Abstract: Universities are establishment by society to preserve and advance knowledge, to develop people and to act as independent critics of the society that support them. Based on it, the education for the profession started at the university as a basic education. For those, the objectives of the university were to teach students to analyzed ideas or issues critically, to develop students’ intellectual/ thinking skills, to teach students to comprehend principles or generalizations. This article aimed to look at the seven areas of competency, which is the main competence of the National Competency-based Curriculum in the context of clinical reasoning and critical thinking where educators agree that clinical reasoning is a central component of physician competence.

Keywords: critical thinking, seven areas of competency

INTRODUCTION

As we all know KIPDI III or the National Competency Based Curriculum is being implemented by a number of medical schools. KIPDI III applies nationally and as agreed on the meeting of all Dean of Medical School, Head of Basic Medical Study Program, and Head of Medical Education Unit in Indonesia in December 2004, to be implemented starting 2005.1

Basic medical education as university education is directed more to train thinking ability, analysis, and critical thinking using the competency based curriculum. Results expected are primary care doctors that are able to implement family medicine approach along with excellent medical knowledge and skills. Even though some still argue whether CBC can produce better doctors than the previous curriculum.2

This article aimed to look at the seven areas of competency, which is the main competence of the National Competency-based Curriculum in the context of clinical reasoning and critical thinking where educators agree that clinical reasoning is a central component of physician competence.3

THE NATURE OF CRITICAL THINKING

Kym, Fraser (1996) in4 stated that in higher learning, learning means construction of knowledge by student as an individual process that takes place within the brain. A model of philosophical statement about knowing and thinking that one persistent unexpressed misconception is that knowledge consists of bits and pieces of information to be implemented in the student’s mind by the teacher and materials. Knowledge is unwittingly considered to be a thing that can be put into students’ heads as some object might be put in their hands.

Knowledge exists only in minds that have comprehended and justified it through thought. Knowledge is something that we must think our way to, not something we can simply be given. Knowledge is produced by thought, organized by thought, evaluated, refined, maintained, and transformed by thought. Knowledge can be acquired only through thought. The educational philosophy underlying educational goals, standards, and objectives should be based on an accurate and full conception of the dependence of knowledge on thought.4
Lipman states in Lipman states in Lipman states in 5, there has been a progressive shift in focus in education, the shift is from learning to thinking. We want students to think from themselves, and not merely to learn what other people have taught. Paul and Binker 5 have succinctly compared and contrasted these and use the labels didactic and critical. The dominant didactic theory of knowledge, learning, and literacy is to teach students what to think so that they learn what the teachers know. In contrast, the emerging critical theory is to teach students how to think so that they can find their own way through the problems and concerns they meet in life. 5

According to the Higher Education Quality Council of UK, graduates are expected to learn not only the content and methods of discipline, but also to develop ‘generic’ abilities (through terms such as ‘key skills’) which can be deployed flexibility in a wide range of work and life contexts. 5 So, critical thinking is not only a skill of thinking but also a personal attribute. 5

In the Australian context, the teaching and learning of a range of ‘generic competencies’ are seen to be at the core of life-long learning to improve students’ flexibility adaptability when they enter the workforce. These competencies are represented, for example, by knowledge and skills relating to: collecting, analyzing, and organizing information; planning activities; problem solving; communicating information; working with others; and using technology (Mayer, 1992). 6

Definitions of critical thinking are numerous. Michael Scriven and Richard Paul proposed, for the National Council for Excellence in Critical Thinking, include various components of critical thinking: Critical thinking is the intellectually discipline process of actively and skillfully conceptualizing, applying, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness. It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem or question at issue, assumptions, concepts, empirical grounding, reasoning leading to conclusions, implications, and consequences, objections from alternative view points, and frame of reference. Critical thinking – in being responsive to variable subject matter, issues, and purposes – is incorporated in a family of interwoven modes of thinking, among them: scientific thinking, mathematical thinking, historical thinking, anthropological thinking, economic thinking, moral thinking, and philosophical thinking.

The term of critical thinking was used in the General Medical Council’s 1993 edition of Tomorrow’s Doctors, it has now been dropped in favor of phrases such as: an ability to gain, assess, apply, and integrate new knowledge …., or an ability ‘to integrate and critically evaluate evidence …’ 8.

Kennedy, Fisher, Ennis, 1996 state that critical thinking involves abilities to identify a problem and its associated assumptions; clarifying and focusing the problem; an analyzing, understanding and making the use of inferences, inductive, and deductive logic, as well as judging the validity, and reliability of assumptions, sources of data or information available.

From those definition reflect a broader process including in medicine not only logic, but also our perceptions, their wording (language), emotions, biostatistical and epidemiological considerations, best evidence, clinical and public health knowledge, attitudes, and skills. Logic and critical thinking are vital parts of human understanding process in general.

**Human Understanding Process**

It starts with reality – what really exist and happens outside the confines of our own minds. From the reality, we make our perception – how we sense or experience reality firsthand. Then thinking processes – how we synthesized our perception of reality in order to create ideas and draw conclusions. Our thinking processes may or may not employ critical thinking. Many factors influence the thinking processes, such as basic emotional and other subjective needs – security, acceptance, belonging, recognition,
love, etc. The other factors are values and principles – our preconceived ideas of what it is important vs. not important and what is right and what is wrong. Then, we make conclusions – our resulting options, claims, beliefs, and understanding of facts. After the conclusion, we come to decision making – problem solving.

**Application to Medicine**

Doctors have reality – existing “real” health and care of patients and communities. From the reality, doctors make perception – observing and describing patient and community health and care. Then thinking processes – making sense of what was seen, preferably by means of a critical thinking path. Many factors influence the thinking processes, such as health providers’ state of mind – a priori acquired and valued knowledge, attitudes, and skills; compassion, fatigue, stress, perception of values, coping with personal problems, etc. The other factors are more objective values and principles – gathered and evaluated best general and specific evidence and effectiveness of its uses. Then, doctors make conclusions – understanding of reality, its causes, and what to do with them. After the conclusions, doctors come to decision-making – what to do or not to do about patient and/or community health, and then action.

In larger framework, evidence-based policy research relies considerably on critical thinking.

**THE NATURE OF CLINICAL REASONING**

How do doctors make decisions? Doctors make decisions all the time – what the problem is, what the diagnosis is, whether to do anything, what to do. What facts do doctors take into account when they come into a decision, and what processes do they see to decide on a course of action? Where does intuition come from? These are the basics of clinical reasoning. When decisions are made in conjunction with the patient, doctors need to have an understanding the “building blocks” of their thinking in order to explain this to the patient and to explore areas where differences in values and opinion may occur.

Clinical reasoning is define as the process of making sense of a clinical encounter.

Research attempting to understand the nature of clinical reasoning has been underway for nearly 3 decades. There are three broad research traditions, ordered chronologically are: (1) attempts to understand reasoning as a general skill – the ‘clinical reasoning process’; (2) research based on probes of memory – reasoning related to the amount of knowledge and memory; and (3) research related to the different kinds of mental representations – semantic qualifiers, scripts, schema, and exemplars.

Geoffrey Norman reviewed papers regarding these researches, and come to conclusion: first, there is little evidence that reasoning can be characterized in terms of general process variables. Secondly, it is evident that expertise is associated, not with a single basic representation in memory, from causal mechanisms to prior examples. Different representations may be utilized in different circumstances, but little is known about the characteristics of a particular situation that led to a change in strategy.

Kassirer JP, experts use three main methods or a combination of these in making a diagnosis. Probably the most common is the hypothetico-deductive approach. An initial hypothesis or hypotheses are generated very early during the initial presentation of the problem, from existing knowledge, associations, and experience. Further questions or examinations are oriented towards supporting or refuting these first ideas. If an hypothesis is discarded, as an alternative one is considered and treated in the same way. Several hypotheses can be actively considered at any one time. Both awareness probabilities (prevalence) of disease and knowledge causal pathways are important.

Pattern recognition is also common. A particular combination of symptoms, or even certain phrase used to describe a symptom, can suggest a diagnosis very strongly. People build up their own internal library of pattern on the basis of their experience and existing knowledge.

Finally pathognomonic signs and symptoms exist where a particular finding almost guarantees a certain diagnosis.
All diagnostic methods depend on breadth and depth of knowledge, but the application of knowledge is not straightforward, as it seems. The use of algorithms (following a structured guideline to reach a diagnosis) are not welcomed by many doctors, despite their accuracy and relative freedom from bias. A
to be human, doctors are to be fallible. Since thinking process influenced by many factors, our thinking processes are often either: (i) hasty, with insufficient investment in deep processing or examination of alternatives; (ii) narrow, with a failure to challenge assumptions or consider other points of view; (iii) fuzzy, or imprecise and prone to conflation; or (iv) sprawling, or disorganized with a failure to conclude.

Several common feature of thinking can occur during the clinical reasoning process. These are known as cognitive biases. A frequent and pervasive cognitive bias affecting everyday practice is ‘confirmation bias’, where we invest more time in seeking to confirm (rather than refute) hypothesis.

Eva reviewed of the research literature on clinical reasoning. It attempts to re-conceptualize the construct of expertise to that of an amorphous entity that might best be defined as flexibility regarding the ways by which solutions to clinical problems can be derived. Different approaches to clinical reasoning were examined using one of the core divides between various models – analytic (conscious/controlled) and non-analytic (unconscious/automatic) reasoning strategies as an orienting framework.

An analytic processing model would remain as long as the notion of careful analysis is maintained, whereas a non-analytic processing model is connected with pattern recognition. Matching between the current patient and the patient encountered in the past. It has been argued that the ability to use non-analytic bases of clinical decision-making increases with expertise, and as a result, the use of pattern recognition should not be advocated among medical students for fear of ‘potentially grim consequences’.

Eva concludes that it is highly probable that both forms of processing contribute to the final decisions reached in all cases. The impact of similarity, in some cases, will be to prompt an analytic consideration of the current case that is analogues to analysis that were performed on a similar case in the past. As a result, the optimal form of clinical reasoning should be considered an additive model in which both analytic and non-analytic processes play a role.

**NATIONAL COMPETENCY BASED CURRICULUM**

With primary care doctor responsibilities in mind, guidance from WHO, WFME (World Federation of Medical Education), results from medical schools around the world and government programs toward Indonesia Sehat 2010, seven areas of competence, also known as the main competence were identified, which are:

1. Effective communication skill.
2. Basic clinical skill.
3. Ability to apply basic knowledge of biomedics, clinical skills, behavioral skills, and epidemiology in family medicine practice in primary service.
4. Ability to manage health issues in the individual, family or community using comprehensive, holistic, continuous, coordinative, and collaborative means in context of primary medical care.
5. Ability to critically use, assesses, and manages information.
6. Ability to develop and introspect oneself and learn at the time.
7. To uphold ethics, moral and professionalism in practice.

Actually, all the seven areas are the “basic skills” of a doctor, according to WFME, which is known as basic medical doctor. To ensure achievement of all seven areas, learning process is required (to master the knowledge), skills trainings (to master the basic clinical skills) and ended with internship (to achieve basic competency as primary care doctors that able to apply family medicine approach).

From the explanation above, we can clearly see the relation between the seven areas of competency with the nature of critical thinking and clinical reasoning. Doctors produced are expected to be doctors that can diagnose the patient using critical analysis with thinking skills (cognitive and metacognitive) by integrating medical
knowledge and clinical knowledge resulting 
good clinical reasoning. Clinical skills 
supported with good communication skill as a 
guide to act and believe.

This also must be supported with ability 
to critically use, assess and manage 
information and willingness to learn all the 
time. One of the important contributions 
of clinical epidemiology and evidence-based 
medicine (EBM) was the formulation and uses 
of critical appraisal. At various stages of 
clinical work and decisions, medical research, 
and health program assessment.⁷,⁸

Critical thinking in linking to 7 areas of 
competencies, very much connected with the 
definition below: “The critical habit of 
thought, if usual in a society, will pervade its 
entire mores, because it is a way of talking up 
the problems of life. Men educated in it 
cannot be stampeded by stump orators... they 
are slow to believe. They can hold things as 
possible or probable in all degrees, without 
certainty and without pain. They can wait for 
evidence and weigh evidence, uninfluenced by 
the emphasis or confidence with which 
assertions are made on one side or the other. 
They can resist appeals to their dearest 
predicates and all kinds of cajolery. Education 
in the critical faculty is the only education of 
which it can be truly said that it makes good 
citizens.”⁷

CONCLUSION

Higher education happens in the 
university, where the students have higher 
learning. Engaging in higher-order thinking 
with others may teach students that they have 
the ability, the permission, and even the 
obligation, to engage in a kind of critical 
analysis that does not always accept problem 
formulations as presented, or that may 
challenge an accepted position.

There is good reason to believe that a 
central aspect of developing higher-order 
cognitive abilities in students is a matter of 
shaping this kind of disposition to critical 
thought.¹²

Cannon, 1998⁴ – Universities are 
establishment by society to preserve and 
advance knowledge, to develop people and to 
act as independent critics of the society that 
support them. Based on it, the education for 
the profession started at the university as a 

basic education. For those, the objectives of 
the university were to teach students to 
analyzed ideas or issues critically, to develop 
students’ intellectual/thinking skills, to teach 
students to comprehend principles or 
generalizations.

A broad, general finding from the 
research base is that nearly all of the thinking 
skills programs and practices investigated were 
found to make a positive difference in the 
achievement levels of participating students.¹³

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