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## Developing Critical Thinking Skills Of Pre-service Teachers In Ghana: Teaching Methods And Classroom Ecology

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## [Developing Critical Thinking Skills Of Pre-service Teachers In Ghana: Teaching Methods And Classroom Ecology](#)

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### Introduction

According to Beyer (1997), the most important goal of schooling is learning and learning is a consequence of thinking. Students' success in school is heavily dependent on their inclination as well as their ability to think skillfully. Promoting critical thinking skills in learners has attracted the attention of educators but little consideration is given to how teachers should be trained to promote it in schools. Educational planners, especially in African countries including Ghana have given little thought to how teacher training institutions should prepare pre-service teachers to enhance students' critical thinking skills (Acheampong, 2001; Hill, 2000). Improving the quality of students' thinking in schools requires skillful teaching. Such a skill does not emerge without preparation. The challenge to pre-service teacher institutions in Ghana therefore, is to pursue training programs that prepare pre-service teachers to develop their students' critical thinking skills. Pre-service teachers need to be prepared to teach their students to think critically but teacher preparation in Ghana is devoid of the application of activities or strategies that develop the thinking skills of student-teachers (Ghana Education service/Teacher Education Division/Overseas Development Agency, 1993). Though there has been a plethora of studies on the negative effects of poor teaching strategies and classroom environment on students' thinking, it is essential to investigate this phenomenon in a particular context and setting to serve the local professionals. It is significant to investigate such a problem in a setting where there are lack of teachers, where there are lack of textbooks and technology, where there are large class sizes, a setting where the academically "weak" are recruited for training and in a setting where the culture of the society bestows on the teacher absolute powers in the classroom. There is therefore, the need to investigate the present state of affairs in Ghanaian teacher institutions and what can be done to promote better thinking.

### Method

The study sought to answer these questions: How do the teaching strategies employed by Ghanaian initial teacher educators and the classroom ecology they create affects the thinking skills of pre-service teachers? And what can be done to improve pre-service teachers' thinking through teaching methods and classroom ecology? The study employed a qualitative case study approach to investigate the problem at Akatakyiman Teacher Training College (a pseudonym) in Ghana. Teachers in science, mathematics and social studies and students were interviewed and observed.

### The Approach

The researcher used the case study approach so that he can make clear the complexities often associated with qualitative research and provide information on important features of the institution under study. This approach focused on direct contact with the participants in their natural setting. The use of this method facilitated the collection of a wealth of detailed information from a small sample and increased the depth of understanding of the situation. It also ensured the effective use of direct quotes and portrayed a complete picture of the setting.

#### The research site

Akatakymman Teacher Training College is one of the 38 initial pre-service teacher training institutions (now Colleges of Education) situated in the Central Region of Ghana. It is co-ed and prepares Senior Secondary School (High school) graduates for a three year teacher certificate (Diploma in Basic Education) to teach at the basic level of the educational system (Primary One to Junior High School – JHS) in Ghana. The institution occupies a unique position among the teacher training institutions because it offers all the programs individual institutions offer and admits students from all over the country. The institution has a total population of about 755 students and offers both programs A and B in teacher training (Program “A” Teacher Training College institutions train teachers to teach at the elementary school level made up of lower primary (P1-3) and upper primary (P4-6), while program “B” Teacher Training College institutions prepare teachers to teach at the upper primary (P4-6) and Junior High School (JHS). The students recruited for training have had 9 years of basic education and 3 years of Senior High School education. Akatakymman Teacher Training College is therefore, representative of initial teacher education in Ghana. This makes the institution a good choice for study to understand some characteristics of teacher training college education in Ghana.

#### Population and sample size

The researcher used purposive sampling to select participants for the study. Two groups of participants, tutors and students, were interviewed and observed. The three selected tutors from science, mathematics and social studies had taught for at least three years as teacher trainers. In addition, thirty students were also selected to form three focus groups for the interview. Each group of ten students represented a year group. Students in classes where the selected tutors taught became part of the observation process. Each teacher was observed at least six times in both content and method teaching.

#### Data Collection Strategies

The qualitative data collection strategies employed in this study included observation and interviews. The researcher used both structured and semi-structured interviews. The use of structured interviews helped the researcher to gather some background information about the participants which he used to develop guidelines for the semi-structured interview. Two separate interview guides were developed; one for the students and the other for tutors. The interviews were pre-tested in a similar teacher training institution. The interview guides centered on teaching methods/strategies employed by teachers, students’ engagement in the learning process, classroom interaction and suggestions for improving students thinking. The observation was direct as the researcher sat in all classes and audio-recorded proceedings.

#### Data Analysis and presentation

This study utilized inductive analysis and creative synthesis data analysis approach. The qualitative inductive analysis is where the researcher groups responses based on his judgment that the responses are similar. The researcher then describes this similarity conceptually and creates domains into which responses are then grouped as analysis continues. In this study, I sorted out recurring regularities, particularly in the interview and observation data into categories bearing in mind internal homogeneity and external heterogeneity. I then grouped and analyzed the data and created a profile for how teaching strategies and classroom ecology impeded pre-service teachers' thinking and what can be done to improve the situation. I presented the data using the narrative-logic approach (Chenail, 1995). The use of this approach made it easy to present the data in a narrative manner, transitioning from one exemplar to another fluently.

## Theoretical Framework

According to Beyer (1987), understanding the nature of thinking is essential to understanding the effective development of thinking skills but the term thinking has been perceived as nebulous and prone to varied interpretations (De Bono, 1991). Notwithstanding, attempts have been made to define the term. In the view of French and Rhoder (1992), thinking is cognition, planned and orchestrated skill, strategies and content knowledge to help learners come out with new products. This definition emphasizes the creative nature of thinking. Fisher (1990) from a philosophical perspective states that thinking involves critical and creative aspects of the mind, both the use of reason and the generation of ideas. In a holistic manner, thinking is any "activity that helps formulate or solve problem, make a decision, or fulfill a desire to understand; it is a searching for answers, a reaching for meaning" (Ruggiero, 1988; p.2). Better thinking which is the focus of this paper is perceived as having more reliable conclusions, deeper insights, sounder decisions, more finely crafted products, more creative intentions, and keener critical assessments (Swartz and Perkins, 1989). Thinking therefore, can be seen as a conscious mental activity or process which involves reasoning to solve a problem or make a decision.

The students we teach are good thinkers who need someone to stir them up. Fisher (1990; p. 245) quoting Barry (who was eight), said "I'm quite a good thinker. I just need someone to stir me up." Teachers play a major role in stimulating the thinking skills of learners. This depends on their skills and ingenuity. Teachers need to use various instructional approaches to enhance learners' thinking skills (Cotton, 2001). Costa (2008) suggests that teachers use higher level questions in the classroom to increase students' engagement in learning. Teachers need to use cognitive instructional approaches to teaching (Beamon, 1997) and learning tasks that are structured around problem solving and decision making (Beyer, 1987). In addition, teachers must practice thinking in their teaching and provide opportunities for students to select activities from a range of appropriate choices and ethical solutions to problems (Collins, 1993). Such activities must be engaging and meaningful. Additionally, teachers can promote thinking by creating a favorable learning environment. Harris (1998) indicates that teachers can promote thinking in learners by eradicating any negative attitudes that inhibits thinking. Teachers must create a democratic classroom environment that motivates learners to express their views without fear of intimidation (Beamon, 1997). Unfortunately, pre-service teacher trainers do not use appropriate methods that enhance the thinking skills of their learners. "Most stumble into and train in the way they were trained sometimes using their university notes of fifteen years ago" (Staurt, 1999; p. 24). Enhancing thinking skills in schools is inhibited by inappropriate teaching methods employed by

teachers and the classroom ecology they create (Beyer, 1988; Vail, 1990).

## Findings and Discussion

Improving the thinking skills of learners does not come without preparation. Instructors will have to go the extra mile for it to happen. It is a difficult task even in the hands of the experienced teacher. The strategies teachers employ and the classroom environment they create has immense impact on the enhancement of students' thinking skills in the learning process (Cotton, 2001; Beyer, 1988). The findings first addressed the methods and classroom ecology and how they affect the development of thinking in pre-service teachers and followed by what can be done to improve the situation.

### a. Teaching Methods

#### Perception of teaching

The perceptions teachers have of teaching influence the way they teach. For example, if one perceives teaching as problem-solving, the structure of the course and strategies employed will be underpinned by problem-solving assumptions. In this research, the researcher wanted to know the perception of teacher trainers and pre-service teachers of teaching so he asked, "What is teaching?" The interviewees first perceived teaching as imparting knowledge and later as guiding or helping students. The students stated:

It is imparting knowledge to younger ones to become useful in life, it is helping people acquire knowledge; teaching is identifying people's problems as far as education is concerned and find[ing] solutions, and guiding someone to know what he does not know.

The teachers also perceived teaching as imparting knowledge. The social studies teacher indicated "it is imparting knowledge, ideas, and skills to learners using suitable methods", while the mathematics teacher added, "teaching is guiding someone to know what he does not know already." These perceptions were evident in the observation process. Teachers mostly imparted knowledge using mostly lecture method rather than engaging learners in the learning process. This finding has been earlier documented by Acheampong (2001).

#### Instructional approach

To develop the thinking skills of learners, teachers should use appropriate instructional approaches. These include the use of probing questions, redirection and reinforcement, and use of higher level questions (Cotton, 2001). Teachers also need to use cognitive instruction approaches to teaching (Beamon, 1997) which include inductive and deductive teaching and scaffolding (Beyer, 1997). Strategies used in the teaching-learning process should be structured to engage students in knowledge-producing activities. The research revealed that teaching at the pre-service institution under study was information given. The lecture method was predominantly used though occasionally discussion, demonstration and role-play methods were employed. When asked the teaching strategies teachers used the students responded,

The lecture method is the main strategy used by teachers though a few go to the extent of using discussion method. Mostly, they use the lecture method because there are inadequate materials. Occasionally, they use the discussion, demonstration, and activity method but as I have said, the lecture method is what they use most.

Sometimes, teachers dictated notes to students as captured in the statement below: “since at the beginning we have no idea about the topic, they dictate notes to us.” When asked why teachers dictated notes instead of leading discussions and allowing students prepare their own notes the science teacher indicated, “... there are no textbooks so the teachers research and give the information to students.” Besides, lack of textbooks, what has driven teachers to using the lecture method was time constraint and examination. The mathematics teacher said, “we use the lecture method because of time constraints ... sometimes we have to lecture and give notes to help students.” The science teacher also added, “... yes, I think I use the lecture method especially, the first years. When they come in they have the basic knowledge and comparing the length of time for the sixteen weeks for the final paper ...” This statement indicates that teacher think students are “blank slates” who need to be fed with information. The teachers interviewed knew theoretically the best teaching approach to use to engage students but the class observation revealed contrary practices. The mathematics teacher said,

In mathematics, we have investigational approach where we pose problems to learners and come out with their views. It is an activity oriented method which increases the students’ ability to think and make learning practical.

The social studies teacher also added, “in social studies we have learner centered method .... because learners are giving much time to express their views.” The lecture method was used for both content and methods classes. Most lessons could be equated to church sermons. On the average, 90% of the talking in the classroom was by the teacher. The lecture method made lessons boring because learners were passive listeners. As a first year students put it: “the lecture us; which sometimes makes the classroom boring ... and their approach to the students is bad so with the lecture method it is not good.” This phenomenon became evident in the observation of lesson conducted in the afternoon. In most lessons, almost half of the class was dozing off mid-way in the lesson or were inattentive.

What makes the use of this method fall short of enhancing students’ thinking skills is that teachers failed to utilize thought provoking questions to engage students. In a one hour social studies lesson, the teacher asked 34 questions of which only 9 were subject related. All these questions were knowledge and comprehension (lower level thinking). Besides, students lamented that the use of lecture method in teaching content and method makes it difficult for them to apply the methods in the classroom when they are on practical teaching. A third year student of practicum noted, “we learn theoretically the methods ... although we learn the methods they do not practicalize[sic] it so when we go out we find it difficult to apply.” Another student added, “instead of taking us to the nearest primary school to practicalize [sic] the methods they rather lecture us.” This phenomenon is confirmed by Acheampong

(2001) that teachers used lecture method in content and pedagogy delivery without involving students actively in the lesson which does not encourage reflective thinking. A student was of the opinion that it is a bad practice for teachers not to use the appropriate method but will expect students to use them. He said,

If it happens that teachers are not using the role-play, demonstration, or bla, bla, bla and they intend to expect us to go and use them in our intended classroom, then I do not think they are doing the right thing because they are to do and practice it so that we can also practice it. If they go by the lecture method alone and neglect the other methods, they are not doing it right.

Another student commented, “they [teachers] should use all teaching methods available in their teaching of both content and method so that we can have exposure to all and select the best one.” This statement suggests that teachers need to use variety of teaching approaches in the classroom for learners to learn their use and application. Students were of the view that the use of the lecture method in teaching method made them handicapped in their application as captured in this statement, “using the lecture method will help us know the content but at the end of the day how to use it becomes a problem. If they do not use the methods in class you will not know how to use it.” Teachers interviewed were of the opinion that feeding learners with information will not help with professional development of pre-service teachers. He said,

At this level we are teaching them to develop their academic ability but we are also helping them to develop professionally. When we feed them with information they will do well academically but the profession. If we don't teach them the method well they will go out and mess up which is not good because they should teach to engage the children.

In addition to the above, the research revealed that teachers used the lecture method without using teaching learning materials. This made the teaching very abstract and sometimes difficult to understand. This is captured in the statement by the interviewees:

Teachers do not use teaching learning materials in class to engage students.

Using teaching materials have never happened in my class. We do most of our learning in abstract and we don't think it is healthy. The teachers think we are adults and therefore need not prepare materials will help us to teach in the primary school.

In sum, the teaching strategies employed by teachers at Akatakyiman Teacher Training College are

equal to what Cochran-Smith (2004) referred to as atheoretical and anti-intellectual; prospective teachers are trained in empty techniques rather than training them in knowledge and decision-making.

#### b. Classroom Ecology

Classroom environment plays a major role in enhancing the thinking skills of students. Potts (1994 citing Keefe & Walberg, 1992) believes "... thinking in the classroom is facilitated by a physical and intellectual environment that encourage a spirit of discovery." (p. 3). The classroom environment should be a motivating place for learners to express their views without fear of intimidation. Fairness, tolerance, dialogue, negotiation, care, active participation, and respect for each other's opinion are hallmarks of a thinking classroom. The classroom environment should raise expectations and extend opportunities for students to use their ability to think (Beamon, 1997). As Costa (2001) sums up, the thinking classroom ecology is a place where students react and interact, students know the objective of the lesson, conveys a congenial sense of order, and students are engaged in meaningful learning. However, authoritarian classroom ecology associated with the teacher and/or peers and environment that lacks the mediation of individuals who can challenge, probe and encourage thinking inhibit thinking in learners (Beyer, 1987).

The study revealed that the classroom environment at Akatakyiman Teacher Training College inhibits students' thinking. Teachers were autocratic. Their views always carry while students' views are disrespected. Students are powerless and there is no avenue to channel their grievances. Teachers insist on students doing things in particular way and use only information they have been provided which kills students' creativity and ability to be independent thinkers as shown in the statement below:

There is a particular master in our school; he wants you to write whatever he gives you word to word ... if you write anything not from his notes or handout, you are marked down and we feel sad but there is nothing we can do because as far as that master is concerned he wants you to put down AA, BB, but it is like what you understand that you have to write but as far as that master is concerned, no way. For example, in science there are many books but if you do not use information from his handout to answer a question but use any other book and explain in your own words, he does not like that ... Last time Mr. X asked what science is and a student it in his own language but it was not accepted because he did not use specific words from the handout.

A second year student also said,

... when we write or say something which is not in what they have given to us but is relevant to the topic we are discussing it is ignored or rejected. They say you do

not know more than they do ... For example, in an HIV class, a friend gave an answer to a question which the teacher has not come across ... it was rejected but later when we were reading we found that the student was right and the teacher did not say anything.

This was evident in the observation. In about 95% of all lessons observed, students' contributions were ignored by teachers. In the end of lessons, teachers dictated notes for students to write. In the interview, teachers indicated that they dictated notes for students because they wanted them to pass examinations. The science teacher said, we are examiners so we know what is required in the examination. Another reason teachers gave for giving notes to students was that there were no materials to be used as references. The students interviewed said that teachers disregard for their opinions inhibited their thinking. A student indicated,

The situation limits us on the way we should think because they don't want us to go extra mile to look for things for ourselves. What they give you is what they want you to give them. I think they have to teach use how to learn; they have to teach us how to fish for ourselves. They have to teach us how to do things in different ways so that we take the best and not just one thing.

The statement above indicates that students were willing to find things for themselves and be creative but their efforts were thwarted by teachers.

Besides, the classroom atmosphere at ATTC was intimidating, which did not support students' thinking. Harris (1998) and Fisher (1990) indicate that positive attitudes and respect for others' views enhance thinking in learners but this was not the case in this research. There were teacher and students intimidation which contribute to low class participation. The statements below indicate what happened in the classroom in relation to intimidation and intolerance to others' views:

... sometimes, it comes from peers; if you are contributing to class discussion and

p>You falter, the atmosphere they will create for you, you will recoil into your shells

[and] sometimes from the teacher. Sometimes, the environment the teacher creates

Before introducing a lesson ... as soon as he enters the class, his face, his appearance

will scare the whole class and you will not feel fine talking in class.

A third year student added, "sometimes, when you give wrong answers they [teachers] embarrass you and nobody wants to be embarrassed". The observation revealed that when peers intimidated others in class their behaviors passed without comments from the teachers; sometimes they were reinforced. In a mathematics lesson on gender bias, a student decided to comment on an issue but the reaction he

received from peers and the teacher shut him down completely. The following is an excerpt from the lesson (Owu-Ewie, 2008):

Student: I think gender bias is necessary because...

Teacher: [interrupts] gender bias is necessary?

Student: ...because in class it may be that the boys or the ladies are actually sharp for instance...

Teacher: [interrupts] What do you mean by sharp?

Student: They are very bright [class shouts at him]

Teacher: You reserve your comments; we shall come to it.

The lesson ended without the teacher either commenting on the behavior of the students or on the student's contribution. Also in a science methods lesson on improvisation, the teacher asked a student to define the term improvisation. This is what transpired:

Teacher: What is improvisation? If you talk about replacing, modifying and making use of, you are out of the marking scheme.

Student I: Using materials found in the environment to bring about desirable effect in learning.

Teacher: [retorts] Out of respect, I will give you 10 points out of 100 [class laughs]

Student II: It is using available local materials in the environment to bring about the same learning effect as the original material.

Teacher: [angrily] I am asking you to be careful. When they [referring to examiners] ask you what is improvisation and you start using replacing, modifying etc., you are out of the range.

Student II: Sir, what then is improvisation? What is in the marking scheme?

Teacher: [Laughs] So you want the marking scheme? Didn't you hear what your friend said?

Student III: It is the utilization of available materials...

Teacher: [cuts in] My friend, what is different from what your friend said and what you are saying?

[The class laughs]

Student IV: <sup>ɔ</sup>dwene sE utilization na yEntee bi da anaa? (Akan-(Ghanaian language) meaning does he think we have not heard the word utilization before?)

[The entire class laughs and the teacher continues teaching]

The student did not have the time to complete his definition nor did the teacher comment on the behavior of the students. Such behavior prevents students from participating actively in class discussions thus inhibiting their abilities to think.

Questioning is a potent tool in developing the thinking skills of learning (Beamon, 1997; Barell, 2008). Thinking is enhanced if teachers ask questions that cause students to think, and encourage them to ask and answer questions. Teachers also need to model thinking in the teaching process and create a classroom environment that will encourage students to think. As Barell (2008, p.106) puts it, "If we want our students to become curious about the world, we need to model our own curiosities within an invitational environment." However, the study revealed that teachers created an environment which violated the assertion. It was found that teachers failed to reward good responses. They rather picked on wrong responses and questions from students and disparagingly dealt with them. Owu-Ewie (2007) identified that when students ask questions in the learning they were reprimanded or punished. Sometimes, students' questions were not given the needed attention. The following statements from the interview attest to this:

Sometimes, when you ask a question and it is not right the way the teacher uses derogatory words on you may put you in a bad mood and sometimes demeaning.

With that next time when he asks a question in class nobody will want to try.

At times, when you ask a question, I don't know if they don't have enough knowledge about the question; they don't talk about it. They just brush it aside and go on with what they are doing instead of referring the question to the class for discussion.

Sometimes teachers do not have time for questions and responses. Sometimes you raise up your hand to ask a question and he asks you to put your hand down. He will just shout you down so you wouldn't want to ask questions. At times, they do not even give you time to think about the questions they ask. They are always rushing.

Sometimes you ask a question in class and the teacher asks you to go and find out. Every day he comes to class and you ask him a question, he says you should go and find out so when he comes to class we will not talk. We allow him to talk till he finishes and then we go.

It is essential for teachers to allow for wait time for students to think about a question. Tobin (1987) posits that allowing for wait time facilitates higher cognitive learning and achievement. The third statement violates this important proposition. The other statements indicate that learners are deterred from asking questions and participate in class discussions. They are made passive learners. This may explain why in the lessons observed about 98% of the questions were initiated by teachers. Students were reluctant to ask questions. The few who were bold to ask questions hedge them with the phrase

please sir... The classroom environment at ATTC is tense and intimidating, which inhibits effective intellectual development of pre-service teachers.

Besides the intellectual ecology of the classroom, the physical ecology plays a role in enhancing students thinking (Potts, 1994; Keefe & Walberg, 1992). The need for teachers to fill the numerous empty classrooms at the basic level (Primary 1- Junior High School) in Ghana has resulted in increase intake of pre-service teachers without corresponding infrastructural development. This has resulted in overcrowded classrooms. Most classrooms at ATTC were designed for a maximum of 32 students but now accommodate between 50 and 52 students. The large class sizes have made it difficult for effective teaching to take place. The social studies teacher said,

... in some classrooms, you go there and you have no place to stand and do

effective teaching. You are pushed under the board. The classrooms are not spacious

and the students are many... The class sizes are large; you can't give many assignments

to check on students' progress because it will pose a problem to the teacher.

Another teacher added sometimes a class has about 52 students instead of the normal class size of 35 and because the class size is large you can't give many assignments. The large class sizes coupled with the lack of teaching/learning materials and technology resulted in the use of effective teaching strategies which promote intellectual development being abandoned for information giving strategies.

#### c. Improving Pre-service students' thinking

The above findings point to the fact that the teaching strategies teachers employed and classroom ecology they created did not support and enhance the intellectual development of pre-service teachers. The following were suggestions interviewees made as a means of enhancing the thinking skills of pre-service teachers.

#### Using Effective Teaching methods

For effective teaching to enhance learner's thinking skills, teachers need to use cognitive approaches (Beamon, 1997), use probing questions to increase students' participation (Cotton, 2001), and increase student curiosity (Harris, 1998). Students interviewed were of the opinion that teachers need to use methods that pre-service teachers are likely to use after completion. A student said, the methods of teaching we are going to employ in the classroom needs to be used and that they should be introduced in the first year. Again, I suggest teachers should give room for personal research. Besides, learners suggested that teachers need to employ the discussion method of teaching so that they can also participate in the learning process. A third year student commented, teachers should not allow us always to depend on their notes. It is difficult to memorize...they should encourage class discussion to help us look for information on our own. This statements agree with what Beyer (1987) suggested that learners should be exposed to a lot of reading materials to show that learning is not just remembering already-given authoritative answers but involves processing a lot of information and making decisions or judgments. For teachers to effectively engage their class, they should have knowledge of what they are teaching. Students interviewed were of the opinion that teachers should do a lot of research before they embark on teaching a topic. A third year student indicated teachers need to do a lot of research

before coming to class so that when learners provide information outside their handouts they will be able to comment on it. To enhance students thinking, teachers should be flexible and be receptive in the classroom. An interviewee said, I will advise them to open up and allow the students to make meaningful contributions in class which the teachers may not have ideas about.” It is also recommended that the Teacher Education Division should institutionalized in-service training for teacher trainers to sharpen their skills in teaching to enhance the thinking skills of pre-service teachers and in modern trends in teacher training.

### Creating a thinking classroom ecology

The classroom ecology can provide a fertile ground for students’ thinking to occur (Beyer, 1987) but it needs to be structured in a conscious, deliberate and clear way, and based on the desired outcomes for learners (Costa, 2008). An authoritarian classroom environment whether associated with teachers and/or learners inhibits thinking rather than promoting it. In this vein, it is suggested that democratic values like dialoguing, negotiating, and consensus building should be cultivated in the classroom to make students have the freedom to express their views. In the classroom, learners should say what they think without fear of intimidation (Wilks, 1995) and negative attitudes that block thinking should be avoided (Harris, 1998). Learners should tolerate and encourage each other in the learning process as indicated in the statement below by a first year: “students should learn to tolerate each other’s views and should not look down upon their friends who do not know much but rather help them make contributions in class.” In effect, learners need to develop positive attitudes like curiosity, to challenge assumptions, to take initiative/risks, and to see the good in the bad. Most importantly, there should be cordial relationship between teachers and learners; a relationship of mutual respects and trust. There should be communication between teachers and students as expressed in the statement below made by a third year student: “there should be open communication between us and teachers. They should open up so that we can approach them with problems. They should also involve as in the classroom decision making process and any other decision that involves our training.” Another student indicated, “I will advise the [meaning the teachers] to open themselves up and allow us to come to them or ask questions without fear...”

In addition, the physical structure of the classrooms needs to be improved. They have to be renovated to ensure proper ventilation, good lighting system, to be enlarged to accommodate more students and to provide movable chairs and tables that can facilitate discussions to facilitate students thinking. A teacher has this to suggest for improving the physical structure of the classroom: The government should build new classrooms with modern facilities to accommodate the ever growing number of students and technological needs of the school.

### Recommendations

#### Recommendations for improving thinking in pre-service teachers

The researcher suggests the following as ways of improving the thinking skills of pre-service teachers in Ghanaian pre-service teacher institutions:

#### Teacher trainers should

- Respect the views of learners (teacher trainees)

- Redefine their roles as custodians of knowledge to facilitators, planners, counselors and organizers.
- Speak less in class, make lessons practical and meaningful, use higher level thinking questions, motivate learners and provide opportunities for learners to think.
- Practice thinking in their teaching and make it visible and explicit (Beyer, 1987).
- Integrate methods and content in the teaching process (Ball, 2000)
- Use appropriate instructional approaches they expect their students to use in their classrooms after graduation.
- Provide opportunities, support and challenge learners to be creative and critical thinkers (Hill, 2000).
- Give enough wait time to ensure increase in students' responses and participation in class (Rowe, 1972; Tobin, 1987).
- Create conducive classroom atmosphere that improves students' willingness to think (Harris, 1998; Costa, 2008).
- Cultivate democratic values like dialoguing, negotiating and consensus building in the classroom.

Learners (teacher trainees) should

- Tolerate and accommodate others views.
- Be receptive to new teaching methods or strategies employed by their teachers.
- Develop positive attitudes to thinking like curiosity and question assumptions.
- Convert their roles as passive learners to active participants in the learning process.

The Teacher Education Division of the Ghana Education Service should

- Provide staff development programs for teacher-trainers in teaching for thinking and modern trends in teacher preparation.
- Reduce the content of the curriculum and the number of tests in pre-service teacher institutions.
- Devise other ways of assessing students in addition to the traditional form e.g. portfolios
- Involve learners in decision making processes involving their training.
- Pay attention to infrastructural and material development, e.g. classroom building, textbook development.

Recommendation for further research

The study covered the development of the thinking skills of pre-service teachers in only one teacher training institution out of the 38 pre-service teacher institutions in Ghana in relation to teaching strategies and classroom ecology. However, more areas in teacher education need to be researched to improve pre-service teacher education in Ghana.

- The study needs to be expanded to cover more participants and institutions to determine the degree to which the findings of this study can be generalized.
- This study has identified teaching strategies and classroom ecology as inhibitors to developing pre-service teachers' thinking but many areas like educational policies, perception of teaching, assessment procedures, culture of the society and the educational system, and staff development need to be investigated independently to ascertain how they impact students' thinking in pre-service teacher institutions in Ghana.

## Conclusion

There has been plethora of research in developing the thinking skills of learners in the western world but little attention is given to how pre-service teachers in developing countries, especially, in Ghana can be trained in thinking to be able to transfer such skills to their prospective learners. The problem identified in this study begets itself. The teachers in the study were taught the same way (Britzman, 1991; Lortie, 1975). As Muses (1998) puts it "They [teachers] teach the way they were taught and the way their teachers were taught and the way their teachers' teachers were taught." (p. 1). The implication of this statement in relation to this study is that it is probable to break this cycle by starting with teacher training institutions. If teacher institutions train their student-teachers with ideas in thinking and how to develop it in learners, the students are likely to use the same skills and possibly improve upon it as teachers because they have been taught in the same way. As schools move from information giving to information processing, there is the need for schools to increase their students' capacities for higher order thinking to improve their capability to acquire, analyze, and apply complex information and to solve problems effectively (Tucker, 1988). It is therefore crucial for teacher institutions to break the cycle by producing teachers who have the skills and capacities to enhance the thinking skills of their learners. The current study had indicated that enhancing thinking skills in pre-service teacher institutions is impeded by strategies employed by teachers and the classroom ecology they create. In finding a solution to this problem, the study has established that teachers need to employ cognitive instructional approaches. There is the need to ensure effective in-service training for pre-service teacher trainers in teaching strategies that enhance students' thinking. Teachers need to build democratic values in their classrooms. In addition, efforts should be made to improve the cognitive as well as physical structures of classrooms and most importantly, to ensure mutual respect between teacher trainers and teacher trainees.

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