Modelling critical thinking through learning-oriented assessment

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Abstract
One of the cornerstones peculiar to the outcomes-based approach adopted by the South African education and training sector is the so-called ‘critical outcomes’. Included in one of these outcomes is the ability to think critically. Although this outcome articulates well with the cognitive domain of holistic development, it also gives rise to some concern. One area of concern deals with cultivating learners’ critical thinking skills. Research indicates that these higher order thinking skills are unlikely to develop simply because of maturation and that they are notoriously difficult to teach and learn.

In two independent studies, the Cornell Critical Thinking Test – Level Z and the Watson Glaser Critical Thinking Appraisal were administered to gauge the critical thinking abilities of teacher education students. The research results obtained from the two studies will be briefly discussed as evidence that there is a dire need to nurture learners’ critical thinking abilities.

The concept learning-oriented assessment (LOA) will be interrogated and it will be indicated how LOA could possibly contribute in developing students’ critical thinking skills.

INTRODUCTION
During recent years, a variety of concepts underpinned by the Constructivist school of thought became part of the South African colloquial language. Amongst these are concepts such as lifelong learning, learner/learning-centeredness, process-oriented learning, participative teaching and problem-based learning. Founded on the principles of Constructivist pedagogy (Brooks and Brooks 1993), Constructivism is further endorsed by the critical outcome: ‘the ability to identify and solve problems and making decisions by using creative and critical thinking’ as proposed by the South African Qualifications Authority (SAQA 1997, 7). From the aforementioned and in relation to several other opinions about the need and urgency to develop learners’ critical thinking, the prominence of this phenomenon in current educational practice becomes evident. Arguments favouring critical thinking include the following.

• Critical thinking is needed because globally solutions have to be found for deep-rooted problems (Paul 1992, 14).
It should be considered a prerequisite in the modern working environment to allow employees to cope with their daily tasks (Haywood 1997, 6).

It should be cultivated since it is one of the key elements for realizing the expectations of the African Renaissance (Vil-Nkomo and Myburgh 1999, 11–39).

It is required to build democracy, establish a system of lifelong learning and promote social development (Odora Hoppers 2001, 1).

Critical thinking is an important and necessary skill because it is required in the workplace, it can help one to deal with mental and spiritual questions, and it can be used to evaluate people, policies and institutions, thereby avoiding social problems (Hatcher and Spencer (2005) in Duron, Limbach and Waugh 2006, 160).

It is a defense against a world of too much information and too many people trying to convince us (Epstein 2006, 1).

It should be nurtured in order to provide learners with opportunities to develop as independent thinkers (Green 2006).

Derived from the above, it is clear that the notion of critical thinking has established itself in education and training circles. As anticipated by Brown and Keeley-Vasudeva (1992), it can also be accepted that the development of critical thinking has become a top priority in higher education.

**PURPOSE OF THE RESEARCH**

The need to develop learners’ critical thinking skills is evident. Hence, the question as to whether higher education students’ thinking abilities reflect competence with regard to critical thinking seems relevant. Furthermore, when acknowledging the complexity of critical thinking and taking cognizance of Angelo’s (1995, 6) remark that critical thinking does not simply develop as a result of maturation, but involves skills that are notoriously difficult to teach and learn, the problem as to how to raise students’ possible low critical thinking competency levels also deserves attention.

The intention of this research is therefore threefold. Firstly, it wishes to determine how critical thinking could be defined. Secondly it would like to provide some evidence of the critical thinking abilities of higher education students and thirdly it wishes to suggest learning-oriented assessment as a strategy for improving students’ critical thinking competence.

**CRITICAL THINKING: IN SEARCH FOR AN EXPLANATION**

Although there appears to be general agreement with Walsh and Paul’s (1988, 13) opinion that critical thinking encompasses a skill that needs to be improved by everybody, a comprehensive description of what critical thinking exactly implies is...
still evasive. In this section a variety of viewpoints will be compared in an attempt to arrive at a conclusive explanation.

Dewey’s (1933, 12) definition of reflective thinking can be regarded as one of the forerunners of what has come to be known as critical thinking when he argued that ‘… reflective thinking, a distinction from other operations to which we apply the name of thought, involves (1) a state of doubt, hesitation, perplexity, mental difficulty, in which thinking originates, and (2) an act of searching, hunting, inquiring to find material that will resolve the doubt, settle and dispose of perplexity’. For Ennis (1984, 6) critical thinking is divided into various aspects namely induction, deduction, value judgments, definition, observation, identification of assumptions, giving meaning and determining credibility. Sternberg (1984, 38–48) classified critical thinking as the ability to identify the nature of a problem and to be able to decide on the processes necessary to solve the problem. In addition, a critical thinker will be able to monitor and evaluate a problem-solving process, make conclusions, react effectively to new tasks and situations and process information effectively, which also involves abilities to classify, compare, categorise, analyse and evaluate. Paul (1985, 37) viewed critical thinking as ‘learning how to ask and answer questions of analysis, synthesis and evaluation’. Norris (1985) in Duron, Limbach and Waugh (2006, 160) posited that critical thinking is deciding rationally what to or what not to believe. Lipman (1985, 28–34) not only suggested that critical thinking is more complex than ordinary thinking but also indicated that it involves careful argumentation which avoids guessing; making logical conclusions based on criteria; providing opinions substantiated by proof; moving away from believing to assuming and consequently from assumptions to hypotheses. McPeck (1990, 34, 35, 40) stated that critical thinking comprises four important components: a critical component, which refers to the ability to reflect, question and judge information effectively; a strong knowledge base in the specific subject area where the critical thinking skills are to be utilised; the capacity to use language to be able to execute critical thinking and a willingness to become involved in problem situations. According to Chaffee (1992, 3) critical thinking involves a variety of cognitive activities which include solving problems and making informed decisions, developing evidence and arguments to support views, critically evaluating the logic and validity of information, applying knowledge to various contexts and new circumstances and exploring issues from multiple perspectives. Freely (1993, 1) and Paul (1993, 22) shared the definition that critical thinking involves the ability to ‘analyze, criticize, advocate ideas, reason inductively and deductively, and reaching factual or judgemental conclusions based on sound inferences drawn from unambiguous statements of knowledge and beliefs’. According to Drewett (1995, 72) critical thinking is a holistic activity, which incorporates both theory of arguments and the context in which those arguments occur. Pithers and Soden (2000, 239) concurred that critical thinking includes the following abilities: identifying a problem and its associated assumptions, clarifying and focusing the problem, analysing, understanding and making use of inferences, inductive and deductive logic and judging the validity and reliability of assumptions,
sources of data or available information. Whereas Epstein (2006, 1) stated that critical thinking mainly involves evaluation, since the learner should be able to determine whether a claim is true or an argument is good, he added that a critical thinker should also be able to formulate good arguments.

In conclusion and based on the aforementioned paraphrases, it appears that critical thinking is a construct, which entails the deliberate direction of one’s own thinking by including higher order thinking skills (cf. Bloom (1956) and Krathwohl (2002)) to arrive at rational justifiable inferences.

A SYNOPTIC VIEW OF HIGHER EDUCATION STUDENTS’ CRITICAL THINKING ABILITIES

What follows is a brief discussion of two independent South African studies, initiated to gain insight into the critical thinking abilities of two cohorts of teacher education students. Both studies were exploratory and quantitative in nature.

Contextualising the first study

The first study was conducted among a group of 88 purposively selected prospective teachers at the beginning of their first academic year. These student teachers were primarily from the so-called previously disadvantaged community, representing a fairly homogeneous sample. As the research sample involved undergraduates, it was decided to use the Cornell Critical Thinking Test-Level Z as this instrument is specifically aimed at measuring the critical thinking abilities of undergraduate students (Ennis, Millman and Tomko 1985). According to the same authors, the test can be taken by undergraduate students in any country, provided that they understand English. As all the students involved in the research had completed their schooling in English and were expected to do their training and future teaching in English, it was decided to use the English version of the instrument. Whereas the instrument focuses on general topics and is designed to determine critical thinking abilities by using ‘general scenarios’, it is not subject-related. From this point of view it was argued that the instrument’s degree of foreignness to the South African circumstances could be regarded as minimal.

The Cornell Critical Thinking Test-Level Z includes 52 multiple-choice items, which must be completed in a time limit of 50 minutes. The instrument covers the following seven dimensions of critical thinking (cf. Lombard and Grosser 2004, 214) to which respondents must react.

- Deduction (Items 1–10): determining whether proposed conclusions following from given statements are contradictory.
- Semantics (Items 11–21): showing an understanding of the verbal and linguistic aspects of a given argument.
• Credibility (Items 22–25): judging the credibility of a given statement against a given experiment.
• Induction (Items 26–38): judging given information as being supportive or against; or neither supportive nor against.
• Induction (Items 39–42): relating possible stated predictions to a given planned experiment.
• Definition (Items 43–46): selecting the definition that best gives the meaning of a given concept from a list of possible given definitions.
• Assumption identification (Items 47–52): identifying unstated assumptions from a given text.

Results of the first study
With regard to the sample’s critical thinking abilities as measured on the Cornell Critical Thinking Test-Level Z, the following results were noted:
• It was observed that the majority of respondents tested below the median (see Table 1).

<table>
<thead>
<tr>
<th>Score intervals out of a possible 52</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>0</td>
</tr>
<tr>
<td>5–9</td>
<td>3</td>
</tr>
<tr>
<td>10–14</td>
<td>16</td>
</tr>
<tr>
<td>15–19</td>
<td>36</td>
</tr>
<tr>
<td>20–24 (median)</td>
<td>26</td>
</tr>
<tr>
<td>25–29</td>
<td>7</td>
</tr>
<tr>
<td>30–34</td>
<td>0</td>
</tr>
<tr>
<td>35–39</td>
<td>0</td>
</tr>
<tr>
<td>40–44</td>
<td>0</td>
</tr>
<tr>
<td>45+</td>
<td>0</td>
</tr>
</tbody>
</table>

• When the raw score totals for the whole group were calculated and an average percentage for the test determined, the apparent inability of the total group of respondents to handle tasks requiring critical thinking, was reflected (see Table 2 below).

<table>
<thead>
<tr>
<th>Group test total</th>
<th>Possible test total</th>
<th>Average percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1589</td>
<td>4576</td>
<td>34.72</td>
</tr>
</tbody>
</table>

• After a comparison was drawn between the respective results of the critical thinking dimensions, it became clear that the respondents excelled in none of these
dimensions. It was interesting to note though, that a slightly better performance was observed in subtest one (Deduction) and in subtest four (Induction). The respondents’ performances in subtest six (Definition) raised concern about their ability to form and give meaning to concepts. The results of subtest two (Semantics) were also noteworthy because of the lowest average obtained, which could imply the respondents’ degree of English proficiency (see Table 3).

Table 3: Comparison of the subtest results

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Possible subtest total</th>
<th>Possible group test total (N = 88)</th>
<th>Actual raw score (N = 88)</th>
<th>Average percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1: Deduction</td>
<td>10</td>
<td>880</td>
<td>406</td>
<td>46.13</td>
</tr>
<tr>
<td>Test 2: Semantics</td>
<td>11</td>
<td>968</td>
<td>240</td>
<td>24.79</td>
</tr>
<tr>
<td>Test 3: Credibility</td>
<td>4</td>
<td>352</td>
<td>105</td>
<td>29.82</td>
</tr>
<tr>
<td>Test 4: Induction 1</td>
<td>13</td>
<td>1144</td>
<td>480</td>
<td>41.95</td>
</tr>
<tr>
<td>Test 5: Induction 2</td>
<td>4</td>
<td>352</td>
<td>97</td>
<td>27.55</td>
</tr>
<tr>
<td>Test 6: Definition</td>
<td>4</td>
<td>352</td>
<td>122</td>
<td>34.65</td>
</tr>
<tr>
<td>Test 7: Assumptions</td>
<td>6</td>
<td>528</td>
<td>139</td>
<td>26.32</td>
</tr>
</tbody>
</table>

Contextualising the second study

As no standardized instruments for measuring critical thinking that are tailor-made for South African respondents are available, the selection of an instrument for the second study was based on four determining guidelines. The first determining guideline was to conduct another study, following the first, to measure the critical thinking abilities of a group of teacher education students by using a different instrument. Secondly, Fisher and Scriven’s (1997) argument that the Watson-Glaser Critical Thinking Appraisal (WGCTA) ‘is probably the most widely used measure of critical thinking in the world’ prompted the choice of this instrument. The third determining guideline was Watson and Glaser’s (2002) own viewpoint that their instrument is appropriate to be taken by respondents who have completed a basic formal education. Fourthly, Watson and Glaser (2002) also indicated that a minimum reading ability of 15 years is required to complete the test. Argued from the premise that the heterogeneous group of 117 first year education students who were selected by means of convenience sampling, managed to complete their schooling careers successfully and cautiously assuming that they comply with the minimum required reading ability, it was decided to use this instrument. Since the Standard English style of South Africans relates closely to British English, the adapted United Kingdom version of the instrument (WGCTA-UK) was considered to be the most appropriate.

The WGCTA-UK consists of five subtests (cf. Lombard 2006, 24–25), which measures different, though interdependent aspects of critical thinking. Respondents are expected to determine the appropriateness and validity of propositions. The
five subtests focus on the following subtests in which respondents have to perform certain tasks:

- Drawing inferences: evaluating inferences drawn from a series of factual statements.
- Recognising assumptions: identifying unstated assumptions in a series of statements.
- Deduction: determining whether certain conclusions necessarily follow from information in given statements.
- Interpretations: weighing evidence to decide if generalizations based on data are warranted.
- Evaluation of arguments: distinguishing between strong, relevant arguments and weak irrelevant arguments.

The instrument includes 80 items; 16 items per subtest. The items comprise two kinds of content: neutral topics and controversial issues. The first include matters on which people generally do not have strong feelings (e.g. weather and scientific facts). Controversial issues deals with matters such as political or social matters on which people have definite emotional feelings. The inclusion of the latter kind of content is motivated by the indication that critical thinking is affected by emotions (Watson and Glaser 2002, 2.2). The time for administering the test is 60 minutes: 50 minutes for completion by the respondents and 10 minutes for dealing with administrative matters. To enable researchers to draw valid inferences on their respondents’ test results, Watson and Glaser (2002, 4.3) suggest that an appropriate predetermined norm group should be identified. Although an identified norm group should closely resemble the profile of the respondent group, the developers of the instrument mention that caution should be exercised when interpreting the test scores of the respondents in comparison with those of the norm group.

Results of the second study

Because the WGCTA-UK was not previously administered in the South African context, two pre-existing norm groups, which, in the opinion of the researcher resembled the sample’s profile, were identified. From the list of norm groups provided by the developers of the WGCTA, it was assumed that the South African research sample, although coming from a different context, could fit somewhere between these two groups. The first norm group was that of American pre-service student teachers and the second consisted of American grade 12 learners.

After administering the WGCTA-UK to the research sample, the test yielded the following overall results, which also reflect the comparison with the identified norm groups (see Table 4). The disturbing revelation when comparing the results of the South African respondents with those of the two identified norm groups is evident.
Table 4: WGCTA-UK results in comparison with two norm groups

<table>
<thead>
<tr>
<th></th>
<th>Raw score</th>
<th>T-score</th>
<th>Mean</th>
<th>Mean: Norm 1*</th>
<th>Mean: Norm 2*</th>
</tr>
</thead>
<tbody>
<tr>
<td>117</td>
<td>5255</td>
<td>4004</td>
<td>34.2</td>
<td>45.7</td>
<td>39.5</td>
</tr>
</tbody>
</table>

* Norm group 1: American pre-service student teachers; norm group 2: American grade 12 learners

From the raw scores obtained in the five subtests, the research sample’s results are represented on the graph in Figure 1 below.

Figure 1: Raw scores obtained in the WGCTA-UK subtests

As the raw scores of the subtests indicated close relationships between the five sets of results, the significance of the differences between the subtests results were determined (see Table 5).

Table 5: Significance of differences between the five WGCTA-UK subtests

<table>
<thead>
<tr>
<th></th>
<th>Test 1</th>
<th>Test 2</th>
<th>Test 3</th>
<th>Test 4</th>
<th>Test 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>771</td>
<td>1102</td>
<td>997</td>
<td>1029</td>
<td>1134</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>2.2635</td>
<td>2.6595</td>
<td>1.8504</td>
<td>2.094897</td>
<td>2.94039</td>
</tr>
<tr>
<td>Test 1 T-value</td>
<td></td>
<td>8.7623 E-14</td>
<td>7.1466 E-11</td>
<td>7.7337789 E-12</td>
<td>9.04396 E-15</td>
</tr>
<tr>
<td>Test 1 P-value</td>
<td></td>
<td>2E-14</td>
<td>8E-11</td>
<td>4.19E-12</td>
<td>4.1E-15</td>
</tr>
<tr>
<td>Test 2 T-value</td>
<td>8.7623 E-14</td>
<td></td>
<td>2.9961 E-14</td>
<td>1.593452</td>
<td>0.74618</td>
</tr>
<tr>
<td>Test 2 P-value</td>
<td>2E-14</td>
<td></td>
<td>0.0033</td>
<td>0.048559</td>
<td>0.45707</td>
</tr>
</tbody>
</table>
The most significant difference between subtest one (Inferences) and the rest of the subtests is evident, while other significant differences are also observable between subtests two and three (Recognition of assumptions and Deduction), subtests two and four (Recognition of assumptions and Interpretation), subtests three and five (Recognition of assumptions and Evaluation of arguments) and subtests four and five (Interpretation and Evaluation of arguments).

Concluding remarks on the results obtained in both critical thinking tests

Norris (1985, 40) reminds us that systematic research suggests that most secondary school and higher education students do not perform extremely well on the kinds of tasks that are used to indicate critical thinking competence, and that adults fare no better. Nevertheless, the research results of both the mentioned studies point to reasons of concern. On the one hand it suggests that traditional teacher-centered teaching and learning methods characterize South African school classrooms. In this connection Espeland and Shanta (2001) maintain that when a teacher-centered approach enjoys preference, it may deprive learners of critical and creative thinking opportunities. On the other hand the results raise concern as to whether higher education institutions have the capacity to act as agents of change to cultivate critical thinking competence.

CRITICAL THINKING: A CHALLENGE TO HIGHER EDUCATION

In South Africa, as probably is the case elsewhere, higher education has been confronted by drastic changes in recent years. Amongst others, and attributable to a variety of reasons, a massive increase in student numbers were experienced. It therefore comes as no surprise when Kvale (2007, 67) typifies contemporary higher education as ‘mass education’. A subsidiary factor of increased student numbers is that many students find themselves ill prepared for the expectations laid down by the higher education sector. Consequently, institutions are experiencing a deceleration in their throughput rates and an increase in their dropout rates. The ramifications are increased demands for accountability of higher education institutions and
intensified pressure to improve student performance. Circumstantial factors such as the aforementioned compel lecturers to revert to predominant ‘teacher-centered’ classroom practices where content coverage rather than engaged student learning enjoys preference. The resultant effect is that classroom practices at higher education institutions are counterproductive in their efforts to nurture critical thinking and that this constructivist ideal and required 21st century demand remain nothing more than lip service. Thus, the big challenge faced by South Africa’s higher education institutions is to obtain equilibrium between the realities of large classes, time constraints and student potential on the one hand, and optimum teaching practices for nurturing critical thinking on the other hand.

**MODELLING CRITICAL THINKING THROUGH LEARNING-ORIENTED ASSESSMENT**

Like many other skills, the nurturing of critical thinking can be approached from multiple perspectives. The fact of the matter, however, remains: if higher education institutions are taking the nurturing of students’ critical thinking abilities seriously, collective intra-institutional interventions are necessary. Collaborative efforts ranging from the institutional level to the individualized classroom should be put in place to extend the learning intentions of all modules beyond the mere mastery of content by also inspiring the nurturing of critical thinking. Based on the argument that lecturers’ classroom practices serve as impetus for bringing about an inversion in students’ thinking abilities, the modelling of critical thinking through learning-oriented assessment is suggested.

**Learning-oriented assessment defined**

According to Boud and Falchikov (2006, 406) assessment and learning can be limiting concepts. Whereas assessment connotes a job for lecturers, learning connotes a job for students. Such viewpoints are, according to Boud (2007, 15), the main reasons why the dominant discourse about the purpose of assessment still centers on summative assessment because it is taken for granted that students are supposed to learn and that lecturers are supposed to measure or assess the degree of learning that took place. This perception also mirrors Morris, Lo and Adamson’s (2000) assertion, as quoted by Keppel and Carless (2006, 180), that ‘assessment is the curriculum component that seems most difficult to reform’. Boud (2007, 15), in turn maintains that the dominant orientation of the summative purpose of assessment has led to the marginalization of the formative purpose of assessment. Kvale (2007, 62) is more positive about the promotion of formative assessment when he expresses the opinion that the alignment of instruction, learning and assessment has become one of the most important issues in educational innovation in recent years. Argued from a Constructivist perspective, the resonance between instruction, learning and assessment seems evident and probably served as inducement for the concept ‘constructive alignment’ used by
Biggs (2003) to describe the congruence between these three components. However, Yorke (2003) posits that the formative purpose of assessment is complex – both in its definition and practice, while Carless (2007a, 58) remark that there appears to be differing interpretations, misconceptions and doubts about the formative purpose of assessment. Endorsing the remarks of Yorke and Carless, Pryor and Torrance (1996) identified two approaches to formative assessment, which arise from different views held by teachers about learning and the role of assessment to support learning. These approaches view formative assessment from a convergent perspective and from a divergent perspective. The first is mainly to ascertain whether the learner knows predetermined content, while the latter emphasizes learner understanding. Related to these approaches, Bell and Cowie (2001) differentiate between planned and interactive formative assessment. Whereas planned formative assessment involves formal structured assessment tasks, interactive formative assessment is seen as informal and ad hoc. Added to the differences in interpretations and practices of formative assessment, it is also subjected to practical impediments such as time constraints, large classes, extra work for both students and lecturers, mostly deferred (if any) feedback and obsessiveness with the accumulation of marks. Hence, it can be concluded that the formative purpose of assessment is obscured by ambivalence and its ‘classroom implementation remains an ongoing challenge’ (Carless 2007b, 171).

From a learning focused orientation several attempts have been made to reconfigure the congruence between instruction, learning and assessment in clarifying the purpose of formative assessment. In this instance Torrance and Pryor (1998, 10) state that formative assessment ‘is a construct, a name given to what should more accurately be characterized as a social interaction (my italics) between teacher and pupil’. Referring to Vygotsky’s zone of proximal development, Sheppard (2005, 66) equates formative assessment with ‘scaffolding’ by arguing that both are strategies to move learning forward (my italics). In demystifying the purpose of formative assessment (though not excluding the applicability to the summative purpose of assessment) further, the resemblances between Bell and Cowie’s (2001) distinction (planned and interactive formative assessment) and Carless’ (2007b, 174) reference to planned or formal and interactive or informal formative assessment are conspicuous. However, from a learning oriented perspective the latter distinction serves to highlight the learning function of formative assessment more powerfully (Keppel and Carless 2006; Carless 2007a) and resulted in the construct ‘learning-oriented assessment’ (LOA). In LOA, according to Carless (2007a, 58), ‘learning comes first, both in the way the term is literally constructed and as a matter of principle of emphasizing the learning aspects of assessment’. Embedded in instruction and assessment, the learning element of LOA is much more important than the measurement function. Furthermore, Carless (2007a, 59–60) maintains that the notion of LOA is underpinned by three elements.
• Designing assessment tasks to promote learning and stimulate learning dispositions.
• Stimulating learner involvement by means of assessment tasks.
• Supporting current and future learning through prompt feedback.

By considering the preceding information and in an attempt to conceptualize LOA in the context of this article, LOA can be described as a synergy between instruction, learning, assessment and feedback during classroom interaction, which consciously intends to engage learners in supporting and stimulating their critical thinking competence. Essentially, LOA lies within the Socratic paradigm and purports ‘what good teachers do’ (Gardner 2006 in Carless 2007, 172).

**Critical thinking and LOA: implications for classroom practice**

It was stated earlier in this article that lecturers’ classroom practices are instrumental in changing students’ thinking patterns. It can therefore be assumed that in modifying their classroom practices in terms of LOA, lecturers’ contribution to enable their students to think critically will extend progressively beyond the classroom to empower them to become independent critical thinkers. To this effect, Boud (2007, 17/18) refers to the ‘sustainable purpose of assessment’. However, to realize this ideal, it is suggested to justify LOA in terms of Bandura’s social cognitive theory (Hill, 2002) and the notion of cognitive apprenticeship (Collins, Brown and Holum 1991). In the context of this article the latter implies that students are able to observe and engage in critical thinking by means of LOA.

To support the successful modelling of critical thinking through LOA, the following classroom practices are imperative:

• Implementing critical thinking through LOA should become a natural part of classroom interaction.
• Lecturers should realize that the nurturing of critical thinking is a progressive journey rather than an instant event. Consequently, planning and presentation in terms of time and student numbers should be considered.
• Lecturers’ role as mediator should be refined to include mediation between students and knowledge, mediation between knowledge and critical thinking skills and mediation between students and critical thinking skills.
• Lecturers should not only have an excellent command of the declarative knowledge in the field of specialization, but should also be able to translate this into conceptual, conditional and procedural knowledge to enable critical thinking.
• Lecturers should be competent in evaluative skills to make instant judgments about student answers and to provide constructive feedback in an interactive manner.
• Lecturers need to make critical thinking explicit to project its meaning and benefits – not only through the curriculum, but also through their daily teaching practices.

• Lecturers should take note of the epistemology on which critical thinking is founded as well as their personal beliefs about the phenomenon within the context of global trends.

• Lecturers should reflect on the appropriateness of their teaching practices in promoting critical thinking.

• To ensure the sustainability of critical thinking, exposure should not be limited to LOA but should be extended to include other forms of assessment as well.

CONCLUSION

Teays’ (1996, 1) remark that critical thinking ‘occurs within a particular space and time, with real people doing that which we want to call “critical thinking”’ implies that its nurturing should be seen as social interactive process. Although not as yet scientifically proven, this article suggests that by adapting classroom practices through modelling and by deliberately engaging students in higher-order thinking, LOA has the potential to develop students’ critical thinking competence.

REFERENCES


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