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CRITICAL THINKING IN TEACHER EDUCATION: A PROCESS-ORIENTED RESEARCH AGENDA

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INTRODUCTION

In recent years, critical thinking has become a central focus of education, especially in North America. Within this focus, there has been a major debate regarding the generalisability of specificity of critical thinking. The main issue in this connection appears to have been whether critical thinking needs to be closely linked with traditional disciplines. If critical thinking is really as vital as its proponents maintain, then it will also be important in applied fields such as teacher education.

Unfortunately, the term "critical thinking" has been used and understood in several different ways (Garrison, 1991, pp. 288-292). For example, Norris and Ennis (1990) associate both inductive and deductive forms of thinking with decisions about belief and action. On the other hand, Brookfield (1987) sees critical thinking in a less scientific sense. To him critical thinking is practically synonymous with "reflection". The debating of issues in the area of study known as "critical thinking", therefore, has been complicated because of the coexistence of differing meanings and perspectives used by contemporary scholars in the field.

Bearing this in mind, it is our intention in this paper to explore the implications, for teacher education, of taking critical thinking seriously. If the Finn/Mayer Reports are implemented, critical thinking will be but one of a series of higher level competencies that teacher education will need to address. The following sections outline and discuss a research agenda covering various elements of the process of teacher education in relation to critical thinking.

1. WHY CRITICAL THINKING MATTERS

Ball (1989) has documented the emergence in recent years in OECD countries of policies, programs and projects designed to develop higher level competencies (though he calls them "enterprise skills"). He defines them as

> *....those personal dispositions, abilities and competences related to creativity, initiative, problem-solving, flexibility, adaptability, the taking and discharging of responsibility and knowing how to learn and relearn.*
> (Ball, 1989, p. 10)

The Finn Report goes on to propose six Key Competence areas to serve as a curriculum framework for Australian education from school through the post-compulsory sector. The key higher level competencies proposed by Finn are:

Language and communication
Mathematics
Scientific and technological understanding
Cultural understanding
Problem solving
Personal and interpersonal

While much of this looks rather familiar, when Finn goes on to detail the key competency areas, some less familiar ideas appear. So, for example, learning various types of problem solving strategies has been a major feature of many courses, but this is not so evident for critical thinking and analysis, which Finn includes under the key competence category of "problem solving".

While critical thinking is only just starting to receive much attention in Australia, it has been a different story in the USA. (For an historical outline see Kennedy et al., 1991, pp. 11-13).

There has been much debate on the question 'what is critical thinking?' (Kennedy et al., 1991, pp. 13-14, 26). While there are still disagreements about matters of detail, considerable agreement has been achieved that critical thinking is a combination of abilities and dispositions. The most influential characterisation of critical thinking is due to Ennis (1987). According to Ennis, good thinking is critical thinking which he defines as follows:

> **CRITICAL THINKING is reasonable reflective thinking that is focussed on deciding what to believe or do.**

As Ennis elaborates it, critical thinking includes both dispositions and abilities. He lists 14 dispositions (e.g. seek reasons, use and mention credible sources, look for alternatives) and 12 abilities (e.g. focussing on a question, making and judging observations, identifying assumptions). (The latest so far unpublished account includes 12 dispositions and 16 abilities, see Ennis, 1991). According to Ennis, to think critically in some discipline or subject is to display these dispositions and abilities within that discipline or subject, i.e. the dispositions and abilities are general.

There has been a major debate, however, about the extent to which critical thinking is generalisable across disciplines. The debate has been clouded by confusion between empirical and conceptual issues, i.e. is a given case of failure of critical thinking to transfer remediable by more effective teaching (say), or is such transfer impossible in principle?

McPeck (1981, 1990a, 1990b) represents the extreme view that critical thinking is subject specific, i.e. the conceptual differences between subjects mean that each has its own unique kind of thinking. On the other hand, McPeck is most convincing when pointing to pedagogical deficiencies. (See, e.g., Hager, 1989). Ennis' position (e.g. 1989, 1990) is the more moderate one that, although major components of critical thinking are general, the degree to which it is general and the factors that would facilitate its transfer are, to a significant extent, empirical matters.

Siegel (1991) has argued that Ennis has been too cautious, thereby conceding too much to McPeck. Siegel points out that Ennis' abilities aspect of critical thinking has two distinct components. Firstly there are the skills and criteria of reason assessment. Siegel admits that some of these are specific, however many of them are general i.e. the kind of thing represented in Ennis' abilities list. Secondly there is the epistemology underlying critical thinking. According to Siegel some will disagree about details but such an epistemology must provide criteria of reason assessment, rationality, rational justification and truth. Whatever its correct characterisation, this second component, the epistemology underlying critical thinking abilities, is, according to Siegel, fully generalisable across fields and domains. Overall then, the case for significant general components of critical thinking, both dispositions and abilities, looks very strong. (See also Hager (Ed.), 1991, for recent work on this debate).

There are many reasons for wanting people to be better at critical thinking. These are some of them:

i. People will be better equipped to compete effectively for educational opportunities, jobs, recognition, and rewards in our society.

ii. Critical thinking is a prerequisite for good citizenship, e.g. it has been suggested that there can be no liberty for a community that lacks the critical skills to distinguish lies from truth.

iii. The ability to think well contributes to a person's psychological well-being; good thinkers are more likely to be well-adjusted individuals than no-so-good thinkers.

i.v We cannot afford for our students/workers not to be critical thinkers. Our civilization faces some very complex and threatening problems. We are now smart enough to destroy ourselves as a species, and, unless we learn to be better thinkers in a broad sense, we may well do so.

v. Thinking is at the heart of what it means to be human, so to fail to develop your thinking potential is to preclude the full expression of your humanity.

vi. Critical thinking is increasingly needed to perform effectively in the workplace.

While each of these reasons is no doubt important, (vi) provides the main reason for critical thinking becoming a recent concern for vocational education and training. It is also the main thrust of the Finn Report's rationale for critical thinking. Although it has been disputed in some quarters, there is increasing evidence that the introduction of microelectronic technology into the workplace is creating an accelerating demand for good thinking ability as an essential requirement for effective job performance (Kaye and Hager, 1991, pp. 19-21).

2. CRITICAL THINKING IN CURRENT TEACHER EDUCATION

The recent Finn Report recognises that the proposed key competencies will have major implications for teacher education providers and others:

> *Teachers will have to update and expand their knowledge and skills and modify their pedagogy in quite major ways. This will not happen easily, particularly given the national context of an ageing school teaching force.*

There will be major implications for pre-service teacher education and ongoing professional development for school and TAFE teachers. There will also be implications for the preparation and professional development of trainers in private vocational education and training institutions and for enterprise-based providers.

There is an obvious challenge for the teacher educators. They will have to adapt in quite fundamental ways to incorporate the new approaches.
(Finn, 1991, p. 77ff.)

It goes almost without saying that in order to be able to develop key competencies, in others, teachers need to be themselves skilled in these competencies. This is certainly the case for critical thinking. (For a survey of evidence on this point, see Kennedy et al., 1991, pp. 22-23). However beyond this there are many unanswered questions. Some interesting research questions include:

1. Is *critical thinking being learnt in existing teacher education courses?* Typically student teachers don't take a separate critical thinking subject, so is critical thinking being learnt in other subjects? There seems to be very little evidence available on this point, though what is available suggests a negative answer to the question (Kaye and Hager, 1991; Hager and Kaye, 1991).

   There is clear scope here for a research project to examine the extent to which critical thinking is required in various subject areas of current teacher education courses. Such a project might employ content analysis (including analysis of assignment topics, marking guides, subject outlines, learning materials and handouts, etc.). Also it might survey student and lecturer perceptions. Some ideas for this project might be gleaned from work already done on student need in areas such as essay writing, usually by staff in university student counselling and study centres (see, e.g., Clanchy and Ballard, 1989).

   As Kennedy et al. conclude on the subject of critical thinking and teacher education:

   ....the question of how we can help teachers acquire critical thinking abilities and dispositions has not really been investigated. How can the transition be facilitated for experienced teachers to go from the traditional classroom approach to the critical thinking approach? How different or alike is the critical thinking approach from the traditional approach?
   (Kennedy et al, 1991, pp. 28-9)

   Another possible lead here will be a closer examination of the abilities of the graduates of Alverno College, which is one teacher education provider which has systematically set out to develop critical thinking capacities in its students (Loacker, et al., 1984).

2. *Is critical thinking a significant part of the process of effective teaching?* While much has been written about the implications of critical thinking theory and research for curricula and the learning needs of students (e.g. Norris, 1985), little attention seems to have been directed at the role of critical thinking in the process aspects of teaching. What thinking dispositions and abilities (if any) are required in effective teaching? While various research findings about teacher thinking are available (see Clark, 1988, for an overview), it appears that we don't know the relationship, if any, between being an effective teacher of a subject and being a critical thinker in that subject (for more on this, see Hager and Kaye, 1991).

   Teaching is complex of knowledge, skills, abilities and attitudes. The general abilities and dispositions, which Ennis has identified with critical thinking, do seem to connect closely with the results of the research on teacher thinking. However we are once again in an area where much work remains to be done. A related question concerns the extent to which teaching is largely general rather than specific. If teaching is largely general, then a competent teacher in one subject will tend to be a competent teacher in whatever they teach, provided they have sufficient subject knowledge. This will result in teacher education with a significant component of generic teaching subjects. If, on the other hand, teaching is largely subject-specific, as Barrow (1990) maintains, then teacher education should not feature generic subjects. (Our own experience of vocational teacher education supports the teaching as generic view.)

In summary, there are many unanswered questions about the appropriate role of critical thinking in teacher education.

3. CRITICAL THINKING AND TRANSFERABILITY

Apart from the debate about whether critical thinking is subject-specific or not (see section 1 above), there has also been discussion of the difficult matter of transferability. It has been pointed out that even if critical thinking is general, it doesn't flow that transfer from one domain to another will occur without its being learnt (see, e.g., Ennis, 1989). While it is generally agreed that transfer of critical thinking from one domain to another is desirable and that teaching should aim to maximise such transfer, (Kennedy et al., 1991, pp. 16-17), there is a problem about the notion of a domain. So, for example, writers such as McPeck (1990), who think that critical thinking is subject-specific, argue that critical thinking is equivalent to the epistemology of a discipline. But then what about education and teaching, which are not disciplines in the traditional sense? Is there no place for critical thinking in education and teaching? The problem is how to tell whether two activities are in the same or different domains (Ennis, 1989). Broadly defined, transfer across domains can mean transfer from one academic discipline to another or from the academic to the nonacademic world. Narrowly defined, transfer across domains can mean transfer from one task or situation to another within the same particular subject area.

It is also arguable that subjects within a teacher education course are linked more closely than usual, hence transfer may be more likely in such a course. Once again we are left with the need for empirical research. A vital question is how to best teach a critical thinking course in teacher education programs so as to maximise transfer.

4. TEACHING FOR CRITICAL THINKING

While the evidence is overwhelming that students can be taught to be better thinkers, the above discussion would suggest that there are many vital unanswered questions. So despite the fact that numerous books and articles have been written on teaching for critical thinking

The remaining task, and it is a large one, is the refinement of our understanding of what aspects of thinking can be learned, by whom, under what conditions, in what settings, and using what methods.
(Kennedy et al., 1991, p. 15)

Apart from issues of subject-specificity/generality and transferability, more empirical research is needed on which methods of teaching critical thinking are most effective. For example, Ennis has elaborated three versions of subject-specificity and two teaching approaches based on this, infusion and immersion (Ennis, 1989). The infusion model combines teaching of thinking in a specific subject with explicit teaching of general principles of critical thinking that apply in that subject area. Immersion concentrates only on teaching of thinking within a specific subject. If the Finn Report is taken seriously, these will become important issues in Australian educational research.

5. ASSESSING CRITICAL THINKING OUTCOMES

Currently, two of the tests most commonly used to assess critical thinking ability are the Watson-Glaser (1980) Critical Thinking Appraisal, and the Cornell Critical Thinking Tests, Levels X and Z (Ennis, Millman, and Tomko, 1985). Broadly speaking, both tests require respondents to decide whether there is sufficient evidence or reasons to draw certain inferences or conclusions. In the Critical Thinking Appraisal, the inferences and conclusions which respondents are asked to examine are drawn from short statements resembling mini-case studies. These are called "exercises". Similarly, the Cornell Critical Thinking Test, Level X, begins with a fictitious situation description followed by a series of alternative inferences and conclusions from which respondents must choose.

One of the problems with assessing critical thinking in this way is that the success of respondents on these tests may also be heavily dependent on their sophistication in language development and use. Conversely, poor performers on these tests may be actually capable of reasoning critically and solving problems in other ways not requiring highly developed language skills. For example, skilled motor mechanics may work out what is causing an engine to malfunction by listening to particular sounds or by observing a part moving in some irregular fashion.

Of course, one might then ask if these kinds of people are, in fact, engaging in critical thinking. Thus, one aspect which lends itself to research is whether there is a necessary link between language ability and critical thinking. Recently, Kaye and Hager (1992) argued that critical

thinking is closely associated with interpersonal communication competence, especially when this is understood from a social cognition perspective. When this argument is coupled with the well established evidence that intra- and interpersonal communication competence is grounded in level of control or "effectance" (Parks, 1985; Berger and Bradac, 1982; Roloff and Berger, 1982; Delia, O'Keefe and O'Keefe, 1982; de Charms, 1968; Goffman, 1959, 1967), the role of critical thinking in developing control over self and over one's environment (including one's social environment) appears to be robustly legitimated.

Given that it is possible to hypothesize, with some confidence, a relationship between critical thinking and one's ability to communicate, it is appropriate to suggest ways other than by means of pencil-and-paper tests, to assess critical thinking ability. A variety of approaches readily spring to mind. For example, observations by independent, trained/skilled investigators, of individuals assigned tasks of solving problems would be one possibility. These observations could be undertaken either openly or unobtrusively, although there would be ethical considerations with the latter alternative which would need to be taken into account.

Another way of identifying whether critical thinking occurred in such situations is to follow-up the critical incident problem-solving session with some retrospective, structured analysis. If such sessions were to be videotaped, there would be opportunity to have participants recalling their thinking at different points of the problem-solving process. This kind of technique has been used by Kagan (1977) in his Interaction Process Recall (IPR) Approach, and more recently by Noller and Callan (1989) who developed a video-based technique to tap into "insider data" about individuals' perceptions of nonverbally cued deception.

There are other possible ways of investigating the occurrence of critical thinking. For example, one could consider using structured interviews in which interviewees would have posed to them dilemmas and arguments which would need to be examined for their validity and acceptability. Skilled interviewers, by developing a coherent sequence of specific questions, should be able to analyse, from the oral responses of interviewees, the nature of critical thinking processes used to address particular dilemmas or arguments.

With particular reference to vocational teachers, there is a very important consideration regarding the relationship between teachers' demonstrable competence and any decision to tenure or promote these teachers. If teacher education providers include in their statements of objectives some intention to facilitate the development of critical thinking in vocational teachers-in-training, how do they determine whether any such development has taken place? Is it possible to do this both theoretically (i.e. through some form of test or problem-based exercises) and in practice (i.e. by witnessing these trained teachers "thinking on their feet" and solving interpersonal communication or learning problems as they arise)? These questions, we believe, are highly significant, and need to have priority in any agenda for applied research in critical thinking.

One thing is clear. If critical thinking can be "taught" (and this, we know, is a point of contention and debate), it is imperative that those who "teach" others to be critical thinkers are themselves well developed in critical thinking. An essential part of the research agenda we are proposing, therefore, is that in the field of vocational teacher education, the critical thinking abilities of teacher educators should be assessed. It is not unreasonable to suggest that in view of the normally advanced academic development of teacher educators, one would expect them to perform very well on the Level Z version of the Cornell Critical Thinking Test, for instance. Nevertheless, without evidence to support this expectation, the need to determine the critical thinking abilities of teacher educators becomes central to our applied research agenda.

As a serendipitous procedure, it may also be interesting to test teacher educators on their perceptions of the importance of critical thinking in teacher education curricula. In the event that teacher educators are found to place low value on the need for teachers to be critical thinkers, a further source of explaining current practices in ignoring or downplaying this competency area emerges. Kaye and Hager (1991) and Hager and Kaye (1991) have already speculated on the possibility that the process of critical thinking has had no currency in traditional, mechanistically-driven teacher education curricula.

Finally, it may be worth placing on the applied research agenda we are proposing, the question of whether claims and recommendations made in bureaucratically generated documents like the Finn Report are founded on evidence that is scientifically supported as well as politically flavoured. For example, the Finn Report, as we have suggested earlier, argues that critical thinking is part of the problem-solving key competence area. On what basis is this claim made? Policy statements of this kind shed very little light on the basis for recommendations and claims made in them.

For example, if McPeck's (1981) claim is to be taken seriously, critical thinking is not an ability which is generalisable or transferable from situation to situation. Those who follow this persuasion could not in any conceivable sense agree with the reasoning promulgated in the Finn Report. Unfortunately, we have no idea who the "experts" were who influenced the thinking of the Finn Committee. One possible inference, therefore, is that committees of this kind may be influenced in their thinking more powerfully by prominent practitioner groups rather than by scholars and applied social scientists.

We can conclude with the observation that a research agenda can be justified for the study of the relationship and place of critical thinking in vocational teacher education. The research questions in some cases require a paradigmatic shift in thinking of the part of parties with vested interests. It must be the fervent hope of current researchers in this area that future relevant employers and bureaucrats in high places will have sufficient vision and openmindedness to recognise potential opportunities to develop a workforce of more autonomous, self-reliant, critical thinkers.

REFERENCES

Ball, C. (1989). *Towards an Enterprising Culture, A Challenge for Education and Training.* Paris: OECD/CERI.

Baron, J. and Sternberg, R. (Eds.). (1987). *Teaching Thinking Skills: Theory and Practice.* New York: Freeman.

Barrow, R. (1990). *Understanding Skills: Thinking, Feeling and Caring.* London, Ontario: Althouse.

Berger, C.R. and Bradac, J.J. (1982). *Language and Social Knowledge.* London: Edward Arnold.

Beyer, B.K. (1987). *Practical Strategies for the Teaching of Thinking.* Boston: Allyn and Bacon.

Brookfield, S.D. (1987). *Developing Critical Thinkers.* San Fransisco: Jossey-Bass.

Carpenter, C. and Doig, J. (1988). Assessing Critical Thinking Across the Curriculum. In McMillan, J. (Ed.). *Assessing Students' Learning, New Directions for Teaching and Learning.* No. 34. San Fransisco: Jossey-Bass.

Chipman, S., Segal, J. and Glaser, R. (1985). *Thinking and Learning Skills, Volume 2: Research and Open Questions.* Hillsdale, New Jersey: Erlbaum.

Clanchy, J. and Ballard, B. (1989). The Cultures of Reason: Students in Strange Lands. In Jewell, P.D. (Ed.). *Intermediate Conclusions.* Adelaide: Flinders University.

Clark, C.M. (1988). Asking the right questions about teacher preparation: contributions of research on teacher thinking. *Educational Researcher, 18*(2), 5-12.

Costa, A.L. (Ed.). (1985). *Developing Minds: A Resource Book for Teaching Thinking.* Alexandria, VA: Association for Supervision and Curriculum Development.

Costa, A.L. and Lowery, L.F. (1990). *Techniques for Teaching Thinking.* Melbourne: Hawker Brownlow.

de Charms, R. (1968). *Personal Causation: The Internal Affective Determinants of Behavior.* New York: Academic Press.

Delia, J.G., O'Keefe, B.J. and O'Keefe, D.J. (1982). The constructivist approach to communication. In Dance, F.E.X. (Ed.). *Human Communication Theory: Comparative Essays.* New York: Harper & Row.

Ennis, R.H. (1962). A Concept of Critical Thinking. *Harvard Educational Review, 32,* 81-111.

Ennis, R.H. (1987). A Taxonomy of Critical Thinking Dispositions and Abilities. In Baron, J. and Sternberg, R. (Eds.) *Teaching thinking skills: theory and practice.* New York: Freeman.

Ennis, R.H. (1989). Critical Thinking and Subject Specificity: Clarification and Needed Research. *Educational Researcher, 18*(3), 4-10.

Ennis, R.H. (1991). Critical Thinking: A Streamlined Conception. Typed manuscript.

Ennis, R.H., Millman, J. and Tomko, T.N. (1985). *Cornell Critical Thinking Tests Level X and Level Z.* Pacific Grove, CA.: Midwest Publications.

Finn, B. (1991). *Young People's Participation in Post-compulsory Education and Training*. Report of the Australian Education Council Review Committee. Canberra: Australian Government Publishing Service.

Garrison, D.R. (1991). Critical thinking and adult education; a conceptual model for developing critical thinking in adult learners. *International Journal of Lifelong Education, 10*(4), 287-303.

Goffman, E. (1959). *The Presentation of Self in Everyday Life.* Garden City, NY: Doubleday/Anchor.

Goffman, E. (1967). *Interaction Ritual.* Garden City, NY: Doubleday/Anchor.

Hager, P. (1989). Are the Skills of Critical Thinking/Logical Reasoning Transferable Across Disciplines? In Jewell, P.D. (Ed.). *Intermediate Conclusions.* Adelaide: Flinders University.

Hager, P. (1990). Vocational Education/General Education - A False Dichotomy?. *Studies in Continuing Education, 12*(1), 13-232.

Hager, P. (1991). The Critical Thinking Debate - Editorial Introduction. *Educational Philosophy and Theory, 23*(1), 1-6.

Hager, P. and Kaye, M. (1991). Critical Thinking Ability and Teacher Effectiveness. *Higher Education Research and Development, 10*(2), 177-186.

Hager, P. and Laurent, J. (1990). Education and Training: Is There Any Longer A Useful Distinction? *The Vocational Aspect of Education,* XLII, No. 112, August, 53-60.

Kagan, N. (1977). *Interaction Process Recall.* East Lansing, Mich.: Michigan State University.

Kaye, M. and Hager, P. (1991). A Study of the Critical Thinking Skills fo Vocational Teachers. *Australian Journal of TAFE Research and Development,* 6(2), 19-29.

Kaye, M. and Hager, P. (1992). Critical Thinking in Adult Vocational Education: A Human Communication Perspective. In Ticehurst, G.W. (Ed.). *Communication Australia: A Search for Meaning in Changing Times.* Sydney: Griffin Publications.

Kennedy, M., Fisher, M.B. and Ennis, R.H. (1991). Critical Thinking: Literature Review and Needed Research. In Idol, L. and Jones, B.F. (Eds.). *Educational Values and Cognitive Instruction: Implications for Reform.* Hillsdale, N.J.: Lawrence Erlbaum.

Loacker, G. et al. (1984). *Analysis and Communication at Alverno: An Approach to Critical Thinking.* Milwaukee: Alverno Productions.

Lowery, L.F. (1990). *Thinking and learning.* Melbourne: Hawker Brownlow.

McPeck, J.E. (1990a). *Teaching Critical Thinking.* New York and London: Routledge.

McPeck, J. (1990b). Critical Thinking and Subject Specificity: A Reply to Ennis. *Educational Researcher,* 19(4), 10-12.

McPeck, J.E. (1991). What is Learned in Informal Logic Courses? *Teaching Philosophy, 14*(1), 25-34.

McPeck, J.E. (1981). *Critical Thinking and Education.* Oxford: Martin Robertson.

Meyers, C. (1986). *Teaching Students to Think Critically: A Guide for Faculty in All Disciplines.* San Fransisco: Jossey Bass.

Nickerson, R.S., Perkins, D.N. and Smith, E.E. (1985). *The Teaching of Thinking.* Hillsdale, New Jersey: Erlbaum.

Noller, P., and Callan, V.J. (1989). Nonverbal behavior in families with adolescents. *Journal of Nonverbal Behaviour, 13,* 47-64.

Norris, S.P. (1985). Synthesis of Research on Critical Thinking. *Educational Leadership, 42*(8), 40-45.

Norris, S.P. (1988). Research Needed on Critical Thinking. *Canadian Journal of Education, 13*(1), 125-137.

Norris, S.P. and Ennis, R.H. (1990). *Evaluating Critical Thinking.* Melbourne: Hawker Brownlow.

Parks, M.R. (1985). Interpersonal communication and the quest for personal competence. In Knapp, M.L. & Miller, G.R. (Eds.) *Handbook of Interpersonal Communication.* Beverly Hills, Ca.: Sage.

Perkins, D.N.. (1986). *Knowledge as Design.* Hillsdale, New Jersey: Erlbaum.

Roloff, M.E. and Berger, C.R. (Eds.). (1982). *Social Cognition and Communication.* Beverly Hills, Ca.: Sage.

Schrag, F. (1988). *Thinking in School and Society.* London: Routledge.

Swartz, R.J. and Perkins, D.N. (1990). *Teaching Thinking: Issues and Approaches.* Melbourne: Hawker Brownlow.

Watson, G. and Glaser, E.M. (1980). *Critical Thinking Appraisal.* N.Y.: The Psychological Corporation, Harcourt Brace Jovanovich.

Weinstein, M. (1990). Towards a Research Agenda for Informal Logic and Critical Thinking. *Informal Logic,* Vol. XII(3), 121-143.