



**Critical Thinking Disposition – counts and matters in
Post-registration SCPH Nurse Education**

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Critical Thinking Disposition Matters and Counts

Can you define critical thinking? Does your teaching promote critical thinking? Paul et al (1997) found that whilst 89% of higher education teachers claimed to be teaching for critical thinking, only 19% could define it, and only 9% were teaching to develop it.

The nature of critical thinking is informed by different philosophical traditions and contested. A Delphi study by the American Philosophical Association (1990) established an eclectic definition that includes reference to both skills and dispositions. Tools have been developed to measure both skills and disposition, and the synergistic relationship between them has been established. Critical thinking disposition is conceptualized by Facione et al (1994) as encompassing the non-discrete elements of truth-seeking, open-mindedness, systematicity, cognitive maturity, critical thinking, self-confidence, analyticity and inquisitiveness. The California Critical Thinking Disposition Inventory (CCTDI) measures disposition and has acceptable validity and reliability. It can be used to establish a base-line and monitor development.

This study investigated critical thinking disposition in students undertaking distance learning preparation for specialist community public health nursing. It was predicated on the belief that critical thinking is essential for Specialist Public Health Nursing (SCPHN) practice and that the achievement of critical thinking outcomes depends on an understanding of students' critical thinking disposition. A methodology for quantitatively assessing and qualitatively exploring critical thinking disposition was tested.

Findings of lack of total disposition, and specifically limitations in the truth seeking and systematicity dispositional elements in SCPHN students may be related to confidence, gender and professional socialization, work cultures and work-life balance issues. Addressing deficits requires a collaborative approach that involves students as active participants to counter barriers and build the confidence to question experience, concepts, self and others. Test results can be used as a platform for discussion that provides critical thinking orientation and a basis for reflection on skills and disposition. Conceptualizing critical thinking and exploring disposition and its determinants may provide a valuable reflective experience for educators.

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Abstract

This mixed method study assessed and explored critical thinking disposition in distance learning Specialist Community Public Health Nursing students. The California Critical Thinking Disposition Inventory (CCTDI) and semi-structured interviews were used to gather data.

Survey findings revealed positive total CTD mean, but wide variation in scores and 27% of participants with scores demonstrating ambivalence towards critical thinking. Although most sub-scale element mean scores were positive (≥ 40), scores for the truth seeking and systematicity were ambivalent (>30 but <40). Qualitative data suggests participants found testing interesting and useful. Sociological and psychological factors, including socialisation, work culture and power relations, exposure to higher education culture, questioning, and confidence were identified as determinants of disposition.

Addressing ambivalences and developing disposition may require critical thinking orientation and introduction to relevant tools, frameworks, and skills; structured feedback on critical thinking; curricular balance between imposed and student centred structure that supports work/life balance; differentiated support; and enhanced opportunities for learning dialogue underpinned by strong inter-personal relations and ground rules. As face to face contact enhances relationship building, blended delivery may offer benefits over fully on-line delivery. CTD assessment and exploration is useful in learning needs assessment, curriculum development, and evaluation. SCPHN educators need to develop CTD development strategies to ensure practitioners are fit for academic award and practice.

Note - Information about the CCTDI test used in this study can be accessed via the test provider's web site @www.insightassessment.com

Introduction and Background

Critical thinking (CT) is essential in professional and higher education (Daly 1998; Dearing 1997). It is required to support judgements in planning and delivery in public health and nursing practice (Alfaro-LeFevre 1995; Facione & Facione 1994; Simpson 2002; APA 2005). Standards for Specialist Community Public Health Nursing (SCPHN) Education (NMC 2004) call for reflective practitioners with public health competencies **and** the critical thinking, problem solving, and self-regulated learning skills required for capability.

This project arose from concerns about a perceived lack of critical thinking development in students undertaking a distance learning (DL) SCPHN programme; its aim was to inform curriculum development. The programme concerned is underpinned by adult, humanist, and reflective learning theory. Wide entry gates admit students with mixed motivations, limited experience of higher education, and under-developed study skills (Dowswell et al 1998; Cottrell 2001).

Definitions of Critical Thinking

Critical thinking is grounded in critical theory therefore its nature is contested, but it is a process that supports belief and action. Fisher (2001) concluded that CT depends on belief in its value and attitudes towards it. CT can facilitate reasoning and understanding of past, present, and future events (Brookfield 1993). It is goal directed, purposeful, abstract, logical, rational, and evaluative; it is also moral thinking and justification of ideas and knowledge (Daly 1998). Critical thinking is central to reflective thinking, and it is a principled process employing the cognitive skills of interpretation, analysis, inference, explanation, evaluation and self-regulation of thinking recursively (Facione et al 2000). Critical thinking is **“an essential tool of inquiry”** and **“a liberating**

force in education” and critical thinkers exhibit certain “habits of mind” or inclinations (APA 1990 in Facione et al 2000:5).

CT in structured learning however differs from CT in practice (Forneris 2004). Practice and academic disciplines perceive CT differently (Gordon 2000). Walthew’s (2004) exploration of conceptions of CT held by nurse educators suggests that CT in nursing, by encompassing intuitive, subjective, and contextual dimensions, as well as rationality and logic, is critical *reflective* thinking. Scheffer and Rubenfeld’s (2001:125) Delphi study defines critical thinkers (below) and supports the view that critical thinking is reflective, context dependent, and predicated by affective dispositions or inclinations.

“Critical thinkers in nursing exhibit these habits of mind: confidence, contextual perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, open-mindedness, perseverance, and reflection.”

Disposition is ***“the attitudinal basis for the internal motivation to think critically”*** (Facione 2004); it is an essential pre-requisite. Halpern (1999) emphasises the importance of CT disposition in higher education (HE) and concludes that dispositions and skills are synergistic. Different ways of conceptualising CT disposition have been proposed (Tishman & Andrade 1996). Facione et al’s (2000:9) is grounded in the APA Delphi study and has 7 ***conceptually non-discrete*** elements (Table 1 & Appendix 2) which need to be interpreted and analysed in relation to each other and the construct. Truth seeking, in particular, warrants careful examination to appreciate that it involves inclination to use both professional judgement and research based evidence. The California Critical Thinking Disposition Inventory (CCTDI) is based on Facione’s conceptualisation. It is the most developed and used CTD assessment instrument (Tishman & Andrade 1996) and consists of 75 “agree-disagree” likert scale items and a 6 point response scale (Appendix 3).

Table 1 – Elements of CCTDI (Facione et al 1994)

Truthseeking: Intellectual honesty – the desire for best knowledge, the inclination to ask challenging questions and to follow reason and evidence
Openmindedness: Tolerance for new ideas and divergent views
Analyticity: Anticipation of and/or alertness to actual or potential problems – being aware of when there is a need to use reason and evidence to solve problems
Systematicity: Inclination towards being organised e.g. ability to focus and stay focused, diligence
Critical Thinking Self-confidence: Trust in one’s own reasoning abilities and capacity to guide others in decision making
Inquisitiveness: Intellectual curiosity and willingness to learn things when the immediate application of these things is not obvious
Cognitive Maturity: Capacity to make judgements that enable the complexity of problems to be appreciated and to make decisions carefully and cautiously.

Literature Review

CT is an espoused outcome of nurse education, but evidence suggests that it is not realised (Adams et al 1999; Rane-Szostak & Robertson 1996; Brunt 2005; Cise et al 2004). This is however contested as some authors question the validity of measures that assess critical thinking without reference to the context of application (Leppa 1997; Adams 1999). Facione & Facione’s (1997) meta-study collated data on CT from 50 nurse education programmes and provides the best evidence.

Using CCTDI and the California Critical Thinking Skills Test (CCTST), Facione & Facione (1997) found weak, but highly significant, correlations between skills and disposition. A relationship was established between

disposition at entry and skills at exit suggesting that disposition may predicate skill development. Wide CTD score ranges were identified (171-210). The first year students' total CTD mean was positive (>280) @ 298.6 and means for 6 of the 7 sub-scales were positive. The mean sub-scale score for truth seeking was ambivalent (<40) @ 36.4; 60% of scores were in the 31-39 range. Means for CT self-confidence (41.3), systematicity (42.5), analyticity (43.2), open-mindedness (43.9), inquisitiveness (46.6) and cognitive maturity (44.9) were positive. Although inquisitiveness was found to be a strength, the overall profile was interpreted as indicative of tendencies towards bias and disorganisation, limited tolerance of other views, and some self-doubt. A similar profile emerged for 2nd, 3rd and 4th year students, but higher means were found (310.4 - 311.4). Truth seeking means ranged from 36.4 to 38.7 (all ambivalent). The effectiveness of nurse education for promoting truth seeking must be questioned.

The CTD of licensed nurses studying was also assessed. Although a selection effect may explain it, their total CTD mean was higher @ 312.8 and their sub-scale means were all positive (>40). They had significantly higher total CTD means and higher sub-scale means for truth seeking, systematicity, inquisitiveness and cognitive maturity. At exit however, despite following similar curricula, licensed students had a lowered total mean @ 309.3, a mean for truth seeking of <40, and lowered sub-scale means in all sub-scales except CT self-confidence. Although this was not matched pair data, it suggests that education had a negative impact on CTD and that these students may have different CTD development needs.

Age was found to be positively and significantly correlated with mean total CTD and sub-scale scores for CT self-confidence, inquisitiveness and truth seeking, but only in the truth seeking was the correlation high enough to account for a significant amount of the difference, and even then only 5% of variance was related to age. Licensed students were older (mean age 33.5), but as age can only explain a small amount of the difference, other variables must exist.

Profetto-McGrath et al (2003) used CCTDI to investigate the relationship between CTD and research utilisation in practising nurses. Mean total CTD was 281.8 (range 228-357), with 52.5% scoring as ambivalent (> 210 & <280). A wide range of sub-scale scores were found, particularly in critical thinking self-confidence (24-60) which produced the lowest mean (36.7). The range for systematicity was smallest (29-53) and it produced the second lowest mean (39.4). Analyticity and truth-seeking also had ambivalent means (38.6 & 39.5). Highest sub-scale means were for cognitive maturity (43.9) and inquisitiveness (43.7). Weak negative correlations were found between total CTD scores and years of nursing experience and age ($p=0.05$).

Colucciello (1999) found ambivalent total CTD scores and ambivalences in truth-seeking, open-mindedness, CTS confidence, cognitive maturity, and systematicity. Thompson & Rebesch (1999) found positive scores at entry (323.9) and significant programme exit gains (332.5), particularly in truth-seeking and analyticity. They identified part-time study and work-life demands as confounding variables. Redding (2001) reports CTD profile differences between progressing and discontinuing nursing students. Bondy et al (2001) report on nursing students ($N=156$) with total CTD mean of 314.9 and means of >40 in all sub-scales, except truth seeking. Ambivalent truth-seeking scores are also identified in Colucciello (1997) and Ip et al (2000). Hicks et al's (2003) found ambivalent scores in analyticity, open-mindedness and truth-seeking in critical care nurses. Colucciello (1997) and Stone et al (2001), report on the possible influence of experience and education level on CTD scores.

Evidence is largely derived from North American studies of full-time face to face students. Definitional differences, the use of small convenience samples, and cross sectional designs limit evidence. Diversity in CTD and multiple determinants are however apparent. Facione & Facione's (1997) findings raise concerns about truth seeking and the impact of HE curricula on the CTD of practising nurses returning to study.

Study Aims and Methods

This study sought to establish the CTD profiles of a population of SCPHN students' undertaking a distance learning programme and investigate whether CTD was related to having a degree, length of post-registration experience, and/or progression on the programme. It also explored students' views on CTD testing, CTD determinants, and CTD development.

A mixed method approach, the two-phase sequential explanatory design (Creswell 2003), was used with a quantitative survey preceding qualitative exploration. The whole programme population of 151 students was included as sampling was not justifiable. Data on critical thinking disposition was collected using CCTDI administered on-line asynchronously. Data on students' stage on the programme; post-registration experience; previous education; and willingness to be interviewed was collected. Email invitations provided a web link to the test centre, a study code, an ID code, and an explanation of the purpose of the study, participation anonymity and data confidentiality. A prize draw used to as a participation incentive. Qualitative exploration employed a convenience sample of 4. Data on students' experiences of testing and their views on CTD determinants and development were gathered using face to face semi-structured interviews which were taped and transcribed.

Quantitative data were downloaded from the test provider's web site and analysed using SPSS13. Qualitative data analysis involved prolonged engagement and progression from raw data to the generation of an explanatory account (Ritchie & Lewis 2003). Tapes and transcripts were examined, categories were derived for coding, and transcripts were manually coded. Credibility, dependability, confirmability and transferability were key considerations (Strubert & Carpenter 1995). Biases and preconceptions were documented (Cresswell 2003) and shared with a critical companion/study observer. Member checking was undertaken. Ethical issues informed design and governance processes were complied with. Methods were piloted.

Findings

IT security systems and low connectivity caused data collection problems. Despite guidance and reminders, only a 37% response rate was achieved (56 completed tests). Cronbach Alpha (CA) for total CTD score was satisfactory (>0.8); sub-scale CAs apart from open-mindedness were >0.5 . CTD data were negatively skewed. Total scores had a wide range (207-349). Mean total CTD was positive (289.9), but 15 (27%) students scored less than 280 and 1 scored less than 210 (207). Variation was greatest in systematicity, CT self-confidence, cognitive maturity, and truth seeking (Table 2). Means for truth seeking and systematicity were ambivalent, all others were positive. Systematicity was lowest (39.1); 27(48%) were ambivalent. Truth seeking was next lowest (39.2); 29 (52%) were ambivalent. 23 (46%) were ambivalent in CT self-confidence; 21 (37.5%) were ambivalent on open-mindedness. Inquisitiveness and cognitive maturity were highest (44.8 and 43.5).

	N	Minimum	Maximum	Mean	S.D.	Range
Truth-Seeking	56	26.7	49.2	39.2	5.3	22.5
Openmindedness	56	21.7	46.7	40.2	4.7	25
Analyticity	56	29.1	52.7	41.7	4.7	23.6
Systematicity	56	24.5	52.7	39.1	5.5	28.2
CT S.Confidence	56	28.9	55.6	41.4	5.5	26.7
Inquisitiveness	56	30.0	54.0	44.8	5.3	24
Cog.Maturity	56	27.0	53.0	43.5	5.5	26
Total	56	207.1	349.8	289.9	25.8	142.7
Valid N	56					

Table 2 Descriptive Statistics for Total CTD Scores & Sub-scale scores

As total and sub-scale score distributions, except CT self-confidence, were negatively skewed, non-parametric tests were used. Due to its normal distribution, CT self-confidence testing employed a parametric test (independent sample 2 tailed t test). Small group sizes and differences between means limited the power of all testing (<0.8). The significance level for testing was $p=0.05$.

Was CT disposition related to having a degree?

14 (25%) had previous degrees. No significant results were obtained to reject the null-hypothesis. However, when testing was repeated using sub-scales data a highly significant result (0.007, $p < 0.01$) was obtained for systematicity.

Was CT disposition related to length of post-registration experience?

Data gathered on length of post-registration experience was not useful; only one respondent had less than 5 years experience. The question was re-formulated to "Is CT disposition related to age?" The age of respondents providing data (N=51) was 26-52 (mean 39.5 years). No evidence to reject the null hypothesis was established.

Was CT disposition related to number of modules completed?

27 (48%) had completed less than 3 modules, 29 (52%) had completed more than 3 modules. No evidence to reject the null hypothesis was established.

What are students' views on CTD testing, the factors that influence CTD, and how it could be developed?

Emergent themes were the value of testing; sociological and psychological determinants; learning support relationships and processes. To achieve triangulation, emergent qualitative themes are integrated into the following discussion of survey findings.

Discussion

Mean total CTD score at 289.9 was lower than Facione & Facione's (1997) 3rd years (308), licensed students (317), and even 1st years (298.6). It was lower than scores in students reported by Bondy et al (2001), Thompson & Rebesch (1999) and Profetto-McGrath (2003), but similar to scores in practising nurses reported by Profetto-McGrath et al (2003) and Hicks et al (2003). All sub-scale means, except truth-seeking, were lower

than those reported for 3rd years and licensed students. Systematicity and CT self-confidence means were equivalent to Facione's 1st years. The truth seeking mean (39.2) was higher than Facione's 3rd year students (38.2), but lower than licensed students' pre-programme mean (40.6) and equivalent to their post-programme mean. Ambivalence towards truth seeking and systematicity, with positive scores for cognitive maturity and inquisitiveness, matches Profetto-McGrath et al's (2003) findings in practising nurses.

For the 27% with ambivalent scores reflective learning may be compromised by lack of criticality. The need for CTD development is apparent and wide score ranges suggest the need for differentiated support. Ambivalences identified in sub-scales will limit development in total disposition, because elements are inter-related and positive disposition requires positive scores in all elements (Facione et al 1997).

The mean score for systematicity (39.1) was lower than Facione's (1997) for all years and licensed students (44.3); 48% were ambivalent. Qualitative findings suggest that gender and professional socialisation, and previous learning in which structure and content were imposed, may be contributory. This fits with evidence that professional socialisation and experience may detract from CTD (Ironsides 2004; Loving and Wilson 2000; Shell 2001).

Systematicity

Findings suggest a relationship between graduate status and systematicity. Drawing on Perkins et al's (1993) model of CTD, which links sensitivities, inclinations and abilities, it may be that learning experience develops systematicity by developing organization skills, sensitivity to the need to apply them, and the inclination to do so. Facione & Facione's (1997) findings indicate that this does not always happen. Qualitative findings suggest that inclination towards organisation depends on abilities and learning contexts; as both are individual, development must be student centred. DL flexibility was identified as a barrier, but the

imposition of structure and organisation was also perceived to detract from systematicity inclination and capacities.

Qualitative findings suggest that work/life balance problems can confound organisation and reduce disposition. This is also a finding in Thompson & Rebesch (1999). Other evidence suggests that middle aged female learners experience significant work/life balance difficulties (Dowswell et al 1998; Ritchie et al 2005). Programme structure/flexibility balance may be required to promote work/life balance and develop systematicity. The experience of determining the need for organisation and developing strategies compatible with individual circumstances may be necessary. A balance between curriculum imposed and individually determined structure may be necessary.

Truth Seeking

Over half (52%) of participants were ambivalent towards truth seeking; reportedly the most difficult disposition to develop (Facione et al 1997; Rimiene 2002). Ambivalence towards truth seeking is common (Profetto-McGrath et al 2003; Colocciello 1997; Facione 1995). Qualitative findings identified work culture, hierarchy, "traditional thought", and lack of confidence to question as barriers. Findings suggest that use of reasoning and evidence is not apparent in practice; it may even be at odds with professional socialisation (Duchscher 2003). Other barriers identified, included personal, professional and political risk associated with CT, and issues relating to power relations; this resonates with Brookfield's (1993) work on cultural suicide. Learners could benefit from examining social, cultural and psychological factors that support "traditional" forms of knowledge and TS ambivalence.

Qualitative findings suggest linkages between truth seeking, systematicity, and CT skills. This fits with evidence of a correlation between CT skills and TS and systematicity dispositions (Crawford 2002). Findings also suggest that research appraisal skills support CTD development. This fits with Profetto-McGrath et al's (2003) linkage of CTD and research utilisation and Thompson & Rebesch's (1999) suggestion

that literature review develops truth seeking and systematicity. Linkage of dispositions and skills development is widely advocated (Halpern 1999; Perkins et al 1993; Facione et al 1997). CT tools e.g. thinking, reflection, and appraisal frameworks may enhance abilities and consequently disposition.

Findings revealed positive means for CT Self-Confidence (CTSC) and Open-mindedness (OM), but wide score ranges; 46% were ambivalent towards CTSC, 37.5% were ambivalent towards OM. Expression and questioning of views is fundamental to critical thinking, but fear of questioning and lack of confidence were identified. Findings suggest linkage between CTSC and OM, and that confidence building requires environments that encourage questioning and the use of evidence and reasoning, whilst recognising the value of existing knowledge. Use of questioning as a teaching/learning strategy in a way that prevents defensiveness may promote the CTSC and OM necessary to develop truth seeking.

Other CTD Elements

Positive means for inquisitiveness, cognitive maturity and analyticity may relate to socialisation and valuing applied over "theoretical" CT (Gordon 2000; Scheffer and Rubenfeld 2001). Strengths in these elements could be used to address weaknesses in other elements. Findings suggest that participants conceptualise inquisitiveness differently from the test construct; they defined it as interest due to both relevance and applicability, whereas the test defines it as interest in the absence of immediate applicability. Adult learning theory (relevancy orientation), would support the students' interpretation (Lieb 1991). Students may need to explore the applicability of critical thinking to enhance their disposition.

The Value of CTD Testing

Response rates suggest resistance to testing as well as IT barriers. Qualitative findings suggest testing is useful and acceptable. The fact that

70% of participants volunteered to be interviewed provides evidence of interest. Interview dialogue appears to have helped students to make sense of results and consider CTD development. Findings suggest that testing provided a framework for reflection on CT disposition and language to discuss it. Reflection, dialogue, and questioning are mechanisms in facilitating development because intrinsic motivation and individual solutions are required (Keeley et al 1995). Ethically testing must be voluntary.

Developing CTD

Qualitative findings suggest that nurses accept other healthcare workers' views uncritically; either there is no critique, or it is not expressed. Gender and professional socialization were reported to result in inequalities between healthcare workers. This may impact negatively on OM and CTSC. Participants identified group interaction as having the potential to promote confidence and develop questioning skills, but findings highlighted that power relations and lack of confidence can inhibit participation and/or lead to defensiveness and intolerance of other views. Some students need to build their confidence for group learning and ground rules are required to ensure all students have a voice.

Qualitative findings suggest that exposure to HE culture promotes CTD, although Facione's (1997) findings suggest otherwise for licensed students. DL makes exposure challenging (Lawhon & Ennis-Cole 2005) and requires effective use of Information and Communication Technology (ICT). Both face to face and electronic group activities can provide interaction opportunities. Facilitated on-line discussions can provide the social context required to build confidence and promote open-mindedness, but they must be well designed to ensure that they are effective and ethical (Leppa 2004).

Findings suggest that the process of disposition development requires self-assessment and intrinsic motivation and is enhanced by CT tools/frameworks and opportunities for dialogue. The need for strong inter-personal relations to underpin dialogue was identified and highlights

the importance of relationship building and confidence. This fits with Keeley et al's (1995) discussion of CT resistance. Qualitative findings suggest that face to face contact may be important to establish key relationships; blended rather than fully on-line delivery may be more effective.

Emphasis on content coverage can lead to didactic transmission. Findings confirm that this is not appropriate for CTD, but that previous experience of didactic approaches influences expectations. Nurse educators believe that students' attitudes and expectations are the most significant barrier to CT development strategies (Shell 2001). Students need control over learning content and process, but findings suggest that students lack readiness for this.

Development of a teaching focus on CT has a positive relationship with skill and disposition scores (Facione et al 1997), but Paul, Elder & Bartell (1997) identified that whilst 89% of HE teachers claimed to be teaching for CT, only 19% could provide a clear definition, and only 9% were clearly teaching for CT. Shell (2001) draws attention to the need for staff development and identifies educators' perceptions of the need to cover content as a barrier to teaching for CT. Professional regulation, including Standards for SCPHN Education (NMC 2004), in calling for depth and breadth may lead to content overload; prioritisation may be required to support CT disposition and skills development.

Limitations

Survey response rate (37%) and qualitative methods limit the generalisability of findings. Response rates raise questions about web access, IT skills, the user friendliness of the test and apathy towards, or apprehension about, testing. Response bias is possible. Evidence of association between CTD scores and research utilisation (Profetto-McGrath et al 2003) may extend to research participation; test takers may have higher CTD scores than non-responders. Insufficient data was collected for acceptable power in statistical testing required for question 3-5. Response

rates may have been improved by better guidance and/or testing whilst students were in attendance.

The researcher's role as an educator may have impacted on data quality and introduced biases in interpretation and analysis of qualitative data. Novice qualitative data analysis skills may have impacted negatively on the trustworthiness and credibility of findings, although member checking, observer monitoring and data triangulation were supportive.

Conclusions

CTD survey revealed a positive total CTD mean, but wide variation in scores and 27% of participants with ambivalent scores. Means for truth seeking and systematicity were ambivalent, all other means were positive. Except for truth seeking, scores were lower than those reported in Facione & Facione (1997). Interview data suggests that participants found testing interesting and useful. Socialisation, work culture and confidence were identified as CTD determinants. Findings suggest that developing CTD requires critical thinking orientation and development through the use of frameworks (e.g. CT models and tools for research appraisal, reflection, and thinking), increased opportunities for dialogue, and confidence building. Sensitivity to the need for organisation skills and inclinations (disposition) to use them should be acknowledged as part of the learning process.

The implications of findings are that to enhance CT outcomes, curriculum design and delivery needs to accommodate a high degree of CTD differentiation and ambivalence. Ambivalences to truth seeking and systematicity need to be addressed by building on strengths in other dispositions. Interventions must take account of issues of confidence, socialization, learning contexts and requirements for dialogue. The need for CT orientation and discussion of knowledge development, including examination of tensions between different types of knowledge, also emerged.

ICT is revolutionising DL provision creating demand for fully on-line programmes (Lockwood & Gooley 2001). IT issues identified in survey data collection and interview findings suggest ICT equipment, skills, and use inclination deficits. Lack of confidence and peer support mechanisms in DL students (Carnwell 2001) may limit the potential of fully on-line delivery for CTD development. Practice cultures resistant to CT and DL delivery may also limit opportunities for HE enculturation (Tishman et al 1992) and CTD development.

SCPHN educators need to make their conceptualisations of CT explicit and reflect on how they are teaching for CT. Establishing a balance between covering content to ensure fitness for practice and purpose, and developing critical reflective thinkers fit for academic award and future practice is imperative. Brookfield's (1993) analysis suggests that peer learning communities can support reflection on, and development of, the critical process required to ensure teaching for CT. Sharing of strategies and materials is also advocated by Jones & Merritt (1999).

Recommendations

This study demonstrates that CTD assessment and exploration is feasible and useful in educational needs assessment. The following recommendations for CTD development have been derived.

- Use CTD testing and follow on dialogue to assess and explore CTD, provide CT orientation, and inform CTD development.
- Provided students with conceptual frameworks to support reflection on CTD and self-assessment.
- Provide differentiated and CT focused tutorial dialogue that employs questioning as a key mechanism.
- Introduce students to research appraisal, reflection frameworks, and other thinking tools introduced early in the curriculum to provide CT orientation, enhance CT skills, and develop CTD.
- Ensure that curriculum delivery accommodates work/life balance issues, develops students' organisation skills, and addresses the need for learner control over content and pace.

- Explored CTD barriers with students & practice teachers.
- Employ a blended approach in DL delivery.
- Increase learner confidence by attending to relationship building; establishing ground rules for group work; and employing both individual & group development activities.
- Assess staff development needs for teaching for CT.

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Appendix 1

Definitions of Critical Thinking

The number and range of definitions of CT illustrates both its importance and its contested nature (Profetto-McGrath et al 2003). Selected definitions of critical thinking are presented below (Fisher 2001)

Dewey 1909

"Active, persistent, and careful consideration of a belief or supposed form of knowledge in the light of the grounds which support it and further conclusions to which it tends."

Glaser, 1941

"(1) an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experience; (2) knowledge of the methods of logical enquiry and reasoning; and (3) some skill in applying those methods. Critical thinking calls for a persistent effort to examine any belief or supposed form of knowledge in the light of evidence that supports it and further conclusions to which it tends."

Norris & Ennis 1989

"critical thinking is reasonable, reflective thinking that is focused on deciding what to believe or do."

Paul, Fisher and Nosich, 1993

"Critical thinking is that mode of thinking – about any subject content or problem – in which the thinker improves the quality of his or her thinking by skilfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them."

Fisher & Scriven, 1997

"Critical thinking is skilled and active interpretation and evaluation of observations and communications, information and argumentation."

Some definitions place the emphasis on CT as a process, in others CT skills are central. Brookfield (2005) explains how different traditions within critical theory influence definitions of CT.

- Ideological critique focuses on how dominant ideologies and power relations influence thinking unconsciously through belief systems and assumptions.
- Psychoanalytical and/or psychotherapeutic perspectives emphasise how psycho-cultural factors influence thinking and development.
- Analytic philosophy and logic focus on argument analysis, examination of reasoning, and the influence of biases, fact, opinion, and evidence on judgements.
- Pragmatic constructivism involves interpretation of experience and the generation of meaning to inform action.

The use/application of CT further complicates definitions. As Forneris (2004: 1) observes using CT in practice is qualitatively different from CT in structured learning situations. Empirical studies provide evidence that CT in structured learning situations does not easily transfer to practice situations (Colucciello 1997 & 1999; Facione et al 1994). Drawing on a range of theoretical perspectives, including Freire, Schon, Argyris, Mezirow and Brookfield, Forneris (2004: 5) concludes that **making thinking in practice “critical” requires reflection**. Reflection raises awareness of the impact of underlying assumptions on reasoning, enhances understanding and enables appropriate action planning. Reflection helps practitioners to ***“engage the contextual elements of culture, underlying assumptions, and necessary facts, concepts, rules and principles”***.

The California Critical Thinking Disposition Inventory

Insight Assessment 2006 accessed on-line @
<http://www.insightassessment.com/test-cctdi2.html> 04.08.06

"People may be positively, ambivalently, or negatively disposed on each of seven aspects of the overall disposition toward critical thinking.

Total Score: The CCTDI total is a measure which estimates one's overall disposition toward critical thinking. A person may be positively and strongly disposed toward seeking to solve problems and address questions using reflective judgment, that is critical thinking; or ambivalent toward that, or even negatively disposed and hostile toward that approach. The total score is based on all 75 items. These items are divided into seven subgroups to form the seven scales described below.

Truthseeking: Truthseeking is the habit of always desiring the best possible understanding of any given situation; it is following reasons and evidence where ever they may lead, even if they lead one to question cherished beliefs. Truth-seekers ask hard, sometimes even frightening questions; they do not ignore relevant details; they strive not to let bias or preconception color their search for knowledge and truth. The opposite of truthseeking is bias which ignores good reasons and relevant evidence in order not to have to face difficult ideas.

Open-mindedness: Open-mindedness is the tendency to allow others to voice views with which one may not agree. Open-minded people act with tolerance toward the opinions of others, knowing that often we all hold beliefs which make sense only from our own perspectives. Open-mindedness, as used here, is important for harmony in a pluralistic and complex society where people approach issues from different religious, political, social, family, cultural, and personal backgrounds. The opposite of open-mindedness is closed-mindedness and intolerance for the ideas of others.

Analyticity: Analyticity is the tendency to be alert to what happens next. This is the habit of striving to anticipate both the good and the bad potential consequences or outcomes of situations, choices, proposals, and plans. The opposite of analyticity is being heedless of consequences, not attending to what happens next when one makes choices or accepts ideas uncritically.

Appendix 2

(continued)

Systematicity: *Systematicity is the tendency or habit of striving to approach problems in a disciplined, orderly, and systematic way. The habit of being disorganized is the opposite characteristic to systematicity. The person who is strong in systematicity may or may not actually know or use a given strategy or any particular pattern in problem solving, but they have the mental desire and tendency to approach questions and issues in such an organized way.*

Critical Thinking Self-Confidence: *The tendency to trust the use of reason and reflective thinking to solve problems is reasoning self-confidence. This habit can apply to individuals or to groups; as can the other dispositional characteristics measured by the CCTDI. We as a family, team, office, community, or society can have the habit of being trustful of reasoned judgment as the means of solving our problems and reaching our goals. The opposite is the tendency to be mistrustful of reason, to consistently devalue or be hostile to the use of careful reason and reflection as a means to solving problems or discovering what to do or what to believe.*

Inquisitiveness: *Inquisitiveness is intellectual curiosity. It is the tendency to want to know things, even if they are not immediately or obviously useful at the moment. It is being curious and eager to acquire new knowledge and to learn the explanations for things even when the applications of that new learning is not immediately apparent. The opposite of inquisitiveness is indifference.*

Maturity of Judgment: *Cognitive maturity is the tendency to see problems as complex, rather than black and white. It is the habit of making a judgment in a timely way, not prematurely, and not with undue delay. It is the tendency of standing firm in one's judgment when there is reason to do so, but changing one's mind when that is the appropriate thing to do. It is prudence in making, suspending, or revising judgment. It is being aware that multiple solutions may be acceptable while appreciating the need to reach closure in certain circumstances even in the absence of complete knowledge. The opposite, cognitive immaturity, is characterized by being imprudent, black-and-white thinking, failing to come to closure in a timely way, stubbornly refusing to change one's mind when reasons and evidence would indicate one is mistaken, or foolishly revising one's opinions willy-nilly without substantial reason for doing so."*

The California Critical Thinking Disposition Inventory

Tool Description

CCTDI uses Facione's elements of CTD and consists of 75 "agree-disagree" items and a 6 point response scale. It takes 20-30 minutes to complete. Total scores can range from 0-420 with sub-scale scores ranging from 0-60. A total score of 280 or less indicates a disposition against CT, 350 or over indicates a consistent disposition towards CT. Sub-scale scores of ≥ 40 are positive, scores of 31-39 are ambivalent, scores of ≤ 30 are weak and scores of ≥ 50 are strongly positive (Facione et al 1997). Positive overall disposition requires scores of ≥ 40 in all sub-scales. CCTDI's validity is established by its basis in the APA study and comparison of test results with results from validated tools for related constructs (Pendarvis 1996 in Facione et al 2000). Its reliability is demonstrated with Cronbach Alpha (CA) measures (a kind of split-half testing).