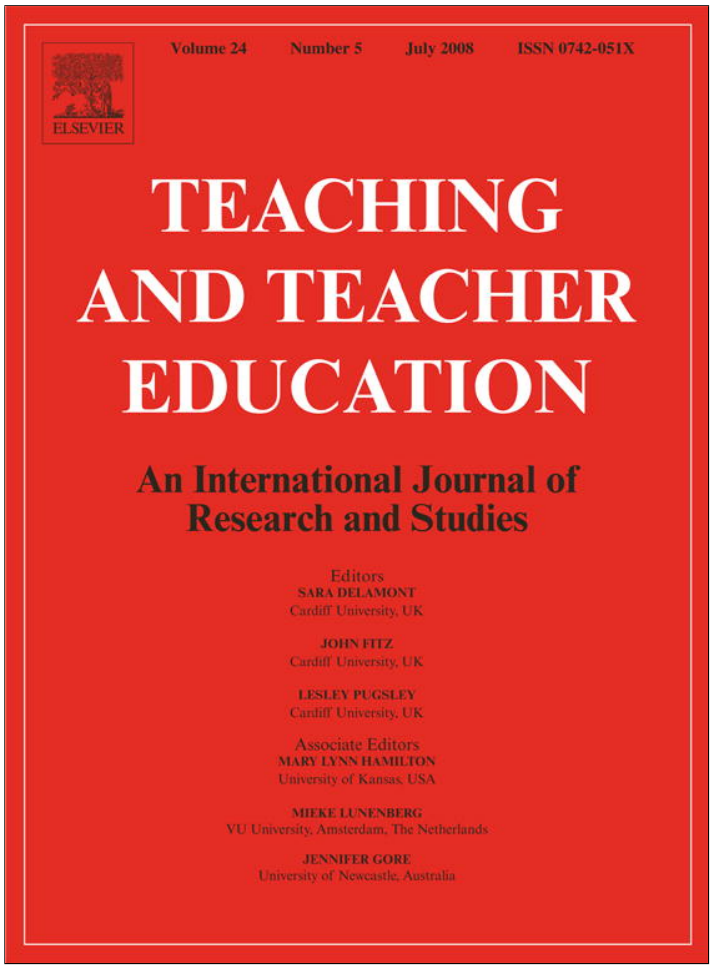

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The relationship between culture and the development of critical thinking abilities of prospective teachers

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Abstract

The emphasis placed on the individualistic and universal nature of cognitive development in some cognitive development models has resulted in the neglect of the cultural context in the development of cognitive abilities. Consequences of this approach for cognitive development are the strong emphasis which is placed on age-dependent patterns of growth and uniformity. Furthermore, the occurrence of changes in the relationship between an individual and the surrounding environment as crucial for the development of cognitive abilities are neglected. In this paper, a cultural approach to the development of critical thinking abilities is proposed in contrast to the traditional, individualistic approach.

The linked purposes of this paper are:

- to elucidate the critical thinking abilities of a mixed cultural group of 114 prospective first-year student teachers studying for a BEd degree at a South African university by means of the Watson–Glaser Critical Thinking Appraisal; and
- to provide insight into the relationship between the critical thinking abilities of the group of prospective teachers and their various cultures.

The study found that (1) a considerable number of the sample of prospective teachers are not yet functioning on Grade 12 level with regard to the execution of critical thinking skills. The sample's apparent inability to execute critical thinking skills is clear from this research and (2) it seems as if the various cultural worlds of these prospective teachers have not prepared them for the execution of critical thinking abilities.

Keywords: Critical thinking; Prospective teachers; Culture; Ubuntu

1. Orientation

One of the challenges of education transformation in South Africa is to ensure that South Africans have the knowledge, values, skills, creativity and critical thinking required to build democracy, establish a system of lifelong learning and promote

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social development and growth in the 21st century (Odora Hoppers, 2001, p. 1). To fulfil the need for this kind of transformation in education in South Africa, the National Department of Education has identified Critical Outcomes that would assist learners in achieving the above-mentioned ideals (South African Qualifications Authority, 1997, p. 7). One prominent element that emanates from the Critical Outcomes is an emphasis on the development of critical thinking skills and the notion that learners should no longer be treated "…as empty vessels that have to be filled with knowledge…" (SA, 1997, p. 30). This implies that educators have to base their teaching on constructivist principles that will provide learners with the opportunity to develop as thinkers (Green, 2006, pp. 310–327; Pienaar, 1999, p. 125; van den Berg, 2000, p. 96).

In addition to the above, the emphasis placed on the individualistic and universal nature of cognitive development in some cognitive development models has resulted in the neglect of cultural context in the development of cognitive abilities (Hong, Morris, Chiu, & Martinez, 2000, p. 709). Consequently, age-dependent patterns of growth and uniformity are of particular importance in these models. Furthermore, the occurrence of changes in the relationship between individuals and their surrounding environment as crucial for the development of cognitive abilities, are also neglected.

2. Problem statement

The development of critical thinking skills is regarded as a prominent outcome on the South African education agenda, but it also gives rise to a range of concerns. The central questions which this article wishes to address are:

- Are prospective teachers from a mixed cultural group able and empowered to think critically in order to initiate the cultivation of critical thinking skills among learners?
- Is there any relationship between culture and the development of critical thinking abilities of a mixed cultural group of prospective teachers?

3. Critical thinking defined

Thinking critically is a defense against a world of too much information and too many people trying to convince us (Epstein, 2006, p. 1). It is also widely accepted that the development of critical thinking skills is a top goal of higher education (Browne & Keeley-Vasudeva, 1992). Despite efforts to transform South African education into a dynamic instrument capable of promoting positive learning outcomes, the current national education policies' focus on the enhancement of critical thinking skills is vague and needs further elaboration.

There is no uniform, clear-cut and concise definition of critical thinking, and an overwhelming number of definitions can be found in the literature. Dewey's (1933, p. 12) definition of "reflective thinking" is one of the forerunners of what has come to be known as critical thinking: "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."

Richard Paul, one of the leaders in the field, views critical thinking as "learning how to ask and answer questions of analysis, synthesis and evaluation (Paul, 1985, p. 37), and "the ability to reach sound conclusions based on observations and information" (Paul, 1988, p. 50). Brookfield (1987, p. 229) asserts that critical thinking comprises two interrelated processes: "…identifying and challenging assumptions, and imagining and exploring others." Beyer (1988, p. 61) states that critical thinking "involves precise, persistent and objective analysis of any claim, source, and belief" and "to judge its accuracy, validity or worth." According to Chaffee (1992, p. 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, p. 1) and Paul (1993, p. 22) share the definition that critical thinking involves the ability to "analyze, criticize, advocate ideas, reason inductively and deductively, and to reach factual or judgmental conclusions based on sound inferences."

Pithers and Soden (2000, p. 239) concur 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.

As the researchers applied the Watson–Glaser Critical Thinking Appraisal (2002a) for determining the critical thinking abilities of the prospective teachers who took part in the research, the definition formulated by the authors of the instrument forms the focus of this research. Watson and Glaser (2002b, p. 2.1, 2.3) distinguish between the following abilities:

- inferences drawn from factual statements,
- recognition of assumptions in a series of statements,
- interpreting whether conclusions are warranted or not,
- determine if conclusions follow from information in given statements,
- evaluating arguments as being strong and relevant or weak and irrelevant.

Epstein (2006, p. 1) supports this view by stating that critical thinking involves evaluation, namely to be convinced that some claim is true or some argument is good, as well as being able to formulate good arguments.

According to Drewett (1995, p. 72), it is clear that critical thinking is a holistic activity which incorporates both theory of arguments and the context in which those arguments occur. Against the transformed South African education background, this is the type of thinking expected of prospective teachers. They should be capable of identifying arguments, draw conclusions within arguments, draw conclusions about arguments and construct their own arguments.

4. The impact of culture on critical thinking abilities

4.1. Culture and cognition

Research reveals two prominent views regarding the relationship between culture and cognition. The first view centres on culture as a latent variable. As a latent variable, members of a culture will share a limited number of consistent elements such as beliefs, attitudes and strategies and exclude any inconsistent elements (DiMaggio, 1997, p. 267). Individuals will rely on automatic cognition, which implies a heavy and uncritical reliance upon culturally available schemata (knowledge and information processing mechanisms) (DiMaggio, 1997, p. 269). The second view favours a representation of culture as a "toolkit of strategies" (Swidler in DiMaggio, 1997, p. 267). If culture is viewed as a toolkit of strategies, one might expect less clustering of cultural elements within social groups, less strong linkages among the elements, and weaker pressures for the exclusion of inconsistent elements (DiMaggio, 1997, p. 267). According to this viewpoint individuals will, when sufficiently motivated, when dissatisfied with the status quo of an issue or when existing schemata fail to account adequately for new stimuli, over-ride programmed modes of thought to think critically and reflexively (DiMaggio, 1997, p. 272).

According to the above, the cultural environment in which a learner grows up, will be a major factor contributing to the development of critical thinking abilities. According to Ayisi (1992, p. 1) culture is "…that complex whole which includes knowledge, belief, art, law, morals, cultural tools, customs, and all other capabilities and habits acquired by man as a member of society." The role of social experience in cognitive development and growth considers in its direct form people interacting with and supporting one another (Gauvain, 2001b, p. 127). In other words, how parents, teachers, other adults, siblings and peers influence children's cognitive development (Gauvain, 2001a, p. x). In its indirect form the role of social experience considers the tools, symbols and values that influence human action (Gauvain, 2001b, p. 127). Cultures have developed many types of tools to support the daily activities of people—labour saving devices, sign and symbol systems, street signs, price tags, product labels, recipes, patterns for dress making etcetera. Gradually, these tools become part of children's own actions. These tools not only enhance human thinking but also transform it (Gauvain, 2001b, p. 127).

In some cognitive developmental models, e.g. the Piagetian approach, notions of chronological development of the child neglect the impact of social and environmental factors on cognitive development. However, Piaget's assimilation-accommodation model provides a valuable conception of how cognitive systems might interact with their external environment (Flavell, 1977, p. 6). It creates a mental construction of reality in the course of numerous experiences with its milieu, rather than simply making a mental copy of what is experienced. The cognitive system simultaneously adapts reality to its

own structure (assimilation) and adapts itself to the structure of the environment (accommodation) (Flavell, 1977, p. 10).

Perspectives that only concentrate on internal processes of cognitive development (growth and age related factors) and ignore external processes (cultural environment) and the interaction of the two, cannot give a complete account of the emergence of human intellect (Gauvain, 2001a, p. xiv). To understand cognitive development across time it needs to be viewed wider than just determined by biological and maturational capabilities. It must be seen deeply embedded in a social and cultural world of occasions, formalities, etiquettes and dramaturgy (Gauvain, 2001a, p. 17).

For Vygotsky (1986) cultural development is the principal driving force of all development. All things cultural are social, and all higher functions evolve socially (Vygotsky, 1986, p. 58). Most basic is the fact that man not only develops, he also constructs himself. Man is a social person, an aggregate of social relations, embodied in an individual and higher mental functions are created in the collective (Vygotsky, 1986, p. 65, 68). At the heart of Vygotsky's theory lies the understanding of human cognition and learning as a social and cultural phenomenon rather than an individual phenomenon (Kozulin, Gindis, Ageyev, & Miller, 2004, p. 1). Development of a child's higher mental processes depends on the presence of mediating agents in the child's interaction with the environment (Kozulin et al., 2004, p. 17). Vygotsky coined the expression "Zone of Proximal Development" which presupposes an interaction on a task between a more competent person and a less competent person, such that the less competent person becomes independently proficient at what was initially a jointly accomplished task (Chaiklin, 2004, p. 41).

How does the cultural world organize and direct cognitive growth? Humans have the largest period of physical dependency by the young on mature members than any species on the planet. This provides protection, warmth, food, the extensive process of social, emotional and intellectual learning that prepares the child for mature participation in society (Gauvain, 2001a, p. 6). Children develop thinking abilities while in the company of other people, especially people important to them (Gauvain, 2001a, p. 7). They are guided in this endeavour by the resources and tools of their community which represents the child's social and cultural world. According to Gauvain (2001a, pp. 11–19) the efforts of parents and others to support, organize and direct cognitive growth can be done by:

- Intentional and goal-directed efforts. This can include informal household chores, skills training through art and music, reading and writing.
- Regulating child participation in activities in which learning occurs.
- Determining the pattern and frequency of routine activities that provide mediation, support and direction for emerging cognitive skills.
- Emphasizing the activities that encourage the learning of valued cultural practices.
- Imparting strategies as early as possible as this has an impact on how well the strategy develops later in life.
- Modelling strategic behaviours.

According to Nisbett, Peng, Choi, and Norenzayan (2001, p. 291) and Nisbett and Norenzayan (2002, p. 3) the cultural differences that exist among different cultures affect not only their beliefs about specific aspects of the world but also impacts on the nature of their cognitive processes. Cognitive processes emerge from practical activity that is culturally constrained and historically developing (Nisbett & Norenzayan, 2002, p. 10). In addition to this, Nisbett et al. (2001, p. 293) are of the opinion that individuals raised in a society focusing on personal freedom, choice, criticism, debate, curiosity and diversity will be characterized by analytic thought (for example, the Western culture). Cultural variation in cognition emerges as a result of the different historical development of societies, leading to different social activities and tools, which lead to different thought processes that are congruent with the particular historical trajectories of societies (Nisbett & Norenzayan, 2002, p. 11). Societies differ in the cultural practices that they promote, affording differential expertise in the use of a cognitive strategy, or differential knowledge about a domain. The result is that a given cognitive process may be equally available in principle, but differentially accessible in different cultures (Nisbett & Norenzayan, 2002, p. 28). This implies that people may habitually rely on qualitatively different cognitive strategies to solve the same problems of everyday life. Different levels of knowledge about a domain may also lead to the use of different cognitive strategies to solve the same problem.

The actual possession of particular cognitive processes may differ across cultures in that different cultures may invent composite cognitive structures out of universal ones, thus performing cognitive engineering as suggested by Dennet (in Nisbett & Norenzayan, 2002, p. 338).

4.2. Culture and cognition: the South African scenario

The above mentioned clearly highlights the link between culture and cognition. In the context of the article, the research participants are representative of both the Western and African cultures. A literature study regarding the impact of these two cultures on cognitive processes revealed distinct differences.

According to Statistics South Africa (2001), the people of South Africa are made up of many diverse cultures. 75% of the population is made up of the population of black African cultures such as the Xhosa, Zulu, Ndebele, Venda, Sotho and Tswana. In Gauteng (the province in which the research was conducted) the majority of people speak Zulu, followed by Afrikaans, Sesotho, English, Sepedi, Tswana and Xhosa. Although the level of urbanization in Gauteng is 97%, and political, economic and social changes are at the order of the day, many of the African people have remained and still enjoy the traditional African culture/lifestyle in which the philosophy of "ubuntu" is emphasized (Thorpe, 1996, p. 32). Ubuntu is a literal translation for collective personhood and collective morality. It is best expressed by the Xhosa proverb, "umuntu ngumuntu ngabantu" (I am because we are) (Mbigi, 1997, p. 2). We have to encounter the *collective we*, before we encounter the *collective I*. I am only a person through others. Ubuntu plays a significant role in building harmony and reconciliation. It focuses on collective solidarity and not individual self-sufficiency (Mbigi 1997, p. 3). Ubuntu philosophy holds that all people should be treated with respect and dignity, because a person becomes a person through other people. The good of the community is held to be greater than the good of the individual because in the long-term, the one ensures the other. The thrust is on caring, protection and imparting positive values that would make children positive, contributing citizens in society. Some of the relevant Ubuntu principles for teaching and cognitive development are: unconditional collective contribution, unconditional collective solidarity, unconditional collective acceptance, consensus and the totality principle (Mbigi, 1997, p. 11). A sense of collective agency governs the thinking of the African culture (Ayisi, 1992, p. 16). Individuals are part of a closely knit collectivity in which prescriptive role relations in a hierarchical system is a guide to ethical conduct (Nisbett et al., 2001, p. 293). The former South African president, Nelson Mandela, bears testimony to this when indicating in his memoirs that as a child he was expected to "learn through imitation", not by questioning but by observing and following the practices of older peers and adults in the community (Rothstein, 2000).

African traditional education prepared people for life—spiritual, social, economic and political development. Young people were taught collective social, economic, spiritual and political stewardship. They were taught to seek collective interdependence and not individual independence in these spheres of life (Mbigi, 1997, p. 137). The mind-set currently created by modern schools is something alien. People are taught to create their own jobs and own employment. Schools seek to develop skills required by the global economy and do not focus on shared accountability and shared agenda (Mbigi, 1997, p. 139).

A further derivative from Ubuntu, according to Mbigi and Maree (1995, p. 97), is the Afrocentric view. The hallmark of the Afrocentric philosophy is about being a good community member. It is also about living and enjoying life rather that the acquisition of the material comforts in life. It is about accepting one's destiny rather than an obsession to control it. It is not about controlling results, but about expecting and living with the outcome (Mbigi & Maree, 1995, p. 97).

The term *Western culture* is usually associated with the cultural tradition that traces its origins to Greek and Roman thought and Christian religion. It also refers to the culture of Western Europe and North-America (Anon., 2006). Cognitive activities in this culture imply that objects are detached from their context, there is a focus on the attributes of an object to assign it to categories, a preference for using rules about the categories to explain and predict the object's behaviour, making inferences that involve the de-contextualizing of structure from content and the use of formal logic and avoidance of contradiction.

On the other hand, individuals raised in a society focusing on holistic, collective thought and social

obligation (as in the African culture) will focus on paying attention to relationships, and rely on experience based knowledge rather that abstract logic, reconciling, transcending or even accepting contradictions. It reflects similarity and contiguity. Furthermore, there is avoidance as means of dealing with conflict and an absence of participation in discussions and an absence of meeting the requirements of rhetoric, for example, the statement of principles and assumptions, derivations, hypotheses, evidence, argumentation, conclusion, making judgments and spotting contradictions (Nisbett et al., 2001, p. 293). The latter scenario, representative of the second largest cultural group of students who took part in this research (see Table 1), clearly indicates that the cognitive actions of pre-service teachers coming from a culture that focuses on collective thought will lack an absence of critical thinking abilities.

Important aspects of relevance to the South African context for cognitive development are the concepts of "frame switching" and "dynamic cultural approach" (DiMaggio, 1997, p. 280; Hong et al., 2000, p. 710) Frame switching refers to the internalization of two cultures. In the context of the study this refers to some of the student's internalized home culture (African culture) and the school culture (Western culture). Internalized cultures are not necessarily blended, and absorbing a second culture does not always involve replacing the original culture. This implies that particular cognitive processes become operative in particular interpretive tasks and in guiding an individual's construction of meaning (Hong et al., 2000, p. 710, 718). What is of importance in a dynamic cultural approach is that the cognitive processes linked to a particular culture are not internalized in the form or an integrated and highly general structure such as an overall mentality, worldview or value orientation. Rather, culture is internalized in the form of a loose network of a domain-specific knowledge structure, such as categories and implicit theories. An individual can acquire more than one such cultural meaning system, even if these systems contain conflicting theories. The conflicting or contradictory constructs can be simultaneously possessed by an individual; they simply cannot simultaneously guide cognition (Hong et al., 2000). According to the above argumentation, it is possible to equip students with critical thinking processes, even though these processes might not be operative in their internalized culture.

Table 1
Cultural groupings of students

Culture	*N*	%
African	46	40.4
Western	68	59.6
Total	114	100

5. Aims of the study

This study aims, by means of an exploratory research to elucidate the critical thinking abilities of a mixed cultural group of prospective teachers, and to provide insight into the relationship between the critical thinking abilities of the group of prospective teachers and their various cultural environments.

5.1. Method of research

A preliminary exploratory study, quantitative in nature, was undertaken to gain practical knowledge of and insight into the research area of critical thinking.

5.1.1. Population and sample

The research was conducted at the North-West University: Vaal Triangle Campus where 420 prospective teachers were enrolled during 2006 to complete the 4 year BEd degree. A sample of 114 first-year students was purposively selected to participate in the research. The students represent different cultural groupings (see Table 1). The students representing the African culture are Black students who are predominantly Sesotho speaking. The Western culture is represented by White Afrikaans and English speaking students.

5.1.2. Data collection instrument

There are no comprehensive and standardized tests available in South Africa for measuring critical thinking abilities. It was therefore decided to use the Watson–Glaser Critical Thinking Appraisal (UK version) (Watson & Glaser, 2002a) as it measures practically all aspects of critical thinking.

Validity was arrived at by considering the following aspects:

Face validity: the thinking appraisal contains relevant content which falls in the scope of rapport. The operations and processes required in the five sub-tests represent abilities that are valued and

readily appreciated as relevant to critical thinking (Watson & Glaser, 2002b, p. 9.2).

Content validity: the content validity is supported by the fact that the specific test items were constructed strictly according to the definition of each section (deduction, inferences, etc.). The test measures the capabilities and objectives that underpin the academic instructional programme of the students involved in the study (Watson & Glaser, 2002b, p. 9.5).

Construct validity: the construct validity is underpinned by the fact that although the test focuses on different sections (inferences, assumptions, deduction, etc.), they all deal with the domain of critical thinking skills. When compared to the literature review regarding what critical thinking constitutes and another critical thinking test, namely the Cornell Critical Thinking Test—Level Z (Ennis & Millman, 1985), there is a high degree of correspondence between what the literature reveals and the different sections of the two tests. It thus appears as if the Watson–Glaser Critical Thinking Appraisal is a good measure of the theoretical construct "critical thinking".

Criterion validity: the test has already been used to predict a variety of criteria such as course grades, degree attainment and academic performance (Watson & Glaser, 2002b, p. 9.6).

Earlier research done with the Watson–Glaser Critical Thinking Appraisal involved determining the reliability of the test. Independent administrations under comparable conditions of the test were done with several groups of students. Results indicated a Cronbach Alpha coefficient of 0.81. A reliability coefficient of 0.80 or higher is acceptable in most Social Sciences application (Statistical Consulting Services, 2005). The data collection instrument thus complied with reliability criteria.

The Watson–Glaser Critical Thinking Appraisal spans more than 50 years of development and refinement. The nature and the content are such that it can be regarded as not constructed exclusively for conditions and students in the United Kingdom. The content of the test focuses on culturally neutral and familiar topics. In short, the focus is on topics that would elucidate strong feelings or prejudices (Watson & Glaser, 2002b, p. 2.2). Other items from newspapers and magazines which are political, economical and social in nature are also included with the purpose to focus on definite feelings or prejudices. The appraisal includes 80 multiple-choice items, which must be completed in a time limit of 50 min. The instrument is designed to determine critical thinking abilities by using "general scenarios". It is thus not subject related. The test items focus on the following aspects of critical thinking:

- Drawing inferences from factual statements.
- Recognition of assumptions in a series of assertive statements.
- Making deductions: To determine if conclusions follow from information in given statements.
- Interpreting and weighing evidence to decide if conclusions are warranted or not.
- Evaluating arguments as being strong and relevant or weak and irrelevant.

5.1.3. Limitations

The following limitations were identified for the data collection instrument.

- There is no local norm group to compare the test results against. Only norm groups in the United Kingdom and the United States of America were available.
- For students whose home language is not English, the test might pose a restriction regarding comprehension.
- The test instrument is based on deductive and inferential logic which are not compatible with the Ubuntu doctrine.

The researchers, however, agreed that the degree of foreignness to the South African circumstances could be regarded as minimal. As all the students involved in the research completed their schooling in English and are expected to do their training and future teaching in English, it was decided to use the English (standard English) version of the appraisal. The compulsory language proficiency test taken by students on admission to the University also revealed that the students were capable of continuing their studies in English. The cognitive processes needed for the completion of the test, although foreign to the culture of some of the students, are however expected in the execution of academic tasks at the University.

5.1.4. Pilot study

Before the appraisal was administered to the sample, a pilot study was conducted with a randomly selected number of respondents from the target population, namely a group of second-year

BEd pre-service teachers (40 students), regarding its qualities of measurement, appropriateness and to review it for clarity. The group did not experience any difficulties in understanding what the questions requested them to do. According to the authors' discretion, the instrument complied with reliability and validity criteria.

5.1.5. Data analysis and interpretation

The Watson–Glaser Critical Thinking Appraisal was administered and scored according to the guidelines set out in the manual. Raw scores were obtained and converted to *t*-scores, percentiles, stanine and sten scores by means of transformation tables in the manual. A correction for guessing was also applied.

Descriptive in nature, the following results were noted with regard to the total sample's critical thinking abilities as measured on the Watson–Glaser Critical Thinking Appraisal (Table 2).

The above table indicates that the students representative of the Western culture performed significantly better in the appraisal on the 0.05 as well as the 0.01 level than the students representative of the African culture. It appears as if the literature review holds truth through the indication given by the responses to the appraisal that cognitive processes in the Western culture tend to focus on the utilization of critical thinking abilities, in contrast to the African culture where there is an absence of utilizing cognitive processes in which critical thinking plays an important role.

As no South African norm group exists to compare the test results against, two norm groups with whom the raw scores of the test results have been standardized, were chosen from the appraisal manual, namely a group of pre-service teachers in the United States of America and a group of Grade 12 students in the United States of America (see Table 3). The researchers were of the opinion that these two groups reflect the characteristics of the research participants, and that their circumstances relate to those of the research participants (they are also pre-service teachers who have just completed Grade 12). Taking the age of the South African sample of first-year students into consideration, it was assumed that the South African group could fit somewhere between these two groups.

Comparisons with both of the selected norm groups respectively yielded lower results for the South African groups (see Table 3). It appears as if the South African group of pre-service teachers is not yet functioning even on Grade 12 level regarding their execution of critical thinking abilities. Both cultural groups also fall below the *t*-score mean of both norm groups. When compared to the norm groups it becomes clear that the students representative of the Western culture are also not able to execute critical thinking skills. This contrasts sharply with the results in Table 2 where it appeared as if the students of the Western culture were more capable of executing critical thinking skills than the students representative of the African culture.

When comparing the significance of the differences between the *t*-score means of the African and Western cultural groups and the *t*-score means of the norm groups it is apparent that the results of the norm groups are significantly better on the 0.05 and 0.01 levels. Only in one instance, namely the comparison between the Western culture and norm,

Table 2
t-Score totals and means

t-score total: African culture: $N = 46$	*t*-score total: Western culture: $N = 68$
1370	2560
t-score mean: African culture	*t*-score mean: Western culture
29.7	37.64
Difference between means	
7.94	
t-value for the difference between means	
t-value = 5.090 exceeds criterion for $p < 0.05 = 1.981$ and $p < 0.01 = 2.620$[a]	

[a]In favour of the Western culture.

Table 3
Comparison of *t*-scores of cultural groups with norm groups

Norm group 1 (US): Pre-service teachers ($N = 105$)		
Norm group 2 (US): Grade 12 ($N = 1636$)		
Norm group 1—mean *t*-score	45.7	
Norm group 2—mean *t*-score	39.5	
South African group: Pre-service teachers ($N = 114$)		
Group—mean *t*-score	34.2	
African culture—mean *t*-score	29.7	
Western culture—mean *t*-score	37.6	
Differences between mean *t*-scores	Norm group 1	Norm group 2
SA group—mean *t*-score	+11.5	+5.3
African culture—mean *t*-score	+16	+9.8
Western culture—mean *t*-score	+8.1	+1.9

+difference in favour of the norm groups.

Table 4
Significance of differences between cultural groups and norm groups

		African	Western
t-value	Norm group 1	10.787 (>0.05, 0.01)[a]	5.880 (>0.05, 0.01)[a]
p-value	(Pre-service teachers)	4.589	4.692
t-value	Norm group 2	9.999 (>0.05, 0.01)[a]	2.330 (>0.05)[a]
p-value	(Grade 12)	5.202	0.024

[a]Significance in favour of the norm group.

group 2 significance was only determined on the 0.05 level (see Table 4).

6. Conclusions

Although the indicated limitations imply that the test results obtained should be interpreted with caution, the apparent inability of prospective teachers to execute critical thinking skills is clear from this research. From the total group of students who took part in the research only 10 students equalled or excelled above the norm for norm group one, namely 45.7 (pre-service teachers). Seventeen students equalled or excelled above the norm for norm group two, namely 39.5 (Grade 12). It appears as if a considerable number of first-year prospective teachers are not yet functioning on Grade 12 level with regard to the execution of critical thinking skills.

Although the South African students performed significantly lower that the two norm groups, it is the significant difference between the test results of the group of students representative of the Western culture and those representative of the African culture that needs specific attention. It is apparent that the focus in South African classrooms is still on teacher-centered approaches with very little opportunity for creative and critical thinking and that learning is not measured in terms of learners' competence as thinkers, but rather in terms of their competence as reproducers of facts.

Although this research was only exploratory in nature, the results provide a gloomy picture. It is clear that this group of prospective teachers experience problems in executing critical thinking skills as measured by the Watson–Glaser Critical Thinking Appraisal. It is argued that their cultural environments have not prepared them for the execution of critical thinking abilities. It seems as if the cultural worlds of the students do not organize and direct cognitive growth. In short, both cultural worlds indicate a lack of people interacting and supporting one another. It is only when cognitive growth is supported by intentional and directed mediated and modelled efforts to direct and develop cognitive skills through parents and teachers, that cognitive growth is not stunted. Even the group of students representative of the Western culture who supposedly are raised in a society focusing on analytic thought, making inferences, criticism, curiosity and freedom of choice also have difficulties in executing critical thinking skills. It could be argued that the lack of critical thinking skills could be attributed to a lack of intentional efforts to nurture these skills. According to the Norms and Standards for Educators, Act 27 of 1996 (SA, 1996) a teacher must be able to:

- use key teaching strategies such as higher-level questioning and problem-based tasks; and
- create a learning environment which encourages the development of thinking strategies, including critical thinking, analysis, reflection, evaluation, problem solving, judging, justifying and interpretation.

Although literature reveals that critical thinking capacity can be improved through instruction and practice, the research results reveal very little evidence that the research participants had the opportunity to be taught by teachers who infused critical thinking in their daily lessons. It could be assumed that critical thinking skill, as well as an understanding of how to teach these skills, are lacking among prospective—and practicing teachers. If teachers are not effectively educated in the skills of critical thinking, it follows naturally that they will not be able to teach them to their learners.

There is also a clear indication that both groups of students rely heavily and uncritically upon culturally available schemata and that opportunities to equip students with critical thinking processes

which might not be operative in their internalized cultures, are not provided.

The literature review pointed out that the cognitive processes representative of the African culture do not focus on the acquisition of cognitive processes in which critical thinking skills such as identifying assumptions, forming hypotheses, providing evidence during argumentation, making judgments and conclusions and spotting contradictions are required. This is supported by the poor results achieved by the group of pre-service teachers representative of the African culture.

From a critical thinking perspective, this research could also imply that the particular group of respondents does not adequately meet the language requirements necessary for thinking critically. From a language point of view, it could also point at the respondents' degree of English proficiency. It is therefore necessary to standardize local raw scores obtained for the test and determine local norms against which local groups can be compared. To determine whether language is indeed an impeding factor on the critical thinking abilities, as indicated by the literature review, translations of the thinking appraisal in the mother tongue language of all the students could assist in determining this.

According to the argumentation for "frame switching" (Hong et al., 2000, p. 710) it is possible to equip students with critical thinking processes, even though these processes might not be operative in their internalized culture. This argument holds a daunting challenge for South African educators to mediate the critical thinking processes which are not operative in the internalized cultures of the students, but are required for teaching and learning. In the context of the research where both cultural groups performed poor, it could be argued that "frame switching" which focuses on intentional and directed efforts to develop cognitive skills, could provide a solution to the problem of a lack of critical thinking abilities due to internalized cultural cognitive processes.

7. Recommendations

The research indicates that the critical thinking skills of students irrespective of culture have to be nurtured. How can critical thinking skills be nurtured? The most obvious place where critical thinking can be cultivated is the class room. One of the prerequisite conditions is, however, that teachers, who are themselves empowered to think critically, are required to initiate this cultivation process. Alternative ways for nurturing critical thinking skills among prospective teachers should be explored. In this regard, it is worth mentioning some possibilities. Those in favour of a *process approach* argue for the teaching of critical thinking as a separate discipline which can be done by means of special developed programmes (Feuerstein, 1980; Lipman, 1985). Another approach, the *infusion approach*, views the teaching of critical thinking as an integral part of subject content. According to this view, the teaching of critical thinking skills should not be separated from subject content (McPeck, 1990, p. 34). In relation to this, Ennis (1990, p. 13) argues that thorough subject knowledge is required before one can exercise critical thinking in a specific subject. The *holistic approach* argues that the teaching of critical thinking should feature throughout the teaching and learning process (Sadler & Whimbey, 1985, pp. 200–202). This involves the involvement of learners in the construction of knowledge, the encouragement of communication and verbalizing of thoughts, the provision of challenges to learners to apply what they have learned and the accentuation of the importance of well-considered decisions. This augers well with what the Department of Education (SA, 1997, p. 30) indicates that learners should no longer be treated as "…empty vessels who have to be filled with knowledge…"

From this research it is clear that the cultural environments impacting directly on the realization of the ideals of education transformation in South Africa. This provides the rational for the importance of accepting the challenge to develop and implement strategies for improving the critical thinking abilities of prospective teachers.

Quality education and realizing the ideal of learners being able to become competent thinkers who can identify and solve problems and make decisions by using creative and critical thinking, a qualitative improvement in the training of educators will have to take place. In this regard Mashile (2002, p. 174) also states that the need for the professional development of educators to enable them to meet the constantly evolving challenges in education cannot be overemphasized. Therefore, it is essential not only to convince educators that the teaching of thinking skills (critical thinking included) is important and that it can be done, but they also need to be equipped to become effective thinkers themselves. They should be knowledgeable on how

to teach thinking skills before they can teach learners how to become effective thinkers. It is perhaps then reasonable to presume that the development of critical thinking skills should form an integral part of the teacher education curriculum. Teacher education institutions are faced with, but should also accept the challenge as indicated by Odora Hoppers (2001, p. 1), namely to ensure that South Africans have the knowledge, values, skills, creativity and *critical thinking* required to build democracy, establish a system of lifelong learning and promote social development and economic growth in the 21st century.

However, a challenge highlighted by this research is that the success of educational reform that requires behavioural changes such as critical thinking is dependent upon the understanding and observing of the cultural heritage of students.

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