Nitzke (1998) discuss an infusion model for teaching critical thinking, and stress that critical thinking skills take time to develop and are difficult to measure. This was further illustrated in the teachers’ responses regarding challenges. “They [students] have difficulty with the problem based approach. They want simple solutions or projects that don’t require much effort.” It is about getting them to see the value of thinking which requires modeling.

Providing guidelines for students to use in solving problems as well as more in-depth background information for scenarios were also mentioned several times. A reoccurring theme which challenged the teachers was their perceived need for developing authentic assessment techniques to show students’ mastery of thinking and problem solving skills. The time involved

in teaching this approach and in developing and implementing new learning materials is a difficult challenge.

Other challenges expressed by the teacher leaders were the concern for time to complete the curriculum and teach more in-depth, when you first have to teach students how to think and problem-solve. Tying critical thinking to practical problem solving and authentic assessment was a natural progression for the teacher leaders. Although, assessing students' accomplishment of critical thinking competencies can be difficult. Thomas (1998b) describes simulation, essay, and interpretive exercises as three ways to assess students' thinking skills. More than one teacher indicated that it was still a "challenge developing scoring guides." Marlowe and Page (1998) caution against being too worried about the assessment itself and focus more on "thinking about assessment as an active demonstration of student understanding and ability to apply this understanding" (p. 62). Gabler and Schroeder (2003a) suggest using a variety of student directed projects that are "driven by challenging, intriguing guiding questions . . . allow for a degree of student choice . . . build on opportunities for students to share what they have learned with classmates . . . (and) feature use of an evaluation instrument that provides students with qualitative feedback on their effort" (p. 418).

Some teacher leaders set specific goals to organize and implement the critical thinking approach more broadly, "create more thematic-based units instead of a few real-life type assignments," and to "[work] on organizing new scenarios." These goals show the teachers' understanding the need for more teaching in-depth and a more holistic approach to incorporating the critical thinking approach. It also illustrates their own growth and development in thinking critically by doing their own problem solving as they implement process skills and model thinking in their teaching.

Keeping their perspective that it is a learning process, valuable for students, and helpful in solving problems and decisions that are applicable to real life situations makes the challenges worthwhile for the teacher leaders. Their concern for the time it takes to first teach students how to think and the patience to keep at it will be well worth it. As one teacher leader wrote, "Thinking is what educated people do. It is fundamental to the education process and not something that people just know how to do." Thompson (2001) a long time FCS teacher reflected on how the new critical thinking perspective impacted her teaching

I had discovered the power and effectiveness of teaching for critical action. I no longer had to be the 'expert'. The students shared the responsibility for and the rewards of their education. The students were highly motivated and created an experience far more meaningful than any technical or communicative classroom experience devised by the teacher. (p. 6)

Thompson (2001) did caution however, that it is hard work, a process, an effort. One of the changes she made as she incorporated more and more critical thinking approaches into her classes was "I added critical questions to tests and daily work primarily as process questions that had to be answered and given to me as an exit slip before the student left the classroom" (p. 4).

When I think about directly teaching a practical problem-solving unit in my classroom, will I do it differently now? How? An emphasis was put on organizational skills. The teachers' comments illustrated their acknowledgement that getting, and staying organized is key to teaching in a critical thinking, problem-solving classroom. Practical considerations highlighted by the teachers were the importance of organization and relevance of the materials. One teacher set a goal to "ask students what are their major problems with individual or family, then I will

work around these problems so they will see relevance.” Another organizational plan described by one teacher is to teach the foundational process skills in FCS (NASAFACS, 1998) which are thinking, communication, leadership, and management. She described it simply as “I plan to begin each semester course with teaching the four process skills and begin to develop each unit as a practical problem.”

Focusing on relevance of the scenarios and problems to make learning important to students was mentioned several times, as was the need to add more background information, depth and “meat” to problems, and follow-up assignments. Teachers stressed the importance of more consistent practice and application of critical thinking and problem solving techniques to engage students, keep them familiar with the process, and see the relevance to learning and living in everyday life.

Mailed Questionnaire

Briefly describe how you feel you’ve met your goals with regards to incorporating these new curricular approaches. Teacher leaders indicated that they met personal and teaching goals, but also insisted that they have not made it all the way. The process was described by more than one teacher as “a work in progress” or admitted they had “improved but it still requires work.” Some teachers described specific strategies and goals they have accomplished such as “rewritten some assignments adding new strategies...developed new course based on [the] critical thinking premise” and “I teach the process skills and then implementing critical thinking in the curriculum is easy.” These teacher leaders through their experiences in the Institute and the ongoing workshops and interaction with colleagues are becoming transformative learners. Cranton (1994) describes this adult learning as a “means of gaining knowledge and skills, a way to satisfy learner needs, and a process of critical self-reflection that can lead to transformation” (p. 3). Modeling thinking skills, practicing them, and blending them into class activities, assignments, and assessments were all part of the process the teacher leaders went through to incorporate the new curricular approaches.

Recommendations

Change in the way teachers teach requires time, continued commitment, retraining, reflection, and practice. The goal is for the teachers to reach a level of transformative learning which, “leads to some type of fundamental change in the learners’ sense of themselves, their worldviews, their understanding of their pasts, and their orientation to the future” (Brooks, 2000, p. 140). There are four critical recommendations as outcomes of this study.

1. Teachers need a solid understanding of the critical thinking, problem-solving approach and the value it has for themselves and their students.
2. Teachers must learn to think critically and model and practice the techniques consistently with students.
3. Teachers who take the time to learn new methods in teaching despite the challenges perceive themselves as successful.
4. Support and continued professional development for current and future teachers in the critical thinking, problem-solving approach is needed.

The change is worth the effort. However, in order for more change to happen and for the approach to be used by more teachers, more training of pre-service and in-service teachers is needed. One teacher leader wrote this comment on the follow-up questionnaire as a suggestion for teacher educators and state staff.

The Teacher Leader Institute should be continued. Other teachers should be incorporated into the training. The shift of changing teaching [and] learning style takes time and practice. This is not a process with one introduction and workshop/seminar and send you home to try it, maybe, or file it and forget about it. The work from the teacher-leader institute needs to be continued and perhaps with quarterly or at least semester in-service.

Teacher educators are also concerned about placements for student teachers (who have been trained in the new approaches) with cooperating teachers who are also practicing critical thinking strategies and modeling it in their classrooms. A fellow FCS teacher educator at another university in the same state wrote

I'm finding that it takes a long time for teachers to really interpret and use the problem-solving approach. They say that they are using it, but when you ask them if the students know what problem they are solving, they have never discussed or stated a problem. My student teachers can write great lesson plans showing this approach, but very few of the available cooperating teachers can model the approach for them and the planned lessons in reality begin looking like traditional lessons . . . We really need a large cadre of teachers that are modeling this approach to learning.

The value of using critical thinking skills helps both teachers and students. The resources and classroom environment needed for the approach are available and possible. Teachers are successful with the approach and the benefits seem to outweigh the challenges. As one teacher leader reflected, "Using thinking skills seems to be difficult for students and yet, it is something which they will use daily and is so vital to their success in both [their] personal and professional life."

Teachers need to model critical thinking and practice it, using flexibility in their approach. Students need to use thinking skills in a variety of ways so they can then transfer the learned skill to other situations (Beyer, 1987). Motivating students is an ongoing challenge in the classroom, but the critical thinking approach is more student driven, student friendly, and can make a difference in the lives of students, their families and their communities. It is a step by step process, for teachers and students, creating and practicing more and more classroom lessons, assessments, and experiences in problem-solving approaches, until the process is systemic to the way teachers teach. As one teacher leader wrote, "I have worked to improve my teaching skills and incorporate critical thinking, problem solving and authentic assessment into my classes. I have improved, but it still requires work." Critical thinking and problem solving skills empower students and teachers. It behooves those of us preparing new teachers and providing in-service for practicing teachers to take the responsibility to provide training, resources, and support for teachers and model and practice critical thinking ourselves.

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