INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT & MANAGEMENT

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CONTENTS

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REVIEW OF LITERATURE

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STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESES

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

SCOPE FOR FURTHER RESEARCH

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APPENDIX/ANNEXURE

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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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INNOVATIVE TEACHING AND LEARNING TO ENHANCE CRITICAL THINKING AND REFLECTIVE PRACTICE, FOR QUALITY AND RELEVANCE OF HEALTH EDUCATION

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ABSTRACT

Critical thinking and reflective practice is accepted as being a key component of health education and practice. Characteristics of instruction that are assumed to enhance critical thinking are: paying attention to the development of the epistemological beliefs of students; promoting active learning; a problem-based curriculum; stimulating interaction between students; and learning on the basis of real-life situations. The aim of this study is to explore innovative teaching and learning to enhance critical thinking and reflective practice, for quality and relevance health education. A mixed method approach with group samples of undergraduate health education students comprised four studies including surveys and non-participant observations of clinical simulation that were conducted in a university learning environment. The results showed overall that health education students believed that they understood critical thinking and reflective practice and perceive them to be useful for their academic studies and clinical practice. Students were able to describe critical thinking and reflective practice in ideal theoretical terms and were positive towards it regardless of their individual learning styles. Evidence of the nature of critical thinking and reflective practice as it occurred during and after clinical simulation scenarios highlights a need for revised approaches to existing learning-teaching strategies with health education students. The use of clinical simulation for the development of critical thinking and reflective practice in the health education curriculum is supported with recommendations for further studies in academic and clinical settings.

KEYWORDS
critical thinking, health education, quality and relevance, reflective practice, teaching-learning.

1. INTRODUCTION

It is believed that higher educational institutions must prepare students to participate in society as citizen, therefore citizenships in modern society demands other competences than the previous once. Nowadays people are not expected to 'know their place' but to 'determine their own position'. A 'critical' and 'reflective' approach is frequently appreciated more than subservient accommodation. It is a question of making choices and knowing why you are making that choice, respecting the choices and opinions of others, communicating about these, thereby forming your own opinion, and making it known. Of course, the extent to which a 'critical' and 'reflective' approach is valued and by whom differs.

Today's health science educators must function in complex and changing health care systems, continuously refresh and update their knowledge and skills through critical thinking and reflection practices, and frame and solve complex patient and healthcare problems. Preparing professionals who possess these capabilities is correspondingly complex.

Critical thinking and reflective practice are traditionally viewed as underpinning the core uniprofessional curriculum has tended to remain a uniprofessional activity. In particular attention will be drawn to the nature of learning as a social and participatory activity founded on dialogue, thereby endorsing the nature of education as negotiated meaning rather than information transmission (Muir & Laxton, 2012).

Critical thinking and reflective practice are frequently noted in the general education literature and are increasingly described as essential attributes of competent health care professionals who are prepared to address these challenges (Mann, Gordon & MacLeod, 2009). Critical thinkers and reflectors in health education exhibit these habits of the mind: confidence, contextual perspective, creativity, flexibility, inquistiveness, intellectual integrity, intuition, open-mindedness, perseverance, and reflection. Critical thinkers in health education practice the cognitive skills of analyzing, applying standards, discrimnating, information seeking, logical reasoning, predicting, and transforming knowledge" (Duffy, 2009).

First, to learn effectively from one's experience is critical in developing and maintaining competence across a practice lifetime. Most models of reflection include critical reflection on experience and practice that would enable identification of learning needs Scho¨n cited in (Ash & Clayton, 2009a). Secondly, as one's professional identity is developed, there are aspects of learning that require understanding of one's personal beliefs, attitudes and values, in the context of those of the professional culture; reflection offers an explicit approach to their integration Epstein citied in (Boud, 2002). Thirdly, building integrated knowledge bases requires an active approach to learning that leads to understanding and linking new to existing knowledge.

Yet, despite reflection's currency as a topic of educational importance, and the presence of several helpful models, there is surprisingly little to guide educators in their work to understand and develop reflective ability in their learners. Further, the literature is dispersed across several fields, including education, health education and psychology, among others. In each field, underlying values, and 'cognitive' and 'normative' maps differ (Clark, 2006), making common terminology and understanding a challenge.

The study therefore designed to evaluate the existing evidences about critical thinking and reflective practice and their utility in health professional education. The researcher in consistent with Kolb's cited in (Duffy, 2009) observations agreed that in observing and analysing current trends, it may be possible to identify simplified models of experience for the common characteristics of teaching and learning that promote critical thinking and reflective practice.

2. REVIEW OF LITERATURE

2.1 CONCEPTS OF CRITICAL THINKING

Psychologists conceptualize critical thinking first and foremost as higher-order thinking skills and focus attention on the appropriate learning and teaching processes Kuhn (Mann, Gordon & MacLeod, 2009). Lastly, the concept of critical thinking functions in 'critical pedagogy'. Critical thinking refers here to the capacity to recognize and overcome social injustice (Ash & Clayton, 2009b). Although we share the critical pedagogical point of view, especially the emphasis on critical and democratic citizenship as an educational goal and the focus on transforming society (Ash & Clayton, 2009b), in our review of the research literature it primarily focus on psychology-oriented research. Obviously the reason for this lies in our concern with the development of adequate instructional designs for enhancing critical thinking. Ten Dam et al define critical thinking as 'reasonable reflective thinking that is focused on deciding what to believe or do'. Critical thinking includes such acts as 'formulating hypotheses, alternative ways of viewing a problem, questions, possible solutions, and plans for investigating something'. In his definition, Ten Dam et al distinguishes between skills (analyzing arguments, judging credibility of sources, identifying the focus of the issue, and answering and asking clarifying and/or challenging questions) and attitudes, the so-called dispositions (be prepared to determine and maintain focus on the conclusion or question, willing to take the whole situation into account, prepared to seek and offer reasons, amenable to being well informed, willing to look for alternatives, and withholding judgement when evidence and reasons are insufficient).

Central to the interpretation of critical thinking is a realization that critical thinking is not a method to be learned, but rather a process, an orientation of the mind and so, includes both the cognitive and affective domains of reasoning. As a concept, critical thinking has been expressed in several ways. A major influence in critical thinking traces back to the work of Dewey cited in (Dyke, 2006). From a philosophical perspective Dewey proposes that critical thinking

involves suspension of judgement and healthy scepticism. Another writer such as Fook (2006:83) suggest students should be assisted in the engagement of thinking that is reflective, reasonable and directed on what to believe or do. Fook views critical thinking as "*the correct assessing of statements*" and notes an individual who is able to think critically, according to this definition, it has the skills to evaluate statements. This consensus was acknowledged by the Corley and Eades (2006:4).

The ability to develop critical thinking skills may be likened to Piaget‟s concrete and formal operations since stages of cognitive development are linked to intellectual potential and environmental experiences (Nehring & Lashley, 2004). When students have not reached the formal operations stage their ability to use critical thinking skills is likely to be limited by an inability to handle abstract ideas. However, if learning environments are crucial to developing students' critical thinking skills, what instructional strategies should be used to promote it?

The Critical Thinking Community defined critical thinking as "the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action" (Scriven & Paul, 2007:1). Critical thinking has also been referred to as metacognition (Mamede& Schmidt, 2004) or the process of "thinking about thinking" as defined and originally purposed by Flavell citied in (Kumar & Natarajan, 2007). Critical thinking skills are important because they enable students "to deal effectively with social, scientific, and practical problems" (Ash & Clayton, 2009b: 42). Simply put, students who are able to think critically are able to solve problems effectively. Merely having knowledge or information is not enough. To be effective in the workplace (and in their personal lives), students must be able to solve problems to make effective decisions; they must be able to think critically.

Critical thinking is associated with elements such as knowledge, active argumentation, reasoning, initiative, intuition, application, analyzing complex meanings, identification of problems, envisioning alternatives and making contingency related value judgements. Critical thinking is substantially larger than the sum of its parts, because it is a process that promotes attitudes to continuously explore, redefine or understand. All these factors contribute to a process of purposeful reasoned interaction between a person and their interaction with a situation or surrounding circumstances. Wheeler and Collins (2003:169) explain that the critical thinking process is multifaceted and further state that "*it is similar to an umbrella under which many types of thinking flow, depending on the situation*".

According to Banning (2006), critical thinking involves scrutinizing, differentiating and appraising information as well as reflecting on the information that will be used to make judgments and inform clinical decisions. Brookfield cited in (Coke, 2009) asserts that identifying, challenging, and analyzing assumptions for validity are essential. Because critical thinkers possess curiosity and skepticism, he opines that they are more likely to be motivated to provide solutions that resolve contradictions.

2.1.1 COMPONENTS OF CRITICAL THINKING

Ekebergh (2007) identifies four components of critical thinking. Firstly, identifying and challenging assumptions is considered a major tenet of critical thinking. Critical thinkers are always mindful of how assimilated assumptions shape their perceptions, understandings and interpretations of themselves and the world around them. Secondly, promoting the importance of context is crucial to critical thinking. The third component relates to critical thinkers having the capacity to imagine and explore alternatives, that is, they are lateral in thought processes. Lastly, reflective skepticism–this author refers to individuals who recognize alternatives to supposedly fixed belief systems, habitual behaviours and entrenched social structures. Thus, individuals who are critical thinkers become skeptical of claims to universal truths or to ultimate explanations and do not take things for granted or as real. For example, they become suspicious of those who claim to have the solutions to all of life's problems. Therefore, learning to think critically involves expanding a person's thought processes.

The premise that critical thinking is to knowing as listening is to hearing implies that critical thinking is a learned skill that must be developed, practiced, and continually integrated into the curriculum to engage students in active learning. To support this premise, focused attention needs to be placed on the application of content, the process of learning, and methods of assessment. In terms of the application of content, teaching techniques that promote memorization (often temporary knowledge) do not support critical thinking. Although some content, such as vocabulary definitions, do require memory, it is the application of the content that stimulates thinking. Instruction that supports critical thinking uses questioning techniques that require students to analyze, synthesize, and evaluate information to solve problems and make decisions (think) rather than merely to repeat information (memorize). Because critical thinking is a mental habit that requires students to think about their thinking and about improving the process, it requires students to use higher-order thinking skills – not memorize data or accept what they read or are told without critically thinking about it (Boud, Cressey, Docherty, 2006). Therefore, critical thinking is a product of education, training, and practice.

2.1.2 THE DIMENSIONS OF CRITICAL THINKING

The dimensions of critical thinking comprise of both (a) cognitive skills and (b) affective dispositions. Scriven and Paul (2007) state that having the requisite cognitive critical thinking skills is essential to being a good critical thinker. The concept of critical thinking is also associated with a set of personal attitudes or dispositions that can be used to describe an individual who is inclined to use critical thinking.

(a) The *cognitive critical thinking skills* can be understood as:

- *Interpretation*: accurately interpreting problems as well as objective and subjective data from common information sources, related to the care of the patient;
- *Analysis*: examining ideas/arguments in problems, objective and subjective data and possible courses of action related to the care of the patient;
- *Inference*: querying claims, assessing arguments (recognizes faulty reasoning) and reaching conclusions which are appropriate to the care of the patient;
- *Explanation*: clearly explaining and defending the reasoning in which an individual arrives at specific decisions in the context of the health care of the patient;
- *Evaluation*: evaluating information to ascertain its probable trustworthiness as well as its relevance to particular patient care situations; and
- *Self-Regulation*: constantly monitoring one's own thinking using universal criteria. For example, clarity, precision, accuracy, consistency, logicalness, significance etc. and correcting oneself as appropriate in the context of caring for patients.

These skills are employed interactively in the reflective reasoning process of making a judgement of what to believe or do. Therefore, in thinking critically, a person not only tries to determine judiciously what to do or what to believe, a person is also able to apply the core critical thinking skills to one another. In other words, one may analyze one's own inferences, explain one's own interpretation or evaluate one's own analysis.

(b) *Affective dispositions*: an individual's disposition is explained as:

- *Open-minded*: having an appreciation of alternate perspectives and willingness to respect the right of others to hold different opinions. Understanding other cultural traditions in order to gain perspectives on self and for others;
- *Inquisitive*: curious and enthusiastic in wanting to acquire knowledge, wanting to know how things work, even when the applications are not immediately apparent;
- *Truth-Seeking*: courageous about asking questions to obtain the best knowledge, even if such knowledge may fail to support one's preconceptions, beliefs or interests;
- *Analytical*: Thinking analytically and using verifiable information. Demanding the application of reason and evidence and the inclination to anticipate consequences;
- *Systematic*: valuing organization and a focused and diligent approach to problems of all levels of complexity; and
- *Self-Confident*: trusting one's own reasoning and inclination to utilize these skills, rather than other strategies, in order to respond to problems. For example, making decisions based on scientific evidence and responding to the values and interests of individuals and society.

2.1.3 BARRIERS TO CRITICAL THINKING

Critical thinking is not an innate ability. Although some students may be naturally inquisitive, they require training to become systematically analytical, fair, and open-minded in their pursuit of knowledge. With these skills, students can become confident in their reasoning and apply their critical thinking ability to any content area or discipline Lundquist cited in (Brodie & Irving, 2007). Critical thinking is often compared to the scientific method; it is a systematic and procedural

approach to the process of thinking (Scriven & Paul, 2007). Just as students learn the process of the scientific method, they must also learn the process of critically thinking.

Four barriers often impede the integration of critical thinking in education: (1) lack of training, (2) lack of information, (3) preconceptions, and (4) time constraints. First, teachers often are not trained in critical thinking methodology (Broadbear, 2003). Elementary and secondary teachers know their content and receive training in the methods of instruction, but little if any of their training is devoted specifically to how to teach critical thinking skills. Post-secondary instructors pursue additional content-based instruction during graduate school, but often have no formal methodological training, much less skill-based instruction. Second, few instructional materials provide critical thinking resources (Brodie & Irving, 2007). Some textbooks provide chapter-based critical thinking discussion questions, but instructional materials often lack additional critical thinking resources.

Third, both teachers and students have preconceptions about the content that blocks their ability to think critically about the material. Preconceptions such as personal bias partiality prohibit critical thinking because they obviate analytical skills such as being fair, open-minded, and inquisitive about a topic (Lee & Tan, 2004). A critical analysis of the information provided on this typesetting topic would support the use of a single space; however, strong biases for two spaces preclude many teachers (predominantly typing teachers) from changing their opinion and adopting the acceptable procedure.

Finally, time constraints are barriers to integrating critical thinking skills in the classroom. Instructors often have a great deal of content to cover within a short time period. When the focus is on content rather than student learning, shortcuts such as lectures and objective tests become the norm. Lecturing is faster and easier than integrating project-based learning opportunities. Objective tests are faster to take (and grade) than subjective assessments. However, research indicates that lecturing is not the best method of instruction, and objective tests are not the best method of assessment (Broadbear, 2003; Brodie & Irving, 2007).

2.1.4 INSTRUCTIONAL STRATEGIES USED TO TEACH CRITICAL THINKING

Sternberg cited in (Brodie & Irving, 2007 provides general guidelines for developing or selecting a program/curriculum that will foster critical thinking. He recommends that instructors focus on strengthening students' intellectual functioning in metacomponents, performance components, and knowledge-acquisition strategies. Meta-components refer to higher order mental processes that require planning, monitoring, and evaluating individuals' actions. Performance components are the actual steps taken or strategies used, while knowledge-acquisition strategies refer to the ways that individuals relate old to new material and apply new material. Notably, Sternberg believes that the learning experiences provided during the formative school years are insufficient for learning how to solve problems and dealing with the critical thinking tasks that students will eventually face in everyday life. Exemplifying his point, he reports that the predominate use of tasks that demand right answers and truth telling as well as administering objectively scored tests, which is characteristic of formative education, do not contribute to the development of or require the use of critical thinking.

2.1.5 MODELING CRITICAL THINKING SKILLS

Students are not born with the ability to think *critically*, and their prior learning experiences often do not require them to think critically. Therefore, instructors who wish to integrate this skill in their classroom experiences must first model the behavior (Harjai & Tiwari, 2009). Students must learn how to think critically before they can apply the skill to content scenarios. Modeling can be demonstrated in a discussion setting by asking a question and "walking students through" the process of critically thinking.

Further, critical thinking activities should be based on a structure that includes four elements: "ill-structured problems, criteria for assessing thinking, student assessment of thinking, and improvement of thinking" (Broadbear, 2003:7). Ill-structured problems are questions, case studies, or scenarios that do not have a definite right or wrong answer; they include debatable issues that require "reflective judgment." For example, asking students to evaluate comparable websites, such as Wal-Mart and Target, requires them to think about the content of the websites, their format, and their usability. Right and wrong answers do not exist as long as the student's choice is supported by logical reasoning. The second element, criteria for assessing thinking, provides students with a framework for thinking about their thinking. Providing students with individualized feedback based on their responses allows them to address specific criteria upon which they can assess their thinking, which is the third element. If instructors model the criteria for assessing thinking and provide a framework, students will eventually apply these techniques on their own Lundquist cited in (Coker, 2009).

2.1.6 GUIDING STUDENTS' CRITICAL THINKING

When students are accustomed to being passive learners by merely memorizing and recalling information, it may be difficult at first to engage them in active learning situations that require critical thinking skills (Ruff, 2005). Instructors should be aware of students' initial resistance and guide them through the process to create a learning environment where students feel comfortable thinking through an answer rather than simply having an answer. For example, peer coaching techniques can engage students in active learning and critical thinking opportunities (Hesterberg, 2005). Assign students to two-person teams; one student is the problem-solver, and the other is the peer coach. Using the *Six Steps to Effective Thinking and Problem Solving,* or "IDEALS" (Facione, 2007), the problem-solver works through a case study or activity by responding to questions from the peer coach. The *IDEALS* are to Identify, Define, Enumerate, Analyze, List, and Self-Correct:

- *Identify* the Problem: *What is the real question we are facing?*
- *Define* the Context: *What are the facts that frame this problem?*
- *Enumerat***e** the Choices: *What are plausible options?*
- *Analyze* Options: *What is the best course of action?*
- *List* Reasons Explicitly: *Why is this the best course of action?*
- *Self-Correct***:** *Look at it again … What did we miss?*

This problem-solving technique guides students through the critical thinking process and utilizes learner collaboration. Similar strategies include integrating project-based learning activities that require students to apply their knowledge by constructing a real-world product. As a final guide to student practice, use peer assessments to facilitate students' critical thinking and meta-cognitive skills (Hesterberg, 2005).

2.2 CONCEPTS OF REFLECTIVE PRACTICE

The term 'reflective practice' carries multiple meanings that range from the idea of professionals engaging in solitary introspection to that of engaging in critical dialogue with others. Practitioners may embrace it occasionally in formal, explicit ways or use it more fluidly in ongoing, tacit ways. For some, reflective practice simply refers to adopting a thinking approach to practice. Others see it as self-indulgent navel gazing. For others still, it involves carefully structured and crafted approaches towards being reflective about one's experiences in practice.

Within this general meaning, reflective practice is accepted as being a key component of professional education and practice in health and social care, adopted by traditional models of professional education as a fundamental foundation of professional development, essential for the integration of theory and practice. However such approaches have tended to be located within uniprofessional frameworks albeit drawing on some key theoretical underpinnings. Additionally, whilst the notion of reflective practice is almost universally agreed to be a 'good thing', it has been suggested that reflective practice has taken on a 'common sense' meaning, 'used in common sense terms rather than with reference to the literature.' Dyke (2006:115). In reality variations in meaning and practice within and between professions have the potential to obfuscate rather than promote effective communication and sharing of thinking and practice.

Reflexivity is frequently confused with reflection although some would argue that the two are inextricably linked. Lee and Tan (2004:127) explain this by referring to the process of circularity whereby the process of reflection itself influences future action in an ongoing feedback mechanism. *Reflexivity means that we constantly get evidence about how effective or worthwhile our actions are, and we can change what we are doing according to the evidence of its value. To do so, of course, require being reflective…..* This point is also made by Fook (2006) who comments that although the notions of reflection and reflexion may have different origins, they are not mutually exclusive and that the process of the former may assist the latter.

2.2.1 REFLECTION, CRITICAL REFLECTION AND REFLEXIVITY

Contemporary writing on reflective practice invites professionals to engage in both personal reflection and broader social critique. Other authors argue for the concept of *critical reflection***,** which is seen as offering a more thorough-going form of reflection through the use of critical theory Brookfield citied in (Black &

Plowright, 2007). For adherents of critical reflection, reflection on its own tends to "remain at the level of relatively undisruptive changes in techniques or superficial thinking" (Fook, White & Gardner, 2006:9). In contrast, critical reflection involves attending to discourse and social and political analysis; it seeks to enable transformative social action and change. For Fook (2006), critical reflection "enables an understanding of the way (socially dominant) assumptions may be socially restrictive, and thus enables new, more empowering ideas and practices. Critical reflection thus enables social change beginning at individual levels. Once individuals become aware of the hidden power of ideas they have absorbed unwittingly from their social contexts, they are then freed to make choices on their own terms."

In practice, introspection is the dominant mode of reflective practice. Sometimes presented as merely a promising personal attribute (Loughran, 2006), it is a predominantly individualistic and personal exercise (Rodgers, 2002) in which practitioners tend to focus on their own thoughts, feelings, behaviours and evaluations. This passes as legitimate 'reflective practice' which professionals then can use to advance their cause to fit formal requirements for continuing professional development. While such reflective practice may take place in dialogical contexts such as supervision sessions, the onus stays on the individual practitioner to reflect upon and evaluate their own practice. What is lacking is any mutual, reciprocal, shared process. Institutional structures and quality assurance systems encourage, perhaps even require, this individual focus. It starts early on during professional education and training where learners engage professional socialisation and are taught how to reflect, using structured models of reflection.

2.2.2 REFLECTIVE PRACTICE AND LEARNING STYLES

Kolb cited in (Shea et al, 2010) defined learning as: "the process whereby knowledge is created through the transformation of experience". In this way, Kolb illustrates that the cognitive and affective realms are inextricably connected within the learning process. As asserted by O'Conno and Hyde (2005), previous and/or current experience inevitably involves itself in all learning in some form. Whilst experiential learning can occasionally be misunderstood and thought of simply as games and activities, Kolb asserts that experiential learning is only useful when its methods help to create a learning environment in which the learners' ability to learn from their own experience is enhanced. The most valuable experiential learning activities are those which are self-sustaining and encourage learner autonomy.

Kolb's underpinning theory is that an individual learns from having an experience (CE) reflects on that experience (RO)reconstructs what has been learnt (AC) and applies the new learning (AE) in future situations. Kolb later suggested however, that an individual may emphasise a preference for one of the four different modes of learning derived from bi-polar opposites of the four modes. This implies that paramedic students outside the bi-polarity of CE/RO and AC/RO may be not comfortable with reflective practice as a learning concept. If so, could their views of the subject be distinctly different to other styles of learners? Additionally a central feature of Kolb's work is that the four different phases of the cycle are linked to four different learning styles.

2.2.3 MODELLING REFLECTIVE PRACTICE

A number of models of reflection have been advanced in different fields of professional practice and education. Ghaye and Lillyman cited in (Fook, 2006) identify five different types: structured, hierarchical, iterative, synthetic and holistic. Models vary in their levels of prescription, explanation, criticality and reflexivity, but most share a focus on reflection as being essentially retrospective (Schon's reflection-on-action).

In the nursing field, one of the models of reflection most commonly cited is Gibbs' Reflective Cycle cited in (Fook, White &Gardner, 2006). Built from Kolb's experiential learning cycle, it proposes that theory and practice enrich each other in a never-ending circle. Originally conceived as a "de-briefing sequence" (2006:46), Gibbs' cycle has become adopted in nursing and other professional education as a way to facilitate reflection.

In summary, different conceptions and models of reflective practice continue to emerge across different professional groups. Paradoxically, the demand for better (i.e. more thoughtful, reflexive and critical) reflective practice has tended to generate yet more models or typologies - which, if used blindly or unthinkingly, can render practice more mechanical and externally subscribed. This, of course, is the very antithesis of Schon's notion of 'professional artistry'. In the end, it seems neither possible nor desirable to fix on any one model as the definitive 'answer'. Different models are needed, at different levels, for different individuals, disciplines and organisations, to use in different contexts. Professional practice and education are also likely to benefit from the stimulus – and challenge – provided by competing perspectives and multiple models. *Models need to be applied selectively, purposefully, flexibly and judiciously*. Given the growing call for more critical and reflexive approaches to reflective practice, the first step in this direction must be to take a critical look at its current state.

2.2.4 STUDENTS' UNDERSTANDING OF REFLECTIVE PRACTICE

A notable gap in the literature emerges from the lack of empirical work regarding what students' understand by reflection. Newell cited in (Carrollet al., 2002) for example noted that despite its growing prominence work in nursing, identifying students' knowledge and understanding of reflection was minimal. Yet it is interesting to note that over a decade later reflective practice retains its appeal. Nurse educators continue to consider it an essential component of nursing education e.g. O'Connor and Hyde (2005) although supporting empirical evidence is lacking. It appears that where studies have been undertaken in nursing especially they have been mainly with post graduate students and using small samples and single methodologies such as focus groups regarding clinical practice (Glaze, 2002).

2.2.5 ATTITUDES TO REFLECTION

The relationship between attitudes and reflective practice appear to have been largely overlooked in the literature although attitudinal measurements have been widely researched in many diverse areas of education for different purposes. The general consensus is that attitudes are integral to learning and behaviour and that it can drive such outcomes. The importance of a positive attitude to reflective thinking is a key ingredient advocated by some theorists, especially the earliest proponent. Dewey suggested that reflective thinking required a supporting value of 'positive attitudes' that were favourable to reflective thinking and enquiry.

However, a later a qualitative study of attitudes to academic work with fourth year medical students by Bolton(2003) has since identified the need to minimize negative attitudes for promoting reflective practice in the undergraduate curriculum. One other study by Rees et al (2003) of attitudes to reflective practice and continuing professional development in pharmacy found that students considered reflective practice to be good in theory but not in practice. It is justifiable therefore to identify and compare the attitudes of undergraduate paramedic students to nursing students as a different discipline and establish whether or not it influences their learning experiences of reflective practice.

2.2.6 METHODS AND TOOLS FOR REFLECTION

Despite the reported lack of clarity about what reflective practice means a significant part of the literature concerns how it might be approached for enhancing learning and teaching. A variety of tools including the use of reflective learning journals, critical incidents and models/frameworks have been used to encourage reflective practice with health care and other professionals (Cole, 2000). The literature in the context of higher education has especially promoted the concept of 'structured reflection' through the use of such strategies and are pertinent to the students in this research project who are expected to be able to demonstrate the use of structured approaches throughout their academic study.

2.2.7 CRITIQUING REFLECTIVE PRACTICE

That reflective practice is a desirable, foundational dimension of professional action and life-long learning is often taken as self-evident. Whether the rhetoric emanates from colleagues, professional bodies, educators, management, or the government, practitioners are forever being exhorted to reflect and to critically evaluate their performance. Yet, as Brookfield cited in (Gustafson et al., 2007) notes, there are few intellectual quests so enthusiastically lauded for such meagre, unsatisfactory returns.

Done well and effectively, reflective practice can be an enormously powerful tool to examine and transform practice. Ghaye(2005) recommends that this self-development process be encouraged in any field whose members work with people. However, reflective practice is not without its 'dark side'. There are cultural and personal risks involved, and not everyone ends up feeling empowered Brookfield cited in (Gustafson et al., 2007). Moreover, busy, over-stretched professionals are likely to find reflective practice taxing and difficult.

3. IMPORTANCE OF THE STUDY

This study argues for a refinement of critical thinking and reflective practice concepts, the *theory - practice gap of* health education students regarding these concepts and new pedagogic approaches to its application in the health education curriculum. The contributions to knowledge are significant to health education professional and educational developments as an emerging higher education discipline and its quest for critical thinkers and reflective practitioners (as already established in other allied health disciplines such as nursing and physiotherapy). It also emphasises 'focuses and 'reflective action' for learning. The framework accommodates critical thinking and reflective practice for both personal and collaborative learning outcomes that are aligned to 'situated learning' concepts which importantly reflect the health education professional learning and clinical contexts. Other contributions include the support for the development of critical thinking and reflective practice through clinical simulation and recommendations for future research in the wider health education contexts elsewhere and beyond undergraduate study.

Further, this study defends a refinement of critical thinking and reflective practice concepts and new pedagogic approaches to its application in the health science curriculum. The following are the areas within which the contributions have been made:

- Critical thinking and reflective practice structures applied to undergraduate health science students.
- Critical thinking and reflective practice indicators for reflection during and after practice.
- A refinement and re-definition of critical thinking and reflective practice.
- A new pedagogic framework for further development and testing of critical thinking and reflective practice learning and teaching outcomes.
- Simulation learning as an educational tool for critical thinking and reflective practice developments.

4. STATEMENT OF THE PROBLEM

Critical thinking and reflective practice in health education is considered to be a significant learning and teaching strategy (Ash & Clayton, 2009a). However, there is a lack of empirical evidence to support its implementation and use in health education. Thus as a curriculum outcome similar to that for the health students it was important to know if health education students believed that they understood critical thinking and reflective practice, how they perceived its usefulness to their academic and clinical learning and what attitudes they held towards such approaches. In this study, the researcher focuses on the question of instructional strategies for enhancing critical thinking and reflective practice. The central tenet is that critical thinking and reflective practice are crucial aspects in the competent citizens needs to participate in a plural and democratic society, and that enable them to make their own contributions to that society (Mann, Gordon & MacLeod, 2009). Hence instructional strategies for critical thinking and reflective practice are very important. Different literatures on the teaching and learning of critical thinking primarily focuses on critical thinking and reflective practice as a higher-order cognitive skill rather than critical thinking as a competence for critical participation in modern society.

The rationale for undertaking this piece of work was threefold. First, as the health education profession has become more education rather than training focussed this research was considered to be timely in response to the increasing emphasis by higher education and health service providers for health education students to become reflective practitioners (Quality Assurance Agency for Higher Education (QAAHE, 2004). Second, as an example of curriculum innovation locally and nationally a need was identified to evaluate the extent to which students had perceived and embed critical thinking and reflective practice within their learning experiences particularly at the point of imminent transfer to graduate practice as reflective practitioners. Critical thinking and reflective practice in health education practice is identified as an important educational strategy for enhanced care delivery and continuing professional development. Currently this is an initiative that lacks empirical evidence to support the continued growth and implementation of critical thinking and reflective practice in the undergraduate curriculum and the health education context generally although it appears that this problem applies to other health care disciplines. Notably, similar questions have been raised about the implementation of reflective practice in nursing curricula (Carroll et al, 2002; Duffy, 2009) even though it has been much longer established within that discipline. It appears also that *"consideration of the context in which reflective action is engaged is a seriously underdeveloped aspect of discussion of reflection"* (Boud, 2002:97). As such the undergraduate paramedic context seemed a reasonable and justifiable starting point for establishing how reflective practice exists in that specific context which is different to nursing. Thirdly, the motivation for this work also arose out of my personal reflective enquiry as an educator with professional responsibilities for curriculum development.

Critical thinking and reflective practice outcomes in the health educational context are designed to ultimately influence professional practice and patient care outcomes and therefore are worthy of study.

The relationships between beliefs, attitudes and individual learning styles to critical thinking and reflective practice concepts have important theory to practice implications in the health education curriculum context and are therefore useful to establish for learning and teaching purposes. The extent to which such factors interrelate to critical thinking and reflective practice learning in the health education context as a new area of curriculum implementation appeared to be lacking and was therefore considered worthwhile to investigate for informing further developments.

5. OBJECTIVES OF THE STUDY

The overall purpose of the research was to explore the extent to which critical thinking and reflective practice influenced and interrelated to the learning experiences of undergraduate health education students. Hence, the following intended outcomes were anticipated:

- Identification of health education students' perceptions, attitudes and applications of critical thinking and reflective practice concepts to academic studies and clinical practice leading up to the point of transfer to graduate practice;
- Critical analyses of health education students' learning styles relationships to critical thinking and reflective practice;
- Refinement of critical thinking and reflective practice concepts relevant to the health education student learning context; and
- Proposal of revised curriculum strategies for learning and teaching of critical thinking and reflective practice in health education.

6. RESEARCH QUESTIONS

Hence, this study set out to explore the following specific questions:

1. Do health education students believe that we understand the basic concepts of critical thinking and reflective practice, including structured reflection?
2. Do health education students perceive that concepts of critical thinking and reflective practice could be beneficial to our learning and clinical practice and if so how might they potentially apply them?
3. What are health students' attitudes towards critical thinking and reflective practice?
4. How do they rate the importance of their learning preferences including critical thinking and reflective methods?

7. RESEARCH METHODOLOGY

This part of the study describes and discusses the research methodology that informed the different phases of this research concerning the status of critical thinking and reflective practice in an undergraduate health education curriculum and the extent to which it influences the students' learning over a full curriculum cycle.

7.1 THE STUDY DESIGN

For reflective practice and the contextual issues discussed in this study, the overall research design is therefore described as 'exploratory'. This approach is highly appropriate to education and social sciences research i.e. when *"examining a new interest or when the subject of the study is relatively new and unstudied"* Babbie citied in (Creswell, 2009). Exploratory research also fits well with curriculum innovations such as the critical thinking and reflective practice in the health education as focussed upon here and where there is an identified need for evidence of new knowledge in a developing area. The researcher intention

was to explore the richness of the naturalistic education environment in which critical thinking and reflective practice was being developed to gain an overall profile of its impact on the students' learning experiences at different stages.

7.2 SAMPLING

The study in this research was conducted with convenience samples of undergraduate health school students i.e. *"they happen to be in the right place at the right time"* Burns and Grove citied in (Creswell, 2009). The benefits of this approach such as cost, time and accessibility were also considered and justified for achieving the intended research purpose and outcomes. Additionally, the rationale for a whole population approach for the study was justified on the basis that there would be sufficient numbers by sub-groups for meaningful analysis.

7.3 METHODS OF THE STUDY

The decision to utilise a mixed methods(triangulation) approach is supported by the literature, for example "*Mixed methods research designs are now an established feature of programme evaluation research and policy evaluation studies*" (Creswell, 2009:209). Further this author suggests that a combination of strategies can complement and enhance the scientific value of research.

Triangulation in the context of this research involved using different methods to look at different aspects of reflective practice at different stages of the students' learning experiences. Together, it was envisaged that the mixed approaches might produce a more holistic picture of reflective practice in the undergraduate curriculum. Previous studies on and critical thinking and reflective practice found in the literature appear to have been small scale in nature and generally used single approaches from the qualitative paradigm such as 'Focus Groups' (Creswell, 2009). Understandably, such approaches have been justified in terms of their compatibility with the philosophical basis of exploring the complexities of health care delivery (Boud, 2002) and therefore appropriate for small scale studies.

THE SURVEY QUESTIONNAIRES: An original questionnaire was designed to explore the relevant attributes that could have influenced the students' learning and embedding of reflective practice from a curriculum perspective. Surveys were chosen for of their suitability for evaluation research and their compatibility with obtaining an overview critical thinking and reflective practice that could inform learning and teaching policies which was one of the aims of the research.

The questionnaires used in the surveys contained both open and closed questions for identifying the students' beliefs, attitudes to critical thinking and reflective practice, learning preferences and relevant attributes. Oppenheim citied in (Creswell, 2009:128) proposes that "*closed questions can be attitudinal as well as factual"* and open questions are useful for obtaining respondents *"ideas in their own language, expressed spontaneously, and this spontaneity is often extremely worthwhile as a basis* for *new hypothesis"*.

OBSERVATION: The rationale for the observation study was to discover firsthand how students apply critical thinking and reflective practice in a work related setting prior to graduate practice with the added advantages of capturing physical and social events as they occur including language used (Sobral, 2005) and reflective conversations in a clinical context. This research utilised a naturalistic learning environment where it would be possible to observe both concepts of *reflection in and on action* within a coaching simulation context.

7.3.1 RELIABILITY

The extent to which the reliability of this research can be determined is explained in the measures that were used to reduce potential sources of errors. First, looking at the surveys used it is suggested that *"reliability of questionnaires may be inferred by a second administration of the instrument, comparing the responses with those of the first*" Best and Kahn citied in (Creswell, 2009). However, the questionnaires used for the study in this research were administered only once and to separate groups of students and on separate occasions so the retest for reliability was not possible. At the same time it was also considered that the students' experiences would be changing at different stages of the programme thus potentially influencing the learners' attitudes concerning reflective practice perceptions and understanding. It is likely therefore that any test- retest measure which is *"best used for things that are more stable over time such as intelligence"* would not be accurate or good measures of reliability for testing reflective practice.

7.3.2 VALIDITY

For the study conducted a number of different types of validity were considered regarding the quantitative and qualitative dimensions of the research. First that of 'content validity' which was concerned with the surveys and the extent to which the questions are closely aligned to the critical thinking and reflective practice concepts studied. Looking at the items in the questionnaires for the study a high content validity was anticipated as the content could be closely mapped to all components of the main research question i.e. critical thinking and reflective practice, structured reflection, attitude relationships and individual characteristics and learning preferences. As a subset of content validity these components could be also be said to represent 'face validity' i.e. the questionnaires used *"give the appearance of measuring the content"* Burns and Grove citied in (Creswell, 2009).

The second consideration was that of 'construct validity' i.e. *"the extent to which the outcomes, samples and setting represent the theoretical construct of interest"* Clarke citied in (Creswell, 2009). critical thinking and reflective practice as the theoretical construct of interest studied and the curriculum framework within which it is operationalised have been amply justified within the methods used to conduct the research. This was deemed highly appropriate to health students in a university context where the development of critical thinking and reflective practice had been identified as an alternative route to professional development than the traditional teaching and learning practices.

7.4 DATA ANALYSIS

The research design incorporated both quantitative and qualitative methods. Quantitative data were analysed using SPSS versions 17 throughout the different phases of the study. Where appropriate this was used to quantify and generate descriptive statistics of the characteristics of the samples and the students' responses to perceptions of critical thinking and reflective practice and their attitude ratings towards it. Examples of statistical measurements of the quantitative surveys in study included chi-square calculations for relationships between categorical variables such as level of study and perceptions of reflective practice, and t-test for comparative purposes with different groups of respondents. SPSS proved useful for ease of quantification, tabulations and the presentation of descriptive statistics in the form of graphical data, numbers and percentages, and for identifying any significant trends in the study.

Qualitative data was gathered to progress the research and obtain a clearer view of the students' personal understanding and use of critical thinking and reflective practice. As a starting point content analyses of the qualitative data concerning the students own views of critical thinking and reflective practice were thematically coded and categorized according to the six components of Gibbs' reflective cycle (Mann, Gordon & MacLeod, 2009).The six components as previously explained matched the undergraduate health curriculum framework which utilises Bloom's taxonomy of educational objectives. The components of Gibbs' cycle also provided a straightforward descriptive coding system that could be easily analysed quantitatively.

Analyses of the qualitative data in study further exploring reflective practice in the simulation context developed from the coding system formulated in study where it was possible to re-use the dimensions of Gibbs' cycle to categorise the debrief sessions representative of reflection-on-action and compare how students described and applied this concept. However, the observations of the simulated clinical practice activities subsequently identified a need for additional coding. The content analyses of the simulation practice (reflection-in-action) were coded according to an algorithm of health educational practice that follows a sequence of primary and secondary assessment and treatment guidelines. As such three layers of coding were identified that were then sub-classified in order to facilitate finer interpretations of the data.

8. RESULTS AND DISCUSSION

This part of the study describes and discusses the data collected through a survey questionnaires and observation to explore health education students' perceived understanding of critical thinking and reflective practice and the important sub-concepts which relate to the students' learning experiences i.e. Reflective Practice, Structured Reflection, Attitude Relationships and Learning Preferences.

8.1 RESULTS

The main results of the study are structured to summarize the relevant study that addressed each of these questions in relation to medicine, nursing and other health professional contexts. The results begin with a selection of demographic details related to age, gender and level of study that are presented for informing the main areas of the foundation study.

TABLE 1: AGE RANGE AND GENDER OF HEALTH EDUCATION STUDENTS

Age range	Percent
18-25 years	78.9%
26-35	17.8%
35 and above	3.3%
Sex: Male	87.8%
Female	12.2%

Table 1, above shows that the majorities of health students are within the 18-25 year range, and are male with the majority of the sample at their academic studies.

In the next set of questions the health students were asked whether they believed that they understood the term 'structured reflection' and about their attitudes towards it.

TABLE 2: COMPARISON OF NURSING STUDENTS UNDERSTANDING OF REFLECTIVE PRACTICE AND STRUCTURED REFLECTION

Items	Yes	No
Understanding of the term critical thinking and reflective practice	97.8%	2.2%
Understanding of the term structured reflection	76.4%	23.6%

Question were asked about the student respondents' perceived understanding of the term 'critical thinking' and/or 'reflective practice' and if thought it could be useful for their learning and for practice. Table 2, shows that as with critical thinking and reflective practice a majority of health students believed that they understood the term structured reflection. As shown however, the majority (97.8%) of positive responses to their beliefs of structured reflection were less than that for the term reflective practice suggesting that less student health perceived that they understood the concept of structured reflection. It is not possible however, to say what they understood by the term due to the closed nature of the question. This would have been useful to know, although the intention of the research was to explorations in the study with the main health education sample of students. Question were asked the students about their beliefs concerning the usefulness of critical thinking and reflective practice to their learning and clinical studies. A paired samples t-test also revealed a significant difference between the responses to the two questions (t [df = 87] = 4.89, $p < .001$) indicating that although a majority of health students believed that they have an understanding of the terms reflective practice and structured reflection there are significant differences in their individual perceptions.

Mamede and Schmidt (2004) found that critical thinking and reflective practice in medicine in their study had a five-factor structure: deliberate induction, which involves the physician taking time to reflect upon an unfamiliar problem; deliberate deduction, which occurs when a physician logically deduces the consequences of a number of possible hypotheses; testing, which involves evaluating predictions against the problem being explored; openness to reflection, occurring when a physician is willing to engage in such constructive activity when faced with an unfamiliar situation; and, meta-reasoning, which means that a physician is able to think critically about his or her own thinking processes. This five-factor model is not a step-by step process; rather, each factor is a unique dimension, overlapping and occurring during and following an event.

Using Likert measurements the health students were asked in question about their attitude towards structured reflection rated against four dimensions that is *Positive, Relaxed, Confident and Unsure.* The respondents showed that the health students' responses to these items. A series of chi-square tests showed significant differences for the items '*Positive*' (χ^2 [3] = 66.25, $p < .001$), '*Relaxed*' (χ^2 [3] = 49.77, $p < .001$), and '*Confident*' (χ^2 [3] = 34.97, $p <. 001$) being rated equally. Therefore overall it appears that the students' responses were significantly favourable towards the concept of structured reflection

A question asked the students "*How would you rate your ability to use structured reflection*?" A majority of the health students stated that their ability to use structured reflection was just acceptable or good. Table 3, relates to the students' health responses reported of their ability to use structured reflection. This table also shows that a significant majority of the students who perceived that they understood the concept also rated their ability to use structured reflection as acceptable or good (χ^2 [df=1] = 17.96, $p = .001$). This result suggests that there is a significant relationship between a perceived understanding of these concepts and a perceived ability to do it.

TABLE 3: UNDERSTANDING OF STRUCTURED REFLECTION IN RELATION TO ABILITY TO USE STRUCTURED REFLECTION

Items		How Would You Rate Your Ability To Use Structured Reflection?				
		Poor	Acceptable	Good	Very good	Total
Do you believe that you understand what is meant by the term structured reflection	Yes	2.3%	31.0%	41.4%	3.4%	78.2%
	No	5.7%	12.6%	3.4%		21.8%
Total		6.0%	43.7%	44.8%	3.4%	100%

It is interesting to note from the results in Table 3, that even those who believed that they did not understand the term (16%) nevertheless perceived that they had good or just acceptable abilities to use this concept. This result suggests that although individuals perceive that may have an inability to define something they may nevertheless perceive that they have an ability to use it. It is also possible that some students may feel that they do not need to understand something in order to do it.

The next part of this subset asked the students to rate the *importance* of structured reflection to their practice. Table 4 shows that a majority of health students agreed that structured reflection was an important part of nursing practice.

TABLE 4: HEALTH STUDENTS' ASSESSMENT OF THE IMPORTANCE OF STRUCTURED REFLECTION IN RELATION TO THEIR OWN ABILITY TO USE STRUCTURED REFLECTION

Items	How Would You Rate Your Ability To Use Structured Reflection?					
		Poor	Acceptable	Good	Very good	Total
If you have used structured reflection before do you agree that it is an important part of nursing practice	Strongly agree			9.5%	1.4%	10.8%
	agree	2.7%	28.4%	29.7%	2.7%	63.5%
	Neutral	2.7%	12.2%	8.1%		23.0%
	disagree		1.4%			1.4%
	Strongly disagree		1.4%			1.4%
Total		5.4%	43.2%	47.3%	4.1%	100.0%

It can be seen from Table 4, that although the majority of students agree/strongly agree that structured reflection is an important part of health education a number of students (nearly 20%) remained neutral to this question. This is surprising given that a majority of students were shown to have a significant positive attitude towards it.

Responses to Question were explored further to identify whether or not there was a relation between how students assessed the *importance* of structured reflection and their perceived *ability* to use it (Table 4).The results shown indicate that all students (100%) perceived they had used structured reflection. However a chi-square test showed that no significant association was found (χ^2 [df = 12] = 13.65, $p = 0.32$) between the nursing students' perceptions regarding the *importance* of structured reflection and their rating of their ability to use it.

Most studies identified in our review offered descriptions of reflective thinking; the researcher explored whether the process is amenable to valid and reliable assessment. Different studies addressed this question. In several of the studies, relationships with other variables were explored, as a means of validating the instruments used and assessments made.

From the studies reviewed, it appears that reflection can be assessed and different levels of reflection discerned. Further, the studies demonstrate that measures of reflection correlate with other measures in theoretically consistent ways. Students do not have the same opportunities as professionals do for reflective practice in authentic settings and therefore some questions remain regarding whether what is being measured is a valid indicator of reflective activity, when one considers the influences of context and culture. Despite these concerns, failure to assess reflection and reflective thinking may imply to learners lack of real value for this activity.

In this final closed question the students were asked to rate the importance of their preferred learning methods itemised in four categories adapted from the literature. This was a general attempt to identify whether or not nursing students preferred more 'active' ways of learning as suggested by Kolb's citied in (Coffield et al., 2004) research compared to the more thoughtful 'reflector' style of learning.

TABLE 5: THE IMPORTANCE OF THEIR PREFERRED LEARNING METHODS

Items	Not at all important	Not very important	Neutral	Quite important	Very important
	%	%	%	%	%
Learning through observing	-	-	2%	26%	72%
Thinking back	-	1%	4%	65%	30%
Learning from studying books	-	-	4%	46%	50%
Hands on experiences	-	-	1%	8%	90%

Table 5 above shows that for all 4 items, the health students perceived that all these particular types of learning approaches were appropriate for them. It is evident that they thought that each of the approaches were all *quite or very* important methods of learning. However, the high response to "hands on experience" suggests a particular preference for 'doing' or active experimentation. Kolb's study of learning styles applications to professional disciplines in higher education classified nurses as 'active experimenters'. The findings in this study nevertheless need to be treated cautiously as the ways in which nursing students interpreted the different ways of learning are purely descriptive and obtained in a classroom environment.

This section further explores the results of the key concepts analysed to identify any significant findings regarding the students' perceived understanding of reflective practice concepts and applications to their learning. A question was asked *how the different reflective practice concepts inter-relate to student healthy responses.* The intention with this separate question was to establish whether or not the students who perceived that they understood the term reflective practice similarly perceived the term structured reflection. A majority of the health students said they perceived an understanding of both terms as earlier seen in Table 4 although the responses were reduced for structured reflection. However, because of the closed nature of the questions it is neither possible to say what students perceived the different concepts to mean or to say what any similarities or differences may be.

Again because of the generally positive levels of understanding for reflective practice this item proved difficult to assess. A series of chi square tests presented below identify that no significant associations were found between the ways that students scored the 'importance' of learning through different methods including reflective ways such as 'observing and mulling over past experiences' (it has shown that): *Observing* (χ^2 [2] = 0.8, p = 0.67); *Mulling over past experiences* (χ^2 [3] = 1.09, p = 0.78); *Learning from books/attending lectures* (χ^2 [2] = 0.1, p = .95); and *Hands on experience* (χ^2 [2] = 0.2, p = 0.9).

Only one significant link was found between students' perceived understanding of structured reflection and their view of the importance of 'thinking back'. A chi square showed a significant relation (χ^2 [3] = 10.38, p = 0.016) between the two indicating that the students who did not understand the term structured reflection were less likely to identify 'thinking back' as an important method for learning. This would seem to be a logical response.

Table 6, below shows how students rated their understanding of structured reflection in relation to their views on the importance of 'thinking back' over past experiences as a way of learning .Thinking back is highly related to the concept of reflection-on-action.

TABLE 6: UNDERSTANDING OF STRUCTURED REFLECTION IN RELATION TO IMPORTANCE OF 'THINKING BACK'

Do you believe that you understand what is meant by the term structured reflection		The importance of student's learning-'thinking back'				Total
		Not at all important	No strong feelings	Quite important	Very important	
	Strongly agree	1.1%	2.2%	18%	2.2%	23.6%
	Agree	-	1.1%	48.3%	27%	67.4%
Total		1.1%	3.3%	66.33.3%	29.2%	100%

The results in Table 6, show that a significant majority (95.5%) of health students who believed that they understood structured reflection considered 'thinking back' as a being a highly important way of learning although even though Figure 5, showed that they perceived it to be less so (74 %) for their nursing practice.

8.2 DISCUSSION

The aim of the study was to explore a variety of critical thinking and reflective practice concepts focussing on their relationships to the context undergraduate health science students and to inform the subsequent study with the health students. This involved exploring the students' understanding of reflection concepts and its practical application in a health science context. It was also necessary to identify how critical thinking and reflective practice is manifested not only in what students write about it but also how it emerges in a professional work-related context that could inform theory-practice relationships within the health science curriculum . Other relevant variables explored included issues such as structured reflection, attitudes to reflective practice, the use of reflective tools, learning styles relationships and simulation based learning.

This was done by surveying the students' perceptions and attitudes concerning critical thinking and reflective practice and structured reflection and the perceived importance to their academic and health science students study. Hence, the following outcomes were achieved:

- Identification of health science students' perceptions of and attitudes to critical thinking and reflective practice concepts concerning their academic studies and clinical work.
- The application of critical thinking and reflective practice in health science context.
- Critical analyses of students' learning styles relationships to critical thinking and reflective practice methods.
- Evaluation of Clinical Simulation learning applied to critical thinking and reflective practice concepts in the paramedic context.
- Refinement and redefinition of critical thinking and reflective practice concepts including a new pedagogic framework that supports effective learning and teaching strategies for critical thinking and reflective practice developments in the health science undergraduate curriculum.

1. STUDENTS' GENERAL UNDERSTANDING OF CRITICAL THINKING AND REFLECTIVE PRACTICE

Two Questions focused on the students' health science' perceived understanding and were designed to establish whether or not the respondents believed that they understood the general meaning of critical thinking and reflective practice including its usefulness for their learning and practice. As indicated in Table 2, a significant majority of health science students believed they understood the term critical thinking and reflective practice. Given the lack of clarity reported in the literature this is considered an interesting result although it could have been influenced by what they had been taught been taught in the curriculum. However, as Palmer et al citied in (Dyke, 2006:65) state *"reflection is an idea used in ordinary and educational life"* consequently it may be a loose concept associated with spontaneous everyday thinking. Several studies explored the effect of context on critical thinking and reflective practice. Sobral (2005) found evidence for improved quality of learning as students strive for control of their learning. He suggests that a greater effort at reflection is associated with a more positive learning experience, and that reflection in learning is related to readiness for self regulated learning, and to the meaningfulness of the experience.

As before a majority of respondents said that the concept of critical thinking and reflective practice was indeed useful for both learning and clinical practice, indicating that students may have a certain level of knowledge about the application of critical thinking and reflective practice or at least experiences of operating in a reflective mode for the two purposes. The importance and use of relevant reflective learning methods applied to their academic learning, healthy

practice and learning preferences were also explored as part of the revised survey that is to find out what reflective tools had they used and how effective these were to their learning. The results of this survey showed that as with the health students a majority (97%) of the student respondents (mainly male) indicated that they believed they understood the terms critical thinking and reflective practice and sub-concepts such as structured reflection. Majorities also believed that critical thinking and reflective practice could be useful both for their learning (83%) and practice (83%). Statistical analyses showed that age was not a significant influencing factor regarding their perceptions although compared to the nursing students they appeared more favourable towards reflective ways of learning such as 'thinking back and observing'.

2. STUDENTS' GENERAL UNDERSTANDING OF STRUCTURED REFLECTION AND THEIR ATTITUDES TOWARDS IT

Four Questions are asked the students to rate whether or not they believed that they understood the term 'structured reflection'. The students were given a set of items derived from the literature that asked them to choose what they considered to be examples of structured reflection.

As with reflective practice a majority of students said that they did also understand the term structured reflection. The majority in this case however was significantly lower (23%) than for their perceived understanding of critical thinking and reflective practice, hence indicating that students did not all necessarily perceive both concepts in the same way, in particular structured reflection which appeared less coherently conceived.

Analysis of questions highlighted some differences in the students' understanding and applications of structured reflection. It was interesting to note that over 23% of the sample said that they did not understand the term structured reflection yet claimed to have acceptable abilities to use this concept. This result possibly suggests that knowing how to do something for some individuals does not necessarily follow a sequence of 'knowing what it means' something that is traditionally associated with formal learning i.e. theory before practice. Also that having practical abilities to do something might not necessarily depend on a theoretical understanding of it but by being able to follow tasks or rules associated with them. In other words the educational ideology of theory before practice does not appear to apply in this context. This proposal would however, need to be tested further beyond students' perceptions alone which by itself makes it difficult to tell.

With regards to the health science students' attitude towards structured reflection a series of attitude items using Likert measurements were presented to test whether the students were generally positive or negative in their attitude towards structured reflection. The results showed that although they were not all sure of their understanding a majority of the sample claim to have a positive attitude towards it. The importance of positive attitudes in the literature is considered to be a necessary condition for the reflective learning process e.g. Goodman citied in (Donaghy & Morss, 2000). Dewey citied in (Dyke, 2006) also advocated positive attitudes such as "wholeheartedness and open mindedness" whilst Boud et al citied in (Dyke, 2006:11) which suggest that "*negative feelings particularly about oneself can form major barriers towards learning".* Thus knowing that the majority of health science students generally have positive attitudes towards critical thinking and reflective practice concepts could be attributed to their motivation to learn and is therefore considered an important curriculum outcome for the implementation of critical thinking and reflective practice.

Concerning interpretations of structured reflection some interesting results emerged. Similar to reflection and reflective practice there are no concrete definitions of structured reflection in the literature although some writers (Moon, 2000; Rolfe et al, 2001) refer to 'structure' as written formalisms e.g. journal writing and guided frameworks. Although, the health science students in this study rated a range of methods in their inclusion or exclusion of structured reflection; a large majority (nearly 80%) perceived using a 'written framework' to be the most favoured representation of structured reflection which concurs with the literature.

Looking at the utility of 'structured reflection' however, just over 50% of the sample considered it to be important for their practice and considered that they were able to use it. When compared to asking the same questions for critical thinking and reflective practice the reduced majority responses for structured reflection suggest that there may possibly be something particular or specific in meaning and applications of these two concepts.

3. LEARNING PREFERENCES AND ASSOCIATIONS WITH CRITICAL THINKING AND REFLECTIVE LEARNING

This item in the questionnaire was designed with the specific purpose of identifying how students' rated the importance of reflective methods within a range of individual preferred ways of learning. The categories for the different ways were adapted from Honey and Mumford's citied in (Donaghy & Morss, 2000) four learning styles preferences (*Activist, Reflector, Theorist, Pragmatist*) i.e. learning by observing, by thinking back, by learning from lectures and reading or from trying things out for themselves.

The distribution of learning methods scored by the students showed that the majority favoured both the passive learning styles associated with reflective learning such as 'observations' and 'thinking back', as well as 'hands on' or active experimentation learning. However, a majority of nurses (Figure 4) rated the 'hands on' approach more highly than the other approaches such as 'thinking back' and 'observing' in indicating that they may not all have as strong a preference for reflective learning methods. Similarly the results shown in Table 4 and 5 suggest that although the students perceived structured reflection as being highly important to their learning they perceived it less important to nursing practice.

In the study of this research attempts were made to identify whether or not any significant relationships existed between the two concepts. Using both descriptive measures through the surveys and a Learning Style Indicator the results showed that regardless of self-scored learning styles the majority of students similarly described reflective practice meanings aligned to the dimensions Gibbs' cited in (Dyke,2006) Cycle, (*description, thoughts and feelings, evaluation, analysis, conclusion and future action*). The majority also indicated that critical thinking and reflective practice was both useful and important to their academic studies and practice. This was found to be the case in study even though the majority of that sample scored themselves in the 'Active Experimenter' category and who according to Kolb cited in (Fook, White &Gardner, 2006) would be more strongly orientated to *"practical applications as opposed to reflective understanding".*

4. DIFFERENCES BY LEVELS/YEARS OF STUDY

Academic levels/years of study appear to be an influential factor concerning what health science students include and exclude in their meanings of structured reflection. However, there are some notable inconsistencies in the overall findings of health science students' perceptions of these concepts. Analysis of the differences in perceptions of critical thinking and reflective practice and structured reflection by the students' level of academic study raises important issues relating to the literature on critical thinking and reflective practice meanings and how they are taught and learnt. An interpretation of the literature on critical thinking and reflective practice for this research indicates that the term acts as an umbrella concept encompassing many different activities, e.g. thinking, critical thinking, learning and a tool for professional practice (Moon, 2000: 3-4). Given the reported lack of consensus regarding definitions of reflective practice concepts it is therefore surprising that the majority of nurses claimed a perceived understanding of its meaning.

The final question was open ended and was intended to give students the freedom to express comments that would hopefully highlight any relevant areas that were overlooked by the researcher or perceived relevant to the students' beliefs and attitudes of critical thinking and reflective practice concepts applicable to themselves as individuals. The findings of these few studies suggest that reflective thinking may develop in association with certain interventions. It also appears that the development of reflective thinking is related to other aspects of learning and professional development. The methods employed were usually observational and analytical, and appropriate to the questions asked.

9. FINDINGS

The following sections provide an outline of the areas for discussion of the research findings.

1. STUDENTS' UNDERSTANDING OF CRITICAL THINKING AND REFLECTIVE PRACTICE CONCEPTS

Health education undergraduate students similar to private nursing students on an equivalent curriculum pathway believe that they understand the meaning of critical thinking and reflective practice including related concepts such as structured reflection even though the literature suggests that the term lacks clarification. This could be the result of what students had been taught, however structured reflection as a terminology is not defined within the health curriculum or elsewhere. Rather, it is implied in the literature that structured forms of reflection include formats such as written learning journals and reflective frameworks/cycles. Therefore the students' belief that they understood its meaning possibly derives from the literature rather than what they had been taught.

2. LEARNING STYLES RELATIONSHIPS AND ATTITUDES TO CRITICAL THINKING AND REFLECTIVE PRACTICE

According to the learning styles instrument used students' views about critical thinking and reflective practice were not found to be influenced by their individual learning styles. Health students generally had a positive attitude towards critical thinking and reflective practice.

3. STUDENTS' DEFINITIONS OF CRITICAL THINKING AND REFLECTIVE PRACTICE

Students defined and described critical thinking and reflective practice as a retrospective process only commensurate with reflection-on-action concepts, i.e. after an experience.

4. STUDENTS USE OF CRITICAL THINKING AND REFLECTIVE PRACTICE METHODS

Students overall indicated that they use the dimensions of Gibbs' (1988) reflective cycle as one of the main frameworks to assist their learning i.e*., description, thoughts and feelings, evaluation, analysis, conclusion and future actions,* although by the fourth and above years health students seem to prefer discursive methods. In second and third years health students seem to practice (oral debrief after an event) students focus most on analyses and least on *'conclusion'*.

5. STUDENTS USE A TECHNICAL/RATIONAL APPROACH TO CRITICAL THINKING AND REFLECTIVE PRACTICE

Students' viewed critical thinking and reflective practice as a tool for informing practice similar to prescribed protocols/guidelines. During and after practice four year health students' focused mainly on *primary clinical* and *technical* issues thus demonstrating a greater adherence to prescribed practices rather than evidence of on the spot thinking.

6. COMMUNICATION AS A KEY INDICATOR OF CRITICAL THINKING AND REFLECTION PRACTICE

In the simulation context, verbal communication emerged as a key supplementary action to direct actions during practice. The different types of verbal communication used in interactions with the patients and peers during practice are now coded into categories that can inform possible external representations of reflection-in-action.

7. SIMULATION LEARNING AS A REFLECTIVE PRACTICUM

Simulation learning using scenarios offers realistic potential for developing critical thinking and reflective practice learning and teaching strategies. However, the post simulation processes need to be facilitated in a more structured way to encourage students to 'synthesise' and inform future learning more explicitly. A new pedagogic framework for critical thinking and reflective practice offers an alternate solution.

10. RECOMMENDATION

While the study is still early in development, and not conclusive, the researcher offers the following implications for educational practice that educators may consider:

Critical thinking and reflective practice may be most useful when viewed as a learning strategy. Used in this way, it may assist learners to connect and integrate new learning to existing knowledge and skills. Reflection may also assist learners to explicitly integrate the affective aspects of their learning. This may be particularly beneficial in the health science learning environment, where many aspects of the professional role are experienced and learned.

Critical thinking and reflective practice, and its role in learning, may not be obvious to learners; it may also be a tacit process in experienced practitioners. An important task for teachers may be to model reflection on their own practice; i.e., to make their own reflective activities explicit. Further, including learners and inviting their contribution may demonstrate that reflection can be a collaborative, as well as an individual, experience. Experience with collaborative reflection may be important as a preparation for participation in interprofessional teams, where the ability to consider the cognitive approaches and values underlying the work of other professionals is important.

As with other skills, learners may need a structure to guide this activity, especially early in their learning. They may require feedback on both the content and the process of their reflection, both ''reflection-in-action'' and ''reflection-on-action.'' Reflection offers an opportunity to consider one's strengths and weaknesses, and to determine learning needs. Learners and teachers may be able to use reflection as one element of self-appraisal, encouraging learners to seek evidence and input to validate and enhance their own judgements.

The literature suggested repeatedly that guidance and supervision are keys to reflection and are factors that learners perceived to be beneficial to their learning. Therefore, as educators, it will want to ensure that when reflection is used as a learning strategy, the process is guided appropriately.

The environment for teaching and learning about reflection will be important. If the culture and environment do not value and legitimize this learning strategy, reflection may not be used, potential benefit may be lost, and negative reflective experiences may result. A key assumption underlying the literature on reflection is that it will enhance competence.

11. CONCLUSIONS

Critical thinking and reflective practice, although a popular concept in higher education and ubiquitous in the literature over the last twenty years continues to retain its popularity despite the reported lack of clarity and consensus of meaning. From the extensive literature reviewed it is apparent that many of the key theoretical ideas surrounding reflection-in- and on-action concepts are not empirically tested. In short, there is a lack of evidence that critical thinking and reflective practice is an effective proven strategy for the education of health care practitioners including health sciences. However, it has been demonstrated in this study that this situation can be improved by explorations of critical thinking and reflective practice in specific contexts.

The phases of this research exploring the applications of critical thinking and reflective practice to the learning experiences of health science students have produced some new and relevant findings that could better inform health and other health care curricula for future developments. For example, students believe that they understand the concept but this is limited to something that happens primarily after an event or experience.

Also it was found in the processes observed that the debrief simulation context lacked full reflectivity and could be better scaffolded by having a clearer learning and teaching focus. Communication in particular was identified as a key critical thinking and reflective practice indicator that helped to inform the findings that 'Technical Reflection' is a significant activity both during and after the students' practice. This could be a discipline related characteristic where time factor can be crucial to care outcomes, however technical reflection is not synonymous with a holistic model of care and the wider critical thinking required for practice.

These findings may be relevant to other disciplines that work in similar ways, where complexities and unexpected problems are characteristic of their clinical work critical, thinking and reflective practice is professionally benchmarked, e.g. medicine and physiotherapy. The findings of the research have also identified that there is need for a greater understanding of any new discipline to higher education. This is essential for the development of sound pedagogies and productive learning from critical thinking and reflective practice in order to expand its body of knowledge and clinical skills.

Further, this research has emphasised the importance of curriculum evaluations of educational innovations such as critical thinking and reflective practice in higher education if they are to be more effectively embedded for learning and work- related applications.

12. LIMITATIONS

The limitations of this research mainly concern the generalisability of the findings owing to the fact that the study conducted and the data collection took place in a single higher education institution with a unique population sample involved in an example of curriculum innovation. Consequently the conclusions reached may only be applicable to the population of undergraduate health science students studied in that particular curriculum context. As such the findings cannot be used to explain the reported lack of clarity regarding definitions of critical thinking and reflective practice found in the literature.

In addition as earlier highlighted in the use of predominantly closed questions for surveying the students' perceptions of critical thinking and reflective practice resulted in limited analyses and findings. Hence, a missed opportunity has been identified that could have possibly yielded substantial data to illuminate the students' understanding of critical thinking and reflective practice across all levels of study including those who were government and private. Critical thinking and reflective practice concerns at all levels of practice therefore using wider explorations and different methodologies for the further investigations of critical thinking and reflective practice influences in health sciences are strongly recommended.

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