Response to Keynote

Cultivating thought-full and creative thinkers: A comment on quality merging Costa with Claxton et al.

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Acquaintance with the details of fact is always reckoned, along with their reduction to a system, as an indispensable mark of mental greatness.

William James – Pragmatism

The two keynote papers in the first issue of *Thinking Skills and Creativity* provide significant food for thought. Working to teach thinking skills and creativity is a real challenge. Many university professors shadow this path with passion and enthusiasm, with serious and playful engagement, often with little reward or recognition—many need the nourishment of understanding.

Students demand quality. Even when students cannot define what quality is, they recognise it when they see it, hear it, read it. Like each new generation of thinkers, the young minds of tomorrow will instinctively recognise that modelling quality pays (Richerson & Boyd, 2005). Some people warn us of the dangers of rising expectations (Vickers, 1983), but, as implied by Arthur Costa, in the modern era – an era in which 'knowledge' grows with such ferocious speed – if human systems are to sustain development and optimize functioning, then students need to *expect* to gain the capacity to be self-initiating, self-modifying, and self-directing. A thought-full curriculum can help to satisfy "the growing need for informed, skilled, thoughtful and compassionate citizens who value truth, openness, creativity, interdependence, balance and love as well as the search for personal and spiritual freedom . . ." (p. 62).

Psychologists who support positive psychology advocate the development of research studies that will help inform us on how best to fashion these strengths (Aspinwall & Staudinger, 2003; Peterson & Seligman, 2004). Naturally, the development of these strengths is potentially constrained by weaknesses in our evolved design (Pinker, 1997, 2002), and in the design of our science (Warfield, 2003, 2004). At the same time, we are far less constrained than are other animals-our behavioural programs are massively open (Heckhausen & Schulz, 1995).

A central observation of lifespan theorists is that, as development unfolds from infancy to adulthood, individuals increasingly act on their environment and produce novel behaviour outcomes, thereby making the active and selective nature of human beings of paramount importance (Baltes & Barton, 1979). Further, as adolescents develop into adulthood, a capacity for systemic and meta-systemic thinking can emerge (Fischer & Bidell, 2006), allowing great potential for the construction of a *life plan* that fosters optimization of action for self and others. Unfortunately, the numerous models of "system dynamics" that are now emerging in developmental psychology say less about how human systems can be 'designed' to optimize action in a rapidly changing field of affordances and constraints. Quality design requires quality dialogue.

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Costa notes that "a thought-full curriculum serves to forge a common vision among all members of the educational community – educators and parents – of the characteristics of "critical thinkers", dispositions of intelligent human beings, qualities of "thought-full" people, and performances of efficient, effective, creative and reasoned problem solvers" (p. 63). This is a very worthy ideal, and achieving this common vision requires dialogue. Dialogue is difficult (Bohm & Nichol, 1996). Although arriving to a state where *quality* dialogue is possible is often a time-consuming affair, it is a necessary foundation stone for an integrated systems science—a science that works toward knowledge coherence and the design of systems that optimize the action of individuals and groups, thus allowing for sustained coherence. As David Bohm has it, quality dialogue harnesses the great power of coherent collective thought. And although professors will often disagree when asked what defines good "critical thinking", it is worth noting that application of a dialogue-based strategy has produced one very useful consensus statement (Facione, 1990). After many months of dialogue, and after six rounds of questions which called for thoughtful and detailed responses, the following words emerged:

> "We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based. CT is essential as a tool of inquiry. As such, CT is a liberating force in education and a powerful resource in one's personal and civic life. While not synonymous with good thinking, CT is a pervasive and self-rectifying human phenomenon. The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. Thus, educating good critical thinkers means working toward this ideal. It combines developing CT skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational and democratic society". (p. 2)

Each of the core elements of CT is elaborated upon in some details in the Delphi report, and fifteen recommendations pertaining to CT instruction and assessment are presented. Also, as noted in the report:

> "Not every useful cognitive process should be thought of as critical thinking (CT). Not every valuable thinking skill is CT skill. CT is one among a family of closely related forms of higher-order thinking, along with, for example, problem-solving, decision making, and creative thinking. The complex relationships among the forms of higher-order thinking have yet to be examined satisfactorily". (p. 5)

Guy Claxton, with Louise Edwards and Victoria Scale-Constantinou, provide some very worthwhile insights into how creative people CREATE, through curiosity, resilience, experimenting, attentiveness, thoughtfulness, and via the construction of their environment-setting. Many of the creative habits and dispositions they speak of resonate with the dispositions listed and elaborated upon in the Dephi Report. Ultimately, in an ideal world, what both keynote papers in the first issue of *Thinking Skills and Creativity* clearly imply is that critical thinking and creativity are best merged. We can conceive of this merger happening in many ways, for many people, with many beneficial outcomes for self-, other-, society-, and culture-development.

Consider two attitudes of thought: the critical and the constructive. Let us assume the critical attitude maps onto discreet cognitive skills identified by the Delphi Committee: interpretation, analysis, evaluation, inference, explanation and self-regulation. Operating in coherence with the critical attitude is the constructive attitude, mapping onto acts of synthesis that seek to bring the products of critical thinking into *a system of relations suitable for reasoned problem-solving and decision-making*. The merger of critical and constructive attitudes is one of the more difficult challenges the thinker has to face. As the opening quote from William James suggests, the growth of mental greatness entails the use of CT skills to judge fact from fiction, and the development of a thoughtful, attentive, and resilient creative disposition that allows for the construction of *syntheses*.

The construction of a system of relations suitable for reasoned problem-solving and decision-making is a central characteristic of adaptive functioning (Piaget, 1980). As the number of elements and relations in a system selected for observation increase, problem-solving and decision-making complexity and difficulty increase. As such, many of the core skills in need of development as adolescents and adults begin to *work with* increasingly detailed and abstract mind sculptures are executive control skills that help them to manage how these 'systems' or 'schemas' are built and used in everyday problem-solving and decision-making scenarios. Executive control skills are necessary both when

becoming acquainted with the details of fact and when *mastering the use of working memory in context* such that there is efficient and effective, necessary and sufficient, reduction of facts to systems. Executive control involves the ability to manage one's thoughts, memories and actions in accordance with task-relevant goals (Anderson & Craik, 2000). Component processes of executive control include working memory (Baddeley, 1986), attention switching (Kramer, Larish, Weber, & Bardell, 1998), sustained attention (Posner & Peterson, 1990), inhibition (Hasher, Zacks, & May, 1999; Shimamura, 1995), and goal maintenance (Duncan, 1995). Each of these skills develops with the exercise of the skill (Hogan, 2005).

Without both critical and constructive attitudes working well together, the developing minds of tomorrow's world may become increasingly confused as they work to navigate their way through an increasingly rich, diverse, and fragmented world of knowledge. Mastering executive control will help them to defend against the threat of fragmentation; it will help them to grow in a positive, integrated direction.

Let us here call the merger of critical and constructive thinking 'quality thinking', and let us here call for the development of strategies that optimize the potential for the growth of quality thinking in schools and universities. In stating it thus, let us begin with what we know about human psychology. Let begin by developing an understanding of the co-dynamics of our strengths and weaknesses—those dynamics we understand but cannot change, and those dynamics we understand and can change.

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