The Critical Thinking Abilities of College Seniors: The Case of Foreign Languages Students at Addis Ababa University

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An Investigation into the Critical Thinking Abilities of College Seniors: The Case of Foreign Languages Students at AAU

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Abstract

The study mainly explored the extent to which the critical thinking skills and dispositions of senior students of the Foreign Languages Department at Addis Ababa University were developed. It also examined the interrelationship between critical thinking skills, critical thinking dispositions, and academic achievement of the students as measured in GPA. An attempt was also made to see if academic achievement had any impact on the critical thinking skills and dispositions of the students.

A total of 70 seniors who had been trained to be English language teachers participated in the study. The California Critical Thinking Skills Test (CCTST) and California Critical Thinking Dispositions Inventory (CCTDI) were used to measure the participants' critical thinking skills and dispositions respectively.

Results provided an evidence of the students' poor critical thinking abilities, but their positive endorsement toward critical thinking. Moreover, critical thinking skills were found to have no significant relationship with critical thinking dispositions and academic achievement. However, their dispositions toward critical thinking showed significant positive relationship with their academic achievement (GPA). High and low achievers were also found to differ significantly in their critical thinking dispositions, but not in their skills. This gave an evidence for the significant impact academic achievement had on critical thinking dispositions. The students' weak critical thinking abilities, the insignificant relationship between their critical thinking skills and academic achievement, and the negligible impact achievement had on their critical thinking skills might all indicate that the college curriculum had not given adequate focus to the core cognitive skills involved in critical thinking.

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UNIT 1

1. INTRODUCTION

1.1. Background

Although the notion of critical thinking as a teaching and learning tool had a long history dating as far back as the times of Socrates, researchers and educational policy makers have shown a resurgence of interest in developing and assessing it recently. This could be evidenced from the considerable amount of research that has been conducted in the past two decades and the remarkable efforts being made on designing and offering critical thinking instructions to students of different educational level. The studies of Stein, Haynes and Unterstein (2003), Zohar and Dori (2004), and Thomas (2004), which focused on examining the relationship between academic achievement and critical thinking skills and assessing critical thinking skills of students at different educational levels, are cases in point.

Most Educators, for example (Barnet, 1997; Thomas, 2004; Curtight, 2004; Zohar & Dori, 2004; Mckendree, Small, Stenning & Conlon, 2002) have recognized the value of fostering critical thinking skills of students both for academic and nonacademic purposes. They believe that critical thinking skills are crucial in coping up with the challenges of the present day highly technical and ever changing world. Moreover, the ability to engage in careful reflective thought is viewed as a "fundamental characteristics of an educated person, as a

requirement for responsible citizenship in a democratic society, and as an important employability skill for an increasingly wide range of jobs" (Cotton, 2004, p.1).

Although the aforementioned authorities believe in the importance of cultivating the critical thinking skills of students from early elementary school level, they underline their special and increasing importance with the increasing level of education. This could be associated with the increasing exposure students might have to the outside world with the increasing level of maturity and education. Moreover, enhancing the critical thinking skills of students is widely considered as the main aim of education at higher levels. For example, countries like the United States have even made it part of their National Goals for Education (Facione, 1997). In line with this, Curtight (2004) asserts, "it is what makes our education higher" (p.1). This indicates the central place given to critical thinking in higher education. The change in the guiding principle "Education for all" to " a thinking education for everyone" in the last decade of the 20th century noted by Resnick (2004) also reflects the high regard given to thinking in education.

In the Ethiopian context too, the overall living conditions seem to necessitate the development of critical thinking skills of the young generation much more than ever before. Being part of the dynamic world, we are getting the privileges of modern technological and scientific innovations and advancements. Moreover, as pointed out by McKendree et al. (2002) "...being able to think critically is

essential to be able to respond appropriately to rapid and complex changes in modern society." (p.58)

However, the local efforts being made to develop and assess this highly required quality are minimal. It is, therefore, quite timely and reasonable to raise queries regarding the level of development of our students' (especially at tertiary level) critical thinking abilities since they are soon supposed to be active participants in this complex world.

1.2. Statement of the Problem

Although research has suggested the positive impact of critical thinking skills on academic achievement (Zohar & Dori, 2004) and various critical thinking instructions have been incorporated into school curricula, especially in the developed countries, the performance of students on measures of higher order thinking skills has displayed a critical need for further development of the skill and attitude of effective thinking (Norris, 1985; Robinson, 1987). For instance, most U.S. educators and employers are calling for more and better thinking skills instruction in schools as the American young people; in general, do not exhibit an impressive level of skill in critical thinking (Cotton, 2004).

This condition seems very true in our context as well. Although there are no independent critical thinking instructions in our country, there is a tacit expectation and belief that our educational programs contribute towards building the critical thinking skills of students. However, most of today's

graduates do not seem to meet this widespread expectation of the society as well as the academic community. As expressed by most educators and employers in the program review workshop (2000) conducted at Unity University College, most of the college graduates today do not seem to exhibit the required problem solving and employability skills like being critical, independent, confident and innovative, which are highly associated with the development of critical thinking skills and attitudes. The current instructional and testing practices are also widely criticized as mainly fostering lower order thinking capabilities like studying and memorizing facts which could be of limited relevance to college graduates.

It is, therefore, this observation and widespread concern that initiated this study to investigate how well developed the capabilities of college seniors for critical thinking are. Moreover, the fact that there is no local research, to my knowledge, addressing this issue, which received a great deal of attention in the other parts of the world, has given the impetus to embark on this research.

1.3 General Objective of the Study

The objective of this study was to investigate the level of development of CT skills and dispositions of college seniors. The study also aimed at exploring the relationship between their skills, dispositions and academic achievement.

Specific Objectives of the study

The study aims at answering the following specific research questions.

1. To what extent are the critical thinking skills of college seniors developed?
2. To what extent are college seniors disposed to critical thinking?
3. What kind of relationship exists between critical thinking skills, dispositions, and academic achievement?
4. Do high, average, and low achievers significantly differ in their critical thinking skills and dispositions?

Hypotheses

Drawing on my personal observations and experiences as an instructor and informed by the extant research literature, the following hypotheses are formulated.

1. The critical thinking capabilities of college students are not as well developed as they should be.
2. Critical thinking skills are directly related to academic achievement.
3. Critical thinking skills are directly related to critical thinking dispositions.
4. High, average, and low achievers significantly differ in their critical thinking abilities and dispositions.
5. Most college seniors are not highly disposed to critical thinking.

1.4. Significance of the Study

The development of critical thinking capabilities for college students, especially seniors, is very detrimental to their success in their future careers. These capabilities are believed to be the enabling skills of the individual which make him/her confident, independent, critical, logical, and fairly judgmental in shouldering real life responsibilities and handling challenges. This study is therefore believed to have immense significance for the following reasons:

1. It contributes towards a better understanding of college seniors' capabilities and their level of preparation and competence to stand the rigors of real life problem solving responsibilities.
2. It also provides valuable information to curriculum designers to make the necessary modifications in the curriculum on the basis of the study.
3. Classroom practitioners could also get clear picture of their students' capabilities and shape their instructions (tasks) in the desired directions.

1.4. Operational Definition of Terms

- **Critical Thinking Skills:** Skills of making purposeful and self regulated judgments made by employing skills like analyzing, synthesizing, inferring and evaluating, as measured by California Critical Thinking Skills Test.

- **Critical Thinking Dispositions:** Overall personal tendencies and internal motivations to think critically as measured by California Critical Thinking Dispositions Inventory.

Abbreviations Used

- **CT :** Critical Thinking
- **CCTST:** California Critical Thinking Skills Test
- **CCTDI:** California Critical Thinking Dispositions Inventory
- **GPA:** Grade Point Average
- **AAU:** Addis Ababa University

UNIT TWO

2. REVIEW OF RELATED LITERATURE

2.1. Critical Thinking: Definition

Although the extant literature tells us that critical thinking skills have captured the attention of most researchers, there has been no universally agreed upon labels to them. Such phrases as "critical thinking", "creative thinking", "thinking skills" and "higher order thinking capabilities/skills" are among the frequently heard, interchangeably used labels coined by various scholars (Cutton, 2004; Mckendree, Small, Senning & Conlon, 2002; Haynes and Unstein, 2003; Bailin & Case, 1999). Sundry definitions, which are in fact somehow consistent with each other, have also been given by various researchers and experts. Thomas (2004, p. 2) describes critical thinking as:

> ...thinking on a higher level than memorizing facts or telling something back to someone exactly the way that it was told to you....higher order thinking requires that we do something with the facts. We must understand them, manipulate them, put them together in new or novel way and apply them as we seek new solution to new problems.

As explained in the above definition, critical thinking (higher order thinking), is a cognitive task of manipulating knowledge in meaningful ways to solve problems of diverse nature. Unlike the lower order cognitive activities, which involve

absorbing, memorizing, and rehearsing facts, critical thinking entails internalizing, analyzing, and manipulating facts as required by different problems and contexts.

The other most popular definition, in the late eighties, which was given by Ennis (1987) describes critical thinking as "reflective and reasonable thinking that is focused on what to believe or do. "

The two key words, reflective and reasonable, used in this definition imply that critical thinking involves cognitive abilities of reacting to problems rationally. Moreover, critical thinking skills provide firm ground for our beliefs and acts by enabling us analyze and examine events and situations deeply, going beyond their superficial appearance.

Others, like Hudgins and Edleman, (cited in Cotton, 2004), define critical thinking as "mental dispositions which help to provide evidence or reasons in support of one's conclusions and also to request evidence from others before accepting their conclusions."(p.3)

Unlike the former definitions, which focused on the cognitive dimension of critical thinking, this definition seems to stress on its affective dimension. According to this definition, critical thinking is our overall mental readiness (disposition) or internal motivation to be guided by reasons, both in making our own decisions and also in accepting others' decisions. Although this definition gives high regard only to internal qualities (tendencies) of critical thinkers, rather

than special skill or ability of thinking, it highlights a different and relatively new perspective on critical thinking.

On the other hand educators like Beyer, (cited in Cotton, 2004), view critical thinking as having two dimensions - frame of mind and a number of special mental operations. This broader definition seems to combine the dispositional and cognitive aspects of critical thinking discussed above. Beyer also refers to the frame of mind as 'critical spirit' or internal desire to be critical.

In general, the above definitions illustrate that critical thinking has been so controversial for years that getting at its precise definition has been very difficult. This also implies the differences between scholars in the way they conceive CT. The following section will further explain this point

2.2. Conceptualizing Critical Thinking

Critical thinking is a broad concept which has been conceptualized differently by different scholars. Although it is very difficult to discuss all perspectives exhaustively in this paper, an attempt will be made to explicate three prominent views on CT.

2.2.1. Cognitive Science Perspective

McKendree, Small, Stenning and Conlon (2002) view critical thinking in relation to the crucial concept of 'representation' which generates from the cognitive science research that examines models of how people learn and transfer what

they learn from one context to another. They define representations as "structures that stand for something else: a word for an object, a sentence for an arrangement of things, a picture for a scene." (p.59)

According to this view, the process of learning is conceived as involving two interrelated skills: forming representations and making meaningful transformations of representations. Mckendree et al. explain that most areas of knowledge have ranges of representations tailored to the particular problems encountered. The facts, concepts, and technical knowledge that students gain from their schools are supposed to capture mental representations of problems they may encounter in real life. In general, they conceive the school curriculum as teaching these representational skills. However, according to this view, learning the representations is not an end by itself; representations should rather be manipulated meaningfully in solving problems of diverse nature. This is to say that in the process of solving particular problems, learners relate the problem with a representation which best captures the major features of the problem. Then, they try to solve the problem by making meaningful transformations by manipulating those critical features in useful ways which suit the various situations and contexts.

However, the task of relating problems with the right representations is not a simple matching activity. It requires thorough understanding of the problem and a careful scrutiny of the best representations. "Being able to think critically

about why a representation may or may not be good in particular context is a big part of being a critical thinker." (McKendree et al., p. 62)

Thus, CT skills are considered as very important requirements in analyzing problems and judging the relevance of the representations which serve as frameworks in finding solutions to them. In the process of manipulating the representations and transforming them to new forms which suit the context, CT abilities are considered as having immense significance.

2.2.2. Critical Thinking as Normative Notion

A number of scholars, for example, (Ennis, 1987; Paul, 1990; Lipman, 1991) basically agree with the view that any thinking regarded as CT must be directed towards some end or purpose, such as answering a question, making a decision, solving a problem, resolving an issue, devising a plan or carrying out a project. In other words, thinking that serves these purposes can be characterized as thinking aimed at making judgments about what to believe or do (Ennis, 1987).

However, Bailin, Case, Coombs and Daniels (1999) argue that not just any thinking aimed at deciding what to believe or do can count as CT. They do not consider careless, superficial, rash or naive thinking as CT. This suggests that thinking which guides our belief and action should meet certain standards to be regarded as CT. They also argue that these standards cannot be met by accident; they rather require making intentional efforts. Thus, for Bailin et al.,

CT is a normative notion, i.e. it is in some sense good thinking. Educators like Johnson and Siegel, cited in Bailin et al., also showed their agreement by considering quality of thinking, rather than process of thinking, as a distinguishing feature of critical thinking from uncritical.

Bailin et al. (1999) have also a different way of characterizing critical thinkers. Unlike the common ways of characterizing critical thinkers by enumerating a list of skills or abilities and a list of attitudes or dispositions such thinkers have, they characterize the critical thinker interms of 'intellectual resources'. These consist of five elements: background knowledge (depth of knowledge, understanding, and experience in a particular area), operational knowledge of standards of good thinking, knowledge of key critical concepts, heuristics (strategies, procedures, etc.), and habits of mind (commitments or attitudes that dispose the critical thinker to fulfill relevant standards and principles of good thinking). These are qualities which, according to Bailin et al., are possessed by ideal critical thinkers. And any thinking to be considered as critical thinking, should meet these norms.

2.2.3. CT Skills as One Component of Criticality

Barnett (1997) believes that criticality consists of three interrelated components: critical thinking (reasoning), critical self reflection (self monitoring), and critical action (actions that we take on the basis of sound reasoning).

Barnett further explains that "criticality takes place at three levels, from critical thinking through critical thought to critique. Each succeeding level offers ever higher forms of alternative possibilities of understanding."(p.7) The first level, critical thinking, according to Barnett, refers to the process of rationalizing events and situations whereas the second and third levels refer to making self reflection and understanding the situation or event in a different form, respectively. He also explained that "critical thinking skills confine the thinker to given standards of reasoning within specific disciplines, whereas critique opens the possibility of entirely different and even contrasting modes of understanding."(p.7) In other words, in thinking critically, we try to justify what we do with reasons and evidence, but in critique, we try to see the event from different angles and give various possible interpretations to the observable events.

Although the above three elements are believed to constitute a critical being, Barnett comments that "critical self reflection and critical action have hardly appeared as components of higher education." (p.7) Barnett's point seems very true in the Ethiopian context as well where criticality is usually equated to only reasoning ability.

In summary, although most scholars basically agree in the importance of developing CT skills of students, differences exist in the way they define and perceive this crucial concept.

In the late eighties, experts showed a great deal of concern regarding this disparity in understanding CT. As a result, an extensive research known as the Delphi Research Project was initiated and started being carried out by a group of critical thinking experts. The next section discusses this research and its findings.

2.3. The Delphi Research and the Resulting Consensus on CT

2.3.1. The Research

The Delphi research is a landmark in the history of rigorous attempts that had been made to define and clearly understand critical thinking and its ways of assessment. The major aim of the research was to arrive at a general consensus on issues related to the nature, components, instruction and ways of assessment of critical thinking.

A team of forty-six critical thinking experts drawn from different disciplines on the basis of their special experience and expertise in critical thinking instruction, assessment or theory participated in the research. A qualitative research methodology, known as 'The Delphi Method', which requires the formation of an interactive panel of experts was employed. The team had various panel discussions, organized around six rounds of questions, which called for thoughtful and detailed responses. The exhaustive discussions and heated debates carried out on each round generated a comprehensive and detailed cross-disciplinary explanation to critical thinking.

Generally, the Delphi research is a remarkable culmination of the individual efforts of most experts made to deeply understand critical thinking. The findings of the Delphi research are serving as the conceptual framework for most of the post 1990 research conducted on the area of critical thinking. Besides, they are serving as bases in designing most critical thinking instructions. Similarly, the present research has also taken the hunches from the important findings of this study.

2.3.2. Findings of the Delphi Research: The Two Dimensions of CT

One of the major contributions of the Delphi (1990) research is its clearing the existing misconceptions regarding the fundamental concepts of CT. This research has established that CT is not only a cognitive ability of thinking but it also includes the affective dispositions which facilitate thinking. Thus, it settled the age long controversy between educators by enabling them to come to a general consensus that CT consists of two dimensions: cognitive (skills) and dispositional dimensions. The other important finding is regarding the teaching and assessment of CT. A detailed discussion of each of these major points is given below.

2.3.2.1. Cognitive Dimension of Critical Thinking

The CT experts, who participated in the Delphi (1990) research, defined critical thinking as follows:

> We understand critical thinking to be purposeful, self regulatory judgment which results in interpretation, analysis, evaluation, and inference as well as explanation of evidential, conceptual, methodological, criteriological or contextual considerations upon which that judgment is based. (Facione, 1990, p.2)

According to this definition, CT is a self adjusting process of judgment that one makes in a given context. Moreover, this consensus statement, mainly focusing on the cognitive dimension of CT, has characterized certain cognitive skills like explanation, interpretation, analysis, evaluation, and inference as core to the process of making purposeful judgments which are the basis for our action, or belief. These skills parallel the higher order cognitive activities identified by Bloom (1965). It also highlights the importance of taking evidences, methods, concepts, criteria and context of reality which underlie the judgment into consideration.

The following six cognitive skills and their respective sub-skills are identified as central to critical thinking (Facione, 1990).

(a) **Interpretation:** refers to the skills of categorization, decoding significance (of content, affective purport, directive functions...) and clarifying meaning by paraphrasing, or making something explicit through description, analysis etc.

(b) **Analysis:** refers to identifying the intended and actual inferential relationships among statements, questions, concepts, description or other

forms of representation intended to express beliefs, judgments, experiences, reasons, information or opinions.

(c) **Evaluation:** is a task of assessing the credibility of statements or other representations which are accounts or descriptions of a person's perception, experience, situation, judgment, belief or opinion and to assess the logical strength of the actual or intended inferential relationships among statements, descriptions, questions or other forms of representation.

(d) **Inference:** refers to identifying and securing elements needed to draw reasonable conclusions; forming conjectures and hypotheses considering relevant information and educing the consequences flowing from data, statements; principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation.

(e) **Explanation:** refers to stating the results of one's reasoning; justifying that reasoning interms of the evidential, conceptual, methodological, criteriological and contextual considerations.

(f) **Self Regulation:** Self consciously monitoring one's cognitive activities, the elements used in those activities and the results educed, particularly by applying skills in analysis and evaluation to one's own inferential judgments with a view toward questioning, confirming, validating or correcting either one's reasoning or one's results.

2.3.2.2. Dispositional Dimension of Critical Thinking

Dispositions to CT, defined as "consistent internal motivation to engage in problems and make decisions by using thinking" (Facione, Facione & Giancarlo, 1997, p.2), have been accepted as one component of critical thinking by the Delphi panelists after the issue of whether CT refers to only cognitive skills or includes dispositions has been debated. The exhaustive discussion on this issue has resulted in articulating some dispositional qualities which characterize the critical thinker in addition to the cognitive skills they are believed to possess.

> ... The ideal critical thinker is habitually inquisitive, well informed, trustful of reason, open minded, flexible, fair-minded in evaluation, honest in facing personality biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria focused in enquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit (Facione, 1990, p.2).

The above consensus statement presents the affective component of critical thinking that are more related to personal tendencies, willingness or habits of individuals to think critically rather than cognitive capabilities. Some affective qualities like open mindedness, flexibility, inquisitiveness, prudence in making decisions... are believed to be possessed by critical thinkers. However, as the

definition presents qualities of the ideal critical thinker, it doesn't imply that all critical thinkers perfectly show those characteristics, but they may demonstrate them to an extent which distinguishes them from non-critical thinkers. They may also develop some of the qualities to a better extent than the others.

Moreover, the panelists have made distinctions between strong and weak critical thinkers by making a subjective comparison of the level of their dispositions to CT. They came to a general accord that there is a critical spirit, a probing inquisitiveness, a keenness of mind, a zealous dedication to reason, and a hunger or eagerness for reliable information which good critical thinkers possess but weak critical thinkers do not seem to have. They also assert that "... a good critical thinker is habitually disposed to engage in, and to encourage others to engage in critical judgment. She is able to make such judgments in a wide range of contexts and for a wide variety of purposes."(Facione, 1990, p.12)

The above statement clearly shows that critical thinking is not only a skill but also a habit of good critical thinkers. Their judgments are always made on the basis of critical investigation of the matter and the overall context in which it occurred. They also like others to do the same.

The qualities, which are identified by the Delphi panelists as demonstrating the individual's dispositions to critical thinking, are discussed below.

(a) Truth Seeking: refers to the intellectual honesty which gives one the courageous desire for best knowledge in any situation, the inclination

to ask challenging questions, and to follow reasons and evidence wherever they lead.

(b) **Open Mindedness:** tolerance for new ideas and divergent views.

(c) **Systematicity:** the inclination to be organized focused, diligent and persevering.

(d) **Analyticity:** demanding the application of reason and evidence, alert to problem situations, inclined to anticipate consequences.

(e) **Inquisitiveness:** intellectual curiosity and the intention to learn things even if their immediate application is not apparent.

(f) **CT self Confidence:** the trust one places in one's reasoning and one's ability to guide others to make rational decision.

(g) **Cognitive Maturity:** judiciousness which inclines one to see the complexity in problems and to desire prudent decision. Awareness that multiple solutions may be acceptable and that reaching closure may be necessary even in the absence of complete knowledge.

To conclude, CT has been agreed upon to have two distinct and mutually exclusive components with their respective elements. These components are the skill dimension of CT, which refers to the ability to engage in an activity, or process by applying some cognitive skills and the dispositional dimension which focuses on the affective element of nurturing the habit and inclination of thinking critically. Although these components are not dependent on one another, their coexistence greatly enhances the level of one's criticality.

2.3.2.3. Teaching and Assessment of Critical Thinking

The deep and general understanding gained from the rigorous Delphi study regarding the nature of CT has generated some valuable pedagogical and assessment implications. On the basis of those findings a number of recommendations have been given in relation to the instruction and assessment of CT. The following are the recommendations reported by Facionne (1990).

The first and foremost recommendation generates from the very nature of CT. As explained by the experts the fact that CT has two dimensions implies that when conceiving of education or assessment of critical thinkers, it is important to consider ways of developing materials, pedagogies, and assessment tools that are effective and equitable in their focus on both dimensions. This is because both dimensions have their own values in the personal, educational and civic lives of individuals. While the possession of the skills indicates the individual's ability or proficiency to think critically, the proper cultivation of the dispositions insures the use and transference of CT skills out side the narrow instructional setting. Thus, the goal of any critical thinking instruction should be furthering students in the development of their CT cognitive skills and affective dispositions.

The other important recommendation relates with the importance of cultivating the CT skills of all individuals irrespective of their age.

> From early childhood people should be taught, for example to reason, to seek relevant facts, to consider options, and to understand the views of others. It is neither impractical nor unreasonable to demand that the educational system teach young people the habits of mind which characterize the good critical thinker, reinforce those practices, and move students well down the path toward their attainment.(p.14)

This recommendation goes in line with the opinions of most experts like (Thomas, 2004; Mckendree, et al., 2002) who argue that delay in embarking on critical thinking instruction till students become youngsters is a mistake. It reinforces the view that practices and disciplines which lead to the virtues of thinking critically should be introduced to students from their early childhood and gradually developed by providing them graded exercises which suit their overall mental and physical development.

This general agreement regarding the importance of CT for every one regardless of age, gave rise to a detailed discussion on the teaching and assessment of critical thinking which culminated in the following consensus statement.

> A CT skill, like any skill, is the ability to engage in an activity, process or procedure. In general, having a skill includes being able to do the right thing at the right time. So, being skilled at CT involves knowing, perhaps implicitly or without the ability to articulate this knowledge, both a set of procedures and when to apply those procedures. Being skilled also involves having some degree of proficiency in executing those procedures

> and being willing to do so when appropriate. Reflecting on and improving one's CT skills involves judging when one is or is not performing well, or as well as possible, and considering ways of improving one's performance. Learning CT involves acquiring the ability to make such self-reflective judgments.(p.15)

This consensus statement clearly articulates what's meant by critical thinking skills and their demonstrations as well as their assessment. It shows that CT skills are just like other skills in that they involve the ability and willingness to do something appropriately in variety of contexts. It also involves devising ways of improving and making a reflective evaluation of one's performance.

Some ways of teaching and assessing CT have also been recommended following this consensus statement. According to the participants of the Delphi research, CT cognitive skills can be taught by making the procedures explicit, describing how they are to be applied and executed, explaining and modeling their correct use, and justifying their application. Teaching CT also involves exposing learners to situations where there are good reasons to exercise the desired procedures, judging their performance, and providing the learners with constructive feedback regarding both their proficiency and ways of improving it. In addition, motivating and coaching learners to achieve higher levels of proficiency and, thereby, independence are among the major skills of teaching CT.

In line with this, Klein and Jerry, (cited in Cotton, 2004), suggest that positive classroom climates characterized by high expectations, teacher warmth and encouragement, pleasant physical surroundings and so on enhance critical thinking development. They further explain that in order to participate actively in CT skills instructions, students need to feel free to explore and express opinions, to examine alternative positions on controversial topics and to justify beliefs about what is true and good while participating in an orderly classroom discourse.

The assessment of the use of a given CT skill or an integrated use of related CT skills is believed to be carried out in one of the four ways (i) to observe a person overtime performing activities which presuppose the use of those skills for proper execution, (ii) to compare the outcome (if any) that result from executing a given skill against some set of criteria, (iii) to query persons and receive their descriptions of the procedures and judgments they are using as they exercise that skill, would use if they were to perform that skill, or did use when they performed that skill, (iv) to compare the outcomes (if any) that result from performing another task against some set of criteria, where the performance of that other task has been shown to correlate strongly with exercising the skill of interest.

In short, the recommended ways of assessing CT have two categories: Assessing continuously or summatively against some set criteria, and asking them regarding their use of the skill.

2.4. Review of Research on Critical Thinking

2.4.1. The Relationship between Critical Thinking Skills and Dispositions

Although the controversy regarding the meaning of CT seems to end with the consensus reached in the Delphi Research, the tendency to overemphasize the skills component seems still existing. For instance the US government policy which first recognized college level CT in its 1994 articulation of national educational goals states, "The proportion of college students who demonstrate an advance ability to think, communicate effectively, and solve problems will increase substantially" (Facione, Facione, & Giancarlo, 2000, p.2). This statement used the language of skills and abilities, which imply the high regard given to the skills dimension of critical thinking.

Paul (cited in Facione et al., 2000) has also expressed his worry that the great attention paid to the skills used in CT might even lead to trivializing CT, characterizing it as merely an assortment of techniques rather than as complex, thoughtful, purposeful process of forming judgments using reasons and evidence.

Carol and Wade (cited in Facione et al., 2000) argued that a person can master CT without being disposed to use it. According to this view, as skill and disposition are distinct components of CT, the presence or absence of one doesn't influence the other.

On the other hand, others (Ennis, 1994 and Perkins, 1993) argue that the two components are mutually exclusive. They draw an analogy from the property of physical objects, and explain that as a cup that breaks must have been breakable, the fact that the person uses skill is evidence that the person is disposed to use that skill.

Such controversies on the relationship between the two dimensions of CT generated some correlation studies on the following two questions.

- Does demonstration of overall skills at CT correlate positively with overall disposition toward CT?
- Do any specific CT skills correlate with specific CT dispositions?

A study conducted by Facione and Giancarlo (1994) provided evidence in support of the correlation between skills and dispositions. The participants of the study were 193 tenth grade students in a district in southwestern US. In this study a positive, significant correlation ($r = .41$, $p < .05$) was found between overall scores in CCTST and CCTDI. A robust coefficient of determination ($r = 16.8\%$) which showed that 16.8% of the variance in the CCTST scores is potentially attributable to the difference in the scores in CCTDI, and vise versa, was also found.

In a similar research, which employed the same research instrument, conducted on nursing undergraduates, Colucciello (1997) found a statistically significant correlation ($r = .318$, $p < .01$) between students scores in the two tests- CCTST and CCTDI. However this result gave a low coefficient of

determination (r = 9) compared with the above mentioned research. Only 9% of the variance in the skills test scores can be associated with the variance in the disposition scores.

By late 1997, Facione, Facione, and Giancarlo (1997) reported the culmination of the five years rigorous task of gathering data to address both hypotheses. The data has been gathered by online investigators from 50 college level programs of nursing throughout the US. The aggregate data set, comprising 145 predominantly undergraduate samples, when completed, included information on 7,926 students. The data set included a wide range of students: entry level freshmen, graduate students, working adults returning to college, and aged undergraduates. The analysis of the data gathered at entry and exit to college revealed that there is significant positive correlation between CT skills and dispositions of the students. At entry to college programs, 1557 students completed both tests- CCTST and CCTDI. Significant correlation ($r = .201$, $p < .001$) were found from the overall scores of the students in the two tests (Facione et al., 1997). However, only about 4% of the variance in critical thinking skills was accounted for by the variance in critical thinking dispositions, and vise versa.

Similarly, the analysis of data gathered from 793 students at exit from nursing programs in different colleges and universities showed a positive correlation ($r = .169$, $p < .001$). The coefficient of determination, as with the entry level findings, was also very low (about 3%). It showed that only 3% of the variance in one of

the two test scores could be explained in reference to the variance in the other. The remaining 70% of the variance is attributable to other causes. This might indicate that the practical significance of the relationship is in doubt.

A further analysis of the same data revealed a strong relationship between students disposition score at entry and skills test score at exit ($r = .233$, $p < .001$). The coefficient of determination has also increased to about 5%. This might indicate that students with stronger initial disposition toward CT showed greater development in CT skills by the end of their studies than those with a weaker initial disposition toward CT.

On the other hand the study conducted on 133 accounting professionals by Blohm (1998) revealed almost no correlation ($r = .091$) between their critical thinking skills and dispositions as measured in CCTS T and CCTDI.

In summary, the correlation studies reported so far gave mixed results. Some indicate positive, statistically significant relationships, though their coefficient of determination is low, while others showed no correlation at all.

The second important research question that concerned experts was whether or not one-to-one relationship exists between subscales in the CCTST and CCTDI.

Facione, et al. (1997) also made an analysis of the data gathered from the aggregate sample to see if any specific CT skill is correlated with any specific CT dispositional factor. They analyzed from 1325 to 1428 students' cases depending on the possible pairings of skills and dispositional factors. With 5 CT

skills and 7 dispositional factors being tested, there were 35 possible pairings to consider. The researchers reported that in 33 of the 35 relationships explored higher CT skills were generally correlated with stronger CT dispositions; but in all cases the correlations were very weak, never stronger than r = .194. Relationships between CT self confidence and analysis and CT self confidence and evaluation did not reach threshold for statistical significance.

These findings tend to disconfirm the hypothesis that there is a one to one relationship between each specific CT skill and its supposed correlative disposition. It also disconfirms Perkin and Tishmans' (cited in Facione, et al., 2000) suggestion that one to one pairing of skills and dispositional factors is possible (However the data supports Ennis's (1996) contention that such pairing is both implausible and impractical.

2.4.2. Studies on the Critical Thinking Dispositions of Students

Studying the habits of mind to think critically has been started recently after the publication of CCTDI, the assessment tool to measure dispositions, two years after the wide recognition of dispositions as one important component of CT in the 1990 Delphi Research. Since there had been no instrument to measure dispositions before 1992, the most widely known measures of CT were only skills tests (Facione, et al.1996 and 1997).

The dispositions assessment tool (CCTDI) reports scores ranging from 10-60 on each of the seven scales and a total score of 70 – 420 as a sum of its seven scale scores. A subscale score of 40 or above indicates affirmation of the characteristic, a score of 30 or less indicates a disinclination or hostility toward that same characteristic. A score of 31 – 39 indicates ambivalence. A total score of 280 or higher indicates a positive overall disposition toward CT, whereas a total score of 210 or below indicates the negative disposition averring CT (Facione, 1992).

(A) Dispositions of Young Students

In 1992, Ferguson and Vasquez made an analysis of the pretest and posttest CCTDI data on 254 French speaking Canadian seventh grade science reasoning students. The total scores at both the pre and post tests revealed their positive overall disposition towards CT. Moreover, they showed a statistically significant mean gain from 290 – 296 on total CCTDI scores over a period of one year (Facione et al., 1996 and Facione et al., 1997).

The fact that the students showed a significant improvement while they had not been given any separate CT instruction during the course of the year, might indicate that growth in overall disposition might occur in the context of instructions focusing on skills and procedures associated with good reasoning in a content area.

By contrast, as noted by Facione et al. (1997), a study of 85 English speaking junior high students in Texas reported an overall CCTDI score of 260, which indicates ambivalence toward CT. The lowest among the seven subscales of the inventory was Truth-seeking with a mean of 33.6 which indicates the students' ambivalence to seek for best knowledge, and pursue reasons and evidence. This finding corroborates with McBride's finding (cited in Facione, et al., 1997) which indicated aggregate high school students' indifference toward CT.

In an other study, which captured data on 154 students at entry to and exit from a private, comprehensive liberal arts college using CCTDI, Facione et al., noted a statistically significant mean gain was noted in the overall disposition score of the students from 303.4 to 310.8 as freshman and senior students in 1992 and 1996 respectively. A further analysis of the data showed that a statistically significant growth occurred in truthseeking where the 1992 score was 36.1 (i.e in the ambivalent range) and the 1996 score landed in a neutral zone at 38.9.

(B) Experimental Research on the CT Skills and Dispositions of Students

Although some recent investigations show the low level of higher education students' critical thinking skills and dispositions (Facione,1995 and Guest, 2000) psychologists claim that critical thinking skills can be learned and that dispositions toward CT can be encouraged to develop (Facione et al., 1997).

A recent experimental study by Remiene (2002) confirmed that CT development programs influence the CT skills and dispositions of students. Remiene took a total of 227 students, which were divided into two groups as experimental (N=77) and control group (N=150), as his research participants from Vilnius Pedagogic University. Their ages ranged from 20-21.

The experimental group took part in CT program which aims at introducing students to CT theory, developing CT skills, and strengthening motivation for CT. They also learnt the principles and stages of CT, the main criteria of successful thinking, and solved different problems that require the use of CT skills.

Both groups were given a pre and post test of CCTST as well as CCTDI. The independent sample t-test administered on the pretest results of the two groups' yielded evidence that the groups were equivalent in their CT abilities at the beginning of the study. Moreover, no significant differences were noted between the experimental and control group on their overall mean scores as well as subscale scores in both tests.

A paired sample t-test was administered on the experimental group to see whether there is significant difference between the mean scores of the students before and after the CT development program. The results of the analysis showed a significant improvement in the overall scores of students on both tests-CCTST and CCTDI- over the two administrations. The overall CCTDI mean score of the students improved from an ambivalent range (274.17) to a positive

range (285.91) on CCTDI. A further analysis of the mean scores of the individual subscales also showed significant difference between the two administrations on open-mindedness, analyticity, systematicity, self confidence, and maturity. Two of the subscales remained unchanged: truth seeking and inquisitiveness. Moreover, significant differences were noted between all the mean scores of the CCTST subscales as well as overall mean scores (13.23-17.61).

By contrast, a similar analysis of the paired sample t-test on the pre and post test results of the controlled group revealed no significant difference between the two administrations.

(C) Cross Cultural Studies on CT Dispositions of Students

Xiang, Wittenbeurg, and Shena (2002) compared the CT dispositions of 218 U.S. and 234 Chinese preservice physical education teachers and further analyzed the effects of culture and gender on CT. The ages of the participants range from 20-23. CCTDI was used to assess their dispositions to CT.

The U.S. sample were drawn from nine representative Universities which offer programs on secondary methods class in physical education on voluntary basis. the participants were either seniors or juniors at the time of the study.

The Chinese samples were selected using purposive sampling so as to select participants whose characteristics match their US counterparts.

Cronbach's Alpha coefficients were calculated for each of the subscales of the inventory (CCTDI) by taking samples from both groups to determine the internal consistency of the items. Although all the subscales showed high reliability (0.53-0.57)for the American sample, three of the seven subscales (analyticity, systematicity, and open mindedness) showed low reliability. Hence, the comparison was made only on the four subscales of the instrument.

The American scored higher than the Chinese in all the four scales: truth seeking, inquisitiveness, maturity, and CT self confidence. Overall, the American sample showed positive endorsement (>40) toward CT on three of the four subscales, whereas the Chinese sample showed the same on two of the subscales. The American sample scored higher on the truthfulness (M=38.17 Vs 34.62) and the inquisitiveness (M= 44.01 Vs M = 43.29) scales. Greater differences were noted on the maturity (M= 42.66 Vs 39.35) and CT self confidence scales (M= 43.90 Vs M=40.72). Consequently, the Americans outscored the Chinese in total mean scores.

The data was further analyzed using MANOVA to see the effects of culture and gender on CT dispositions of the two groups. The results showed a main effect for culture. However, there were no significant main effects for gender, nor any interaction between culture and gender. Follow-up univariate F-tests revealed that culture had an effect on Maturity and Self-confidence. On the other hand, no significant differences were noted between the two cultures on either the Truth-seeking or Inquisitiveness subscales.

The differences noted in the self confidence and maturity subscales were reasonably explained by the authors as resulting from the noticeable cultural differences between the two groups. The Chinese culture which highly encourages collective thinking and group solidarity was supposed to negatively influence the results while the U.S. culture which promotes more individuality and inner directedness might have positive impact on those dispositional attributes.

UNIT THREE

3. METHODOLOGY

3.1. Research Design

The major objective of this research, as mentioned in the preceding units, is to examine the current status of college seniors' CT skills and dispositions. It also aims at investigating possible interrelationships between the two components of CT and academic achievement as measured in cumulative college GPA.

To this end, the survey method, which is the most commonly used descriptive method in educational research is employed for it helps to " (a) describe the nature of existing conditions, or (b) identify standards against which existing conditions can be compared, or (c) determining the relationship that exist between specific events." (Cohen & Manion, 1980, p.94)

3.2. Target Population of the Study

The target population of this study was seniors in the Department of Foreign languages at Addis Ababa University. The students were pursuing their studies in the teaching stream of the Department; they were trained to be English teachers upon completion of their studies.

The rational for this exclusive focus on the would-be English language teachers is two-fold.

- Critical thinking skills are generally important for teachers as they are entrusted with the task of producing learners who are able think critically. Teachers need to be role models to their students. They cannot teach them to think critically without themselves being critical thinkers. As pointed out by Mckendree et.al. (2002) " Instead of providing only an argument from authority (teacher) that one should think critically, perhaps the most powerful way to get students to adopt the model is to show the process in action." (p.65)

- Critical thinking skills are especially necessary for language teachers because their profession requires them to delve into the various disciplines and aspects of life. The willingness and ability to think critically are very crucial for the language teacher, as contents of language lessons are naturally drawn from different disciplines. So, the preparation and teaching of language tasks require competence in such cognitive skills as analyzing, synthesizing, evaluating etc. This implies that CT abilities are among the core skills required of language teachers.

3.3. **The Sample of the Study**

The total population consisted of 150 students. Out of these a total of 70 students (55 males and 15 females) were selected as a sample using a combination of purposive and simple random sampling techniques. The procedure of selection was as follows.

First the list of students attending their studies in the teaching stream of the Department was taken from the Department of Foreign Languages. Then a simple observation of the name list helped the researcher to learn that the

number of males and females was quite incompatible. Thus, it was decided to apply purposive sampling technique to take all the females as participants of the study so as to attain a good representation of the female population. However, in the selection of the male participants simple random sampling technique was used for it provides every member of the population the same opportunity of constituting the sample (Cohen & Manion, 1980; Seyoum & Ayalew, 1987). The following table presents the characteristics of the sample.

Table 1- Characteristics of the sample

Classification		No.	Percentage
Sex	Female	15	21%
	Male	55	79%
Age.	20-22	23	33%
	23-25	36	52%
	26-29	6	9%
	30-35	5	7%

3.4. Instruments Used for the Study

In order to measure the skills and dispositions of the students in CT, the following critical thinking test and a dispositions inventory were used.

(i) California Critical Thinking Skills Test (CCTST)

CCTST is a standardized CT skills test which was prepared on the basis of the 1990 Delphi consensus regarding the core skills which constitute CT cognitive abilities (see literature review above). It is a 34 items discipline neutral multiple choice test which aims at measuring the reasoning abilities of high school and above learners on a wide range of universal issues (Facione et al., 1990). Besides, the test measures the learners capabilities on six major cognitive skills subscales- interpretation, explanation, analysis, inference, evaluation, and self regulation- which add up to give a general picture of their CT ability.

Although this test yields both subscale and overall CT skills scores, in this study, only overall scores in the test are considered since the focus of the research was generally to learn about the degree of development of overall CT skills of the sudents rather than the discrete skills they might possess. Moreover, the individual subscales are so overlapping that considering them as one whole seems more sensible than analyzing them as separate skills in the real sense of the term.

Validation studies conducted from 1989-1990 indicated that the internal consistency estimates (KR-20) of the test range from .68- .70. This indicates that the test is quite reliable. A KR-20 between .65 and .75 is desirable for an instrument of this kind which was intended to measure a variety of cognitive abilities (Facione et. al., 2002).

A pilot study on 20 college students which was conducted to check the instrument reliability in the Ethiopian context also produced a KR- 20 reliability coefficeint of .70.

(ii) California Critical Thinking Dispositions Inventory (CCTDI)

Like the CCTST, CCTDI was a standardized test prepared following the Delphi (1990) expert consensus regarding the behaviors that characterize the ideal critical thinker.

The inventory has a total of 75 statement prompts, phrased in standard English, which express familiar opinions, beliefs, values, expectations and perspectives to be answered in a six-point likert scale ranging from strongly agree to strongly disagree. For each item to agree or disagree is consonant with or in opposition to a recognized CT dispositional attribute. Values ranging from 4-6 and 1-3 are given for agreement and disagreement with the statements that express the various dispositional attributes respectively. As the inventory has a forced choice scale, participants can hold neither middle nor neutral positions. The test gives total dispositions score as well as separate scores on the seven interdependent but distinct subscales of the inventory. The scores indicate if the participants have positive, negative, or ambivalent dispositions toward CT. Both total test score and subscale score analysis were done in this study.

Repeated pilot tests on large number of standardizing population have proved that the test is highly reliable. Alpha reliabilities for the seven subscales in the

initial CCTDI pilot sample ranged from .71-.80 while that of the overall instrument was .91. Second administration of the test to 1019 college freshmen also remained relatively stable, ranging from .60 to .78 on scales and .90 on the overall test (Facione et al., 2001).

Similarly, a pilot study conducted by the researcher on 20 freshmen at Unity University College produced a high Chronbach alpha reliability coefficient (r = .72) indicating the internal reliability of the instrument. Informal discussions were also made with some selected students regarding the clarity of the test items. Finally minor adaptations were made in the wording of some of the items on the basis of valuable feedback gained in the due discussion.

3.5. Procedures

3.5.1. Test Administration

After completing the selection of the sample, arrangements were made with one major course instructor to administer the tests during his regular class time which was a continuous 2 hours period. A day before the administration, the students were informed by their instructor about their being selected as a sample for a study, and they were also oriented about the importance of responding to the tests frankly. The instructor also convinced them about the need to answer all the test items with patience, as the tests are relatively long. This contributed a lot in making the participants psychologically ready for the tests even before the researcher met and briefed them.

Both tests were administered in one seat as recommended by the original test publishers in the respective test manuals (Facione et al., 2001; and Facione et al., 2002). The CCTDI was administered prior to the CCTST so as to decrease the likelihood of giving cue to the respondents as to the socially desirable responses to the CCTDI. To insure clarity in the understanding of instructions and content of the tests, both tests were administered in the presence of the researcher.

Relatively longer times were given for the tests compared with the time recommended in the original test booklets. Especially for the CT test (CCTST), considering the speed of understanding, the language proficiency of the students, and other related factors an hour and half was given even if the time allowed in the original test was only 45 minutes. For the Inventory (CCTDI), as the statements were short and made very simple most of them were able to complete them in 20-30 minutes. In fact, the recommended time was also 20 minutes.

3.5.2. Scoring and Interpretation of Test Scores

In the CCTST, total scores could possibly range from 1-34 as every correct and incorrect answer carry 1 and 0 points respectively. Whether the students have demonstrated acceptable levels of CT skills or not was interpreted by comparing their mean scores with the norm established for college students on the basis of a large number of standardizing sample.

As discussed in the test manual (Facione et al., 2002), norms have been established for three groups of participants: college students (with no prior exposure to CT instruction), nursing students working towards their masters, and cadets in law enforcement academy.

Among the aforementioned three norm groups, the first one seems an appropriate reference to compare (interpret) the data at hand with. It has a number of similarities with the participants of the present research. This norm group as explained by Facione et al. (2002) was established on the basis of the analysis of 781 tests completed by a representative sample of college students during the 1989/90 academic year. The group was composed of college seniors, juniors, and freshmen whose average age was 22 years. They also had no prior exposure to CT instruction. A significant number of the norm group (19%) reported that English was not their native language. The following is the descriptive statistics depicting the results of this norm group in CCTST.

Table 2- Descriptive statistics showing the CCTST results of the norm group

No	minimum	Maximum	Mean	Median	Mode	Std.Error	Std.Dev.
781	2	29	15.89	16.00	16.00	0.159	4.457

Thus, in interpreting the present research, the above results were taken as reference due to the number of relevant similarities between the two groups.

In CCTDI, for each of the 75 items, scores might range from 1-6 depending on the level of agreement or disagreement with the given statements. Thus, every individual can have a subscale score ranging from 10-60 and an overall dispositions score ranging from 70-420. The interpretation of the results is as follows (Facione et.al.2001).

Table 3 - Interpretation guide for CCTDI results

Total score	Subscale score	Level of disposition to CT
Below 210	Below30	Negative
210-279	31-39	Ambivalence
280-350	40-50	Good/positive
Above 350	Above 50	Strong/ high

3.6. Data Analysis

The data gathered was scored, collated, and subjected to the following statistical analysis (using SPSS program) which enabled to answer the research questions set in the first unit.

1. Descriptive Statistics

To give a general picture of the results of the participants in the two tests, aspects of descriptive statistics like mean, and standard deviation were computed.

The overall mean scores of the participants on CCTST were used to infer the level of development of CT skills. Total scores of the participants on CCTDI indicate the strength or direction of their dispositions to think critically at three levels: positive, ambivalent and negative. The subscale mean scores on the seven dispositional scales of the CCTDI gave valuable information regarding the nature of the specific disposition on separate subscales.

2. Pearson Product Moment Correlation

Correlation coefficients were computed to determine the nature of relationship between:

(i) CT skills and dispositions

(ii) CT skills and academic achievement (as measured in GPA)

(iii)CT dispositions and academic achievement

3. Comparison of Means

One way ANOVA was computed to see whether academic achievement has an impact on the CT skills and dispositions of students. Thus students were divided into three groups as low, average and high achievers on the basis of their cumulative GPA's and comparisons of total mean scores were made on their CT skills and CT dispositions as revealed in the test results.

UNIT FOUR

4. RESULTS AND DISCUSSION

In this unit, the results which answer the research questions that guided this research are presented.

4.1 Critical Thinking Skills of College Seniors

One of the major aims of this research was to find out how well developed the critical thinking skills of the would-be language teachers of AAU are. Out of the 70 participants of the study, 53 completed the CT skills test while the remaining 17 returned incomplete or unattempted test booklets. Below is a table showing the results of those students who completed the test.

Table 4 - Descriptive statistics of scores on CCTST

Test	N	Min.	Max.	Mean	Mode	St.
CCTST	53	6	19	13.04	14	2.8

As can be seen from the table, a mean score of 13.04 and a modal score of 14 were gained by the students. This finding indicates that the students did not reach the threshold level to be considered adept at CT. Compared with the reference mean score (15.83), (see section 3.5.2) which is the norm for college students, the students demonstrated lower abilities in thinking critically.

Similarly, in an experimental study conducted on students of Vilnius Pedagogical University, Remiene (2002) found a pretest mean score of 13.23 indicating a similar weakness in CT. However after the experimental group took separate CT instruction their post test results in the same CT test (CCTST) improved significantly (17.61), indicating that CT skills are changeable if appropriate efforts are made to develop them. The studies conducted on the CT skills of Higher education students in Western Europe and USA also revealed that the students are disappointingly weak in their CT abilities (Facione, 1995; Guest, 2000;).

As noted by Lipman (1991) the development of a "community of inquiry" is essential for the development of CT skills within the individual. Entwhistle and Ramsden (1983) have also highlighted the importance of both horizontal (student-student) and vertical (student-teacher) interaction as detrimental to the development of CT skills.

However, the Ethiopian context doesn't seem to promote both conditions. In a traditional society like ours, the belief and practice of self initiated inquiry, independence of thought, and asserting one's individuality are among the important skills which do not seem much favored and encouraged. Our culture and way of life would rather seem to value compliance with the customs and traditionally established norms. Our educational system doesn't seem supportive either. Although both the government and institutions have espoused much commitment to the current paradigm shift from the traditional

teacher-centered approach to the modern student-centered one, its practical applicability doesn't seem successful. To mention one good example, with such large classes as 60 or above that we have in most of our schools and universities, it seems unrealistic to expect

good level of horizontal and vertical interaction to the level it promotes CT skills of the learners. Therefore, in light of these practical constraints, the lower CT abilities the students demonstrated are not surprising.

4.2. Critical Thinking Dispositions of College Seniors

The dispositions of the students toward CT were measured by the slightly adapted version of California Critical Thinking Dispositions Inventory (CCTDI). The 75 items of the inventory intended to elicit information on the seven component subscales of CT dispositions (see literature review). The items were interspersed throughout the inventory (see appendix A). Thus,

(i) items 1, 7, 11, 12, 19, 23, 43, 50, 62, 70 and 75 which form the truth seeking subscale measured the extent to which the students seek for the best knowledge (truth), to ask tough questions courageously, to peruse the truth rather than reflecting personal interest or bias. In general these items measured their level of intellectual honesty and objectivity in pursuing inquiry.

(ii) items 8, 20, 24, 28, 39, 41, 52, 64,and 73 aimed at measuring the level of open-mindedness to divergent views. They elicit valuable information regarding their degree of tolerance to opposing views and open mindedness to world views.

(iii) items 3, 6, 26, 31, 36, 38, 44, 45, 53, 57, and 58 which form the Analyticity subscales elicit information regarding the participants' alertness to problem situations and potential difficulties and also their demanding the application of reason and evidence in solving problems.

(iv) items 4, 9, 21, 25, 29, 35, 54, 63, 66, 68, and 74which constitute the systematicity subscale are intended to measure one's inclination to be organized, including to be focused, diligent and persevering.

(v) items 2, 18, 30, 32, 34, 47, 48, 49, 55, 59, 61, and 65 which form the inquisitiveness subscale measure the intellectual curiosity and the intention to learn things even if their immediate application is not apparent.

(vi) items 10, 16, 17, 27, 33, 37, 40, 46, 56, 69, and 71 form the CT self confidence scale which measures the trust one places on one's own reasoning and one's ability to guide others to make rational decision.

(vii) items 5, 13, 14, 15, 42, 51, 60, 67, and 72 constitute CT maturity subscales which measures the judiciousness which inclines one to see the complexity in problems and to desire prudent decision making.

The students' overall disposition toward CT was demonstrated by the sum of scores they earned in all the seven subscales, whereas their strengths in the separate constituents of overall disposition were inferred from the individual subscale scores they earned. The following two tables summarize the results.

Table 5- Descriptive Statistics on the CT dispositions of Students

Subscale	N	Min.	Max.	Mean	St. Dev.	Remark
Truth seeking	70	21	59	35.54	7.41	Ambivalence
Open mindedness	70	24	46	34.80	5.28	Ambivalence
Analyticity	70	38	63	48.37	5.61	Positive Disp.
Systematicity	70	34	62	50.07	5.73	High positive Disp.
Inquisitiveness	70	30	65	49.81	9.30	High positive Disp.
CT confidence	70	23	57	43.83	7.03	Positive Disp.
CT maturity	70	20	49	32.31	6.02	Ambivalence
Overall Disposition	70	205	350	294.37	23.74	Positive Disp.

Table 6- Frequency and Percentage of Students at the Various Levels of Disposition

Direction of disp.	Truth seeking		Open-mind.		Analyti-city		Systemati-city		Inquisitiveness		Confi-dence		Maturity		Total disposition	
	Fr.	%	Fr.	%	Fr.	%	Fr.	%	Fr	%	Fr.	%	Fr.	%	Fr.	%
Negative	16	23	15	21	-	-	-	-	-	-	2	4	21	30	1	2
Ambivalent	36	51	39	56	2	3	1	2	13	19	22	31	41	59	14	20
Positive	16	23	16	23	36	51	36	51	15	21	31	44	8	11	54	76
Strong pos.	2	3	-	-	32	46	33	47	42	60	15	21	-	-	1	2
TOTAL	70	100	70	100	70	100	70	100	70	100	70	100	70	100	70	100

Table 3 illustrates the dispositions of the students toward CT. Following the interpretation guide given in the test manual (see section 3.5.2.) the students showed a positive overall disposition toward CT; their overall disposition mean score was found to be 294.37. The above frequency table also shows that a large majority of students (a total of 78%) were positively disposed to CT. This finding goes in line with earlier findings of Facione et al., (1995) and Ferguson and Vasquez (1992) who reported positive overall dispositions of Liberal Arts College and French speaking junior high school students respectively. However, other studies have found ambivalent overall dispositions of students. The study of Facione et al., (1997) on English speaking junior high students and Remiene's (2002) pretest results of the experimental research on Vilnius Pedagogical University students are cases in point.

The high (positive) overall dispositions the students showed imply their willingness and internal motivation to be critical thinkers. From our common sense, we might assume that strong disposition toward CT could be integral to insuring the use of CT skills whenever required. This assumption seems to get sound support from motivational theories. Lewin, cited in Facione et al., (2000) confirms that motivational theory provides the theoretical grounds for the assumption that the disposition to value and utilize CT would impel an individual to achieve mastery over CT skills, being motivated to close the gap between what is valued and what is attained. Dewey's statement (cited in Facione et al., 2000, p33), "If we were compelled to make a choice between these personal attributes and ...some degree of technical skill in manipulating special logical processes, we should decide for the former.", would also reveal the importance of giving priority to the dispositions as they contribute importantly to the development of the skills.

Thus, the positive desire the participants of this research showed to use CT as a favored means of solving problems and making decisions is an important indication for their personal readiness to learn and use CT skills provided the external conditions are supportive. Moreover, their dispositions being positive while their CT skills are poor (as discussed in the preceding section) might also suggest that their prior schooling as well as university experiences have not been so supportive in developing their abilities. Schooling should not be assumed as the only facilitator for the development of CT skills though.

An examination of the students' subscale mean scores also gave evidence of their positive inclination towards most of the specific dispositional attributes.

As presented in table 5, the students showed high levels of positive dispositions in subscales of systematicity (mean =50.07) and inquisitiveness (mean = 49.89). Table 6 also shows that 98% and 81% of the participants demonstrated positive dispositions toward the respective dispositional attributes.

Systematicity is described as a tendency to approach specific issues, questions or problems in an orderly, focused, and diligent way. The large number of students who expressed their agreement with statements like "I always focus the question before I attempt to answer it." (item 9), "I am known for approaching complex problems in an orderly way" (item 54) and "If I have to work on a problem, I can put other things out of my mind"(item 68) indicate their valuing organization, focus and persistence in approaching problems of all levels of complexity rather than approaching them haphazardly. It also indicates that they have the habit of concentrating in their works instead of being easily distracted.

The students have also witnessed their endorsement of statements like "Studying new things all my life would be wonderful (item 2), "I look forward towards learning challenging things" (item 47) and "I really enjoy trying to figure out how things work", which reflect positive inclination to the dispositional element of inquisitiveness. Inquisitiveness addresses an individual's intellectual curiosity and desire to learn. Facione et al. (1995)

conclude that a lack of inquisitiveness signals a fundamental limitation of one's potential to develop expert knowledge and professional practices in a chosen field. Thus, the high mean score (49.89) the students recorded shows their great desire to learn about their chosen profession.

The mean scores in the analyticity (48.37) and CT confidence (43.83) subscales also revealed the students moderate levels of positive dispositions towards those attributes. Similarly the frequency table shows that a total of 97% and 65% of the participants showed their agreement with the statements which describe the characteristics of analytic and self confident person.

As discussed in the preceding section (see literature review), analyticity refers to the disposition of being alert to potentially problematic situations, anticipating possible results or consequences, and prizing the application of reason and the use of evidence evenif the problem at hand turns out to be challenging and difficult. The large majority's (97%) agreement with such statements as "It bothers me when people rely on weak arguments to defend good ideas" (item6), "when faced with big decision, I first seek all the information I can" (Item 26) and "People need reasons if they are going to disagree with others' opinion"(item 36) show their positive inclination towards this dispositional attribute. Their mean score (48.37) also gave an additional evidence for their desire to seek for reasons and evidence as they consider what to do, rather than decide on the basis of impulse, whim, fashion, pressure or caprice which are the vices of analyticity (Facione, et al., 2000).

The CT self confidence subscale results (mean = 43.83) also revealed the students endorsement of this important aspect of CT disposition. What characterizes persons with CT confidence is the trust they place on their own reasoning ability, and also the belief that others consider them as good at making reasonable judgments. These feelings were reflected in their agreement with statements like "I am proud that I can think with great precision" (item10), "Tests that require thinking, not just memorization are better for me"(item 16), and "My peers call on me to make judgments because I decide things fairly." (item 27) Facione et al. (1995) explain that these are the characteristics of culture that values individuality in both thought and action. Although it might be difficult to fully characterize our culture as encouraging independence in thought and action, the current finding, which revealed the majority's endorsement of this important aspect of CT disposition might indicate that the culture is showing good progress in this regard. This inturn gives good support for the flourishing of such character in most individuals. Moreover, the relatively high confidence the students expressed about their own reasoning skills might possibly generate from their successful accomplishment of their studies so far.

In contrast to the results of the students in the above discussed four subscales, the mean scores for three of the remaining subscales - truth seeking (35.54), open mindedness (34.80) and CT maturity (32.31) - revealed their ambivalent position regarding these dispositional elements. Table 6 also shows that 74%,

77% and 89% of the participants were found in the negative and ambivalent ranges in the respective subscales.

In the positive sense, these subscales represent the tendency to seek for answers as objectively as possible, to be tolerant of divergent ideas and opposing views, and to see the complexity and subtlety of problems, noting multiple possible resolutions respectively. In the negative direction being unable to step past personal bias, fear, self- interest, or preconception; being intolerant; and being simplistic in seeing things in stark, dualistic terms (good or bad, right or wrong etc.) correspond to the respective virtues associated with each subscale. However, the ambivalent position indicates that strong habits have not been formed in one way or another (Facione et al., 2001). Therefore, the students mean scores for the three subscales- truthseeking (35.54), open mindedness (34.80), and CT maturity (32.31) – suggest that they don't hold any clear position either in the negative or positive direction. Especially, the mean score on the maturity subscale is slightly higher than the range for negative disposition (< 30), whereas the truthseeking and open mindedness results show tendencies to be closer to the positive disposition range (> 40).

Despite the disparities in the overall results of most studies of dispositions, one common feature observed in such research, including the present one, is the lower level truth seeking mean scores which remained in the negative to ambivalence range. Even in the experimental research of Remiene (2002), at Vilnius Pedagogical College, where post tests were given after CT instruction,

the truth seeking mean score showed slight improvement (31.42 - 32.18) which was not statistically different from the pretest result. In both tests it remained in the ambivalent range. Facione et.al.'s (1997) cross sectional comparison of 567 college freshmen who entered college in 1992 with 317 graduating seniors at that same university in 1996 also showed that truth seeking scores were generally in the ambivalent range (36.1 and 38.8).

In line with this, Facione et.al. (1997) state, "From the data collected at scores of settings in a wide variety of contexts, it would appear that the majority of us are disposed not to seek the truth courageously and not to pursue reasons and evidence wherever they might lead."(p.9)

Generally, although research has repeatedly proved that CT skills and dispositions are changeable, the disposition to seek for truth seems an exception. The above discussed findings, including the present one, might suggest that college education, or even CT instruction, has not been so successful in impelling more students to show improvement in their attitude toward intellectual honesty, objectivity, and courageous desire for best knowledge. The other possible explanation for this widely recurring problem could be the scales inclination to personality measure than CT (Butkien, 1996). Infact, truthseeking and open mindedness were reported to have significant relationships with personality constructs like "openness to experience" and "ego resiliency" which represent awareness of inner feelings and a need for variety in

actions, and flexibility in adapting to situational constraints respectively (Costa & McCrae, cited in Facione et al., 2001).

4.3. Interrelationship between CT skills, CT Dispositions and Academic Achievement

Table 7- Correlation of CT skills, CT Dispositions and GPA

	CTS	CTD	GPA
CTS	1.00		
Sig.(2-tailed)			
N			
CTD	.002	1.00	
Sig.(2-tailed)	.991		
N	53		
GPA	-.089	**.333****	1.00
Sig.(2-tailed)	.524	.005	
N	53	70	

** P < .01

An examination of the students' performance in CT skills test and scores in dispositions inventory revealed no significant relationship between CT skills and dispositions. As can be seen from table 7, an analysis using Pearson's correlation coefficient support this point ($r(53) = .002$, $p > .05$).

Other empirical studies which investigated the relationship between these two components of CT also support the present finding. In a research conducted on a sample of 133 accounting professionals, although higher levels of CT abilities (score of 21.7 in CCTST) and positive CT dispositions were found, the correlation between the two was closer to zero ($r = .091$) (Blohom,1998). In addition, in studies of nursing undergraduates, at entry and exit from college, Facione et al. (1997) reported similar results. Although the correlation coefficients were found to be statistically significant, they were all very weak, ranging from .169 to .318. This might indicate the poor practical significance that might exist between the two variables. Thus, the current finding, being consonant with the former results, confirms the fact that CT skills and dispositions are two distinct elements of CT. In fact, these results would take us to Facione et.al.'s (1996) conclusion that being skilled does not assure one is disposed to CT and vice versa.

The other important relationship which was hypothesized in this research as prevailing was between academic achievement and the two components of CT-CT skills and dispositions.

The above table illustrates that there is a weak inverse relationship between GPA and CT skills. Besides, it is statistically insignificant ($r(53) = -.089$, $p > .05$).

On the other hand, overall dispositions to CT significantly correlated with GPA ($r(70) = .333$, $p < .01$). This indicates that the variance in GPA accounted for by the variance in CT dispositions and vice versa is around 11%. The remaining variance could be attributed to other causes. Other studies conducted on this area have also indicated that in school subjects where reasoning is involved, scores in CT dispositions significantly correlate with achievement scores in those subjects. A case in point is the positive significant correlation ($r = .35$, $p < .01$) between CT disposition scores and achievement scores observed in the study of science reasoning junior students (Facione et.al., 1997).

4.4. **Critical Thinking Skills and Dispositions of Low, Average and High Academic Achievers**

To see whether or not CT skills and dispositions of the students differ with the differing levels of academic achievement the sample were divided into three groups using the scatter gap method. GPA was used as a measure of academic achievement. Hence, the following classifications were made.

Table 8- Classification of the Participants According to Their Achievement

Group	N	GPA	Level
1	20	2.00 – 2.50	Low achievers
2	29	2.60 – 2.80	Average achievers
3	21	2.85 -3.67	High achievers

This classification is also somehow consistent with the percentile classification. Considering the top 25% and the lower 25% as high and low achievers, and the middle 50% as average achievers also produced a similar classification (2.00 - 2.50, 2.51 -2.85, and 2.86 and above). However the scatter gap method was preferred for it showed the gap between the three levels of classification clearly.

The following table illustrates the descriptive statistics for the students in the different academic achievement strata.

Table 9- Descriptive statistics showing the CT skills and CT dispositions of the students at three levels of achievement

Test	Group	N	Mean	St. Dev.
CT Disposition	1	20	282.55	24.44
	2	29	295.00	20.32
	3	21	304.76	23.37
TOTAL	-	70	294.37	23.74
CT Skills	1	14	13.14	2.88
	2	25	13.24	2.52
	3	14	12.57	3.32
TOTAL		53	13.03	2.80

As can be seen from the table, the groups showed varying degrees of CT dispositions and skills. A mean dispositions score of 282.55, 295.00, and 304.76 were earned by the low, average and high achievers respectively. In the CT skills test, the groups earned a mean score of 13.14, 13.24, and 12.57 respectively. From these scores, some differences across the groups could be noticed. But the major question here is, whether the difference is statistically significant or not. A one way ANOVA was run to find an answer for this question.

Table 10- Summary ANOVA for CT skills and Dispositions of the groups at three levels of achievement

		Sum of	df	Mean	F	Sig.
CCTST	Between	4.222	2	2.111	.261	.771
	Within	403.703	50	8.074		
	Total	407.925	52			
CCTDI	Between	5073.583	2	2536.792	**5.022***	.009
	Within	33844.760	67	505.146		
	Total	38918.343	69			

* **P < .05**

The ANOVA summary table shows that the three groups do not differ significantly in their CT skills (F (2, 52) = .261, p >.05). This indicates that academic achievement has no impact on the development of CT skills of the students. This, inturn, could probably suggest that their academic achievement might not be a reflection of their employing the core cognitive skills as used in CT in doing their exams. In other words their exams might have required using mainly lower order cognitive skills.

However, in a similar study which compared the CT skills of high and low achievers, after attending a CT instruction program for months, Zohar and Dori (2003) found that students with high academic achievements gained higher thinking scores than their peers with low academic achievements. However, students of both subgroups made considerable progress with respect to their initial scores. This implies that academic achievement has an impact on the CT skills of the groups if an element of reasoning is included in the curriculum.

On the other hand, significant differences were found between the overall CT dispositions of low, average and high academic achievers ($F(2, 69) = 5.022$, $p < .05$). Hence, post hoc multiple comparison (Tukey HSD) was made to find out which pair showed significant difference.

Table 11- Post Hoc Tests Using Tukey HSD (Dependent Variable: Total Disposition)

I (Group)	J (Group)	Mean diff. (I –J)	Std. Error	Sig.	95% confidence Interval	
					Lower bound.	Upper bound.
1	2	-12.4500	6.5327	.145	-28.1082	3.2082
	3	**-22.2119***	7.022	.007	-39.0434	-5.3804
2	1	12.4500	6.5327	.145	-3.2082	28.1082
	3	-9.7619	6.4400	.290	-25.1978	5.6740
3	1	**22.2119***	7.0222	.007	5.3804	39.0434
	2	9.7619	6.4400	.290	-5.6740	25.1978

* The mean difference is significant at .05 level

The post hoc comparison carried out using the Tukey HSD test revealed that high (group 3) and low academic achievers (group 1) significantly differ in their CT dispositions. The mean difference (22.2119) was found to be significant at.05 level of significance. This provides evidence that academic achievement has an impact on one's internal motivation to think critically. High achievement is found to be associated with high level of disposition while lower achievement is associated with lower levels of disposition.

UNIT FIVE

5. SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. Summary

The literature has established that CT is about effectively making sound judgments regarding what to believe or do. And in making judgments, two distinct components of CT, CT skills and CT dispositions, come into play. Like other skills, CT skills are manifested in performance. The extent to which a person is adept at CT can be inferred from his ability to apply cognitive skills like explanation, interpretation, analysis, synthesis, and evaluation as required by different problems and contexts. On the other hand CT dispositions refer to the consistent internal motivation to use one's own CT skills in deciding what to believe or do. Both components, skills and dispositions, are believed to play decisive roles in making purposeful and self-regulated judgments.

This study aimed at examining the extent to which CT skills and dispositions of seniors in the Department of Foreign Languages, AAU, are developed. It also aimed at investigating the relationships between CT skills, dispositions and academic achievement as measured in GPA. Moreover an attempt was made to see if academic achievement has an impact on the CT skills and dispositions of the students. A total of 70 students (55 males & 15 females) participated in the study.

Data was gathered using the slightly adapted version of California Critical Thinking Skills Test (CCTST) and California Critical Dispositions Inventory (CCTDI).Both instruments were prepared on the basis of the Delhpi (1990) expert consensus regarding the basic concepts of CT and critical thinker. The data was analyzed using descriptive statistics, Pearson product moment correlation, one way ANOVA, and the Tukey honestly significant difference (HSD) test.

Findings revealed that college seniors, who were supposed to be language teachers upon graduation, have underdeveloped CT abilities. Their performances in the CT skills test (mean = 13.04) showed that they are below the expected norm (15.83).

The relationship between CT skills and academic achievement (GPA) was also found very weak. This seems to suggest that the kind of cognitive skills required in CT might not be given adequate focus in the college curriculum. In fact, studies on Ethiopian higher education (Ayalew, 2002; Tekalign, 2001; Essayas, 2001)have established that teaching, curriculum, and assessment are characterized by the knowledge transmission model which mostly promotes lower order cognitive skills.

On the other hand, the students have demonstrated positive dispositions to CT. Their overall mean score and most of the subscale means indicated that they are well motivated to think critically. However, this research has also indicated that not all dispositional attributes are developed to the same extent. The higher scores they earned, especially, in the analyticity, systematcity, inquisitiveness and CT confidence subscales indicate that they are highly motivated towards this dispositional attributes while the truth seeking, open

mindedness and maturity subscale scores highlighted their weaknesses in those dispositional aspects. . Thus, this study has revealed that, though the students have the willingness to involve in CT, they have limited capacities to do so.

Investigating the possible relationships CT dispositions might have with CT skills and academic achievement was the other area of focus in this study. Results revealed that the CT skills and dispositions of the students have almost no relationship ($r = .002$). In fact, some scholars like (Facione et.al. , 1996; Ennis, 1996) have noted that despite their being important components of CT the two are separate things in people which are prized by educators and employers. However, significant correlation ($r = .333$, $P < .05$) was found between CT dispositions and academic achievement as measured in GPA.

The other important question addressed in this study was whether achievement has an impact on the CT skills and dispositions of the students. The one way ANOVA run to find out if high, average, and low achievers differ in their CT skills and dispositions revealed that the groups significantly differ in their CT dispositions, but not in their CT skills. The Tukey HSD post hoc test of multiple comparisons further indicated that particularly high and low academic achievers have significantly different levels of dispositions. Both the mean comparison (ANOVA) as well as the correlation results proved that high academic achievement is associated with high CT disposition.

5.2. Conclusion

Based on the findings of the study the following conclusions have been reached.

1. The critical thinking skills of the would-be language teachers are found to be poor as hypothesized by the researcher. Moreover, counter to our common sense expectation as teachers, the relationship between academic achievement and critical thinking skills is found to be insignificant.

2. The students' dispositions towards CT are generally found positive indicating their endorsement of the application of critical thinking in solving problems and making decisions. This was generally noted from the overall positive dispositions mean scores they earned in the CCTDI and also the mean scores they recorded in four of the seven subscales of the inventory: Analyticity, Systematicity, inquisitiveness and CT self confidence. However the students have shown ambivalent dispositions in the subscales of truthseeking, open mindedness, and CT maturity.

3. The relationship between CT dispositions and academic achievement is found to be direct and statistically significant. Both were found to covary in a similar direction.

4. Academic achievement's influence on the CT dispositions of the students was also proved in this research. Low and high academic achievers significantly differed in their dispositions to CT.

Generally, this research has revealed that the students greatly value the application of CT in their life. But the dismal level of CT skills they possessed might inhibit the effective realization of what is valued. This indicates the great need to narrow the gap between what's valued and the possibility of its application by devising some ways of CT skills improvement programs.

5. 3. Recommendations

On the basis of the conclusions reached in the study the following recommendations are given.

1. The poor CT skills the students showed in this research are worrisome indicators of their under preparation and incompetence in coping up with the challenges of this complex and dynamic world. Hence, educational institutions, especially tertiary levels, should revise and update their curriculum so as to give due emphasis to the cognitive skills which enhance the CT skills of the students.

2. Class room practitioners should evaluate and revise their courses, lessons and methods of teaching in such a way that they promote the CT skills of their students and also instill in them the habits of thinking critically.

3. Teachers should be role models to their students by demonstrating some behaviors of critical thinkers and also encourage them to form the intellectual habits of thinking critically.

4. Continuous and progressive follow up and assessment of students' performances should be made to diagnose the possible problems in the CT skills and dispositions of the students at the different stages of their studies. On the basis of the assessments, appropriate remedial measures should be taken to improve their CT skills and nurture better habits of thinking.

5. Teachers and Educational administrators should make efforts to ensure conducive school climate that makes students feel free to participate actively in activities which enhance their critical thinking skills.

6. CT skills and dispositions are highly required by every one irrespective of age so as to cope up with the challenges of the present day complex world. Thus, parents and the wider community should create conducive home environment which facilitates the development and nurturing of CT skills and dispositions of learners from early childhood.

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Appendix- A

Addis Ababa University
School of Graduate studies
Department of Psychology

CCTDI
A Dispositions Inventory

General Instruction

THIS IS NOT A TEST!! **There is no right or wrong answer. The purpose of this inventory is to gather information related to your beliefs and attitudes on various issues. The value of this study is highly dependent upon the care and truthfulness you answer each item. Since your answers will be treated with the strictest confidence, feel free to answer all questions frankly and honestly.**

Directions

I. **Fill in the following personal information**

I.D.No._____

Sex_____Age_____

GPA (at the end of last semester)_____

II. **Indicate how much you agree or disagree with each numbered statement by putting a tick in the appropriate box. Please give your frank reply immediately after reading each item.**

Agreement	Disagreement
SA = strongly Agree	MD = moderately disagree
Ag = agree	D = disagree
MA = moderately agree	SD = strongly disagree

	Items	Agreement			Disagreement		
		SA	Ag	MAg	MD	D	SDA
1	Considering all the alternatives is a luxury I can't afford.						
2	Studying new things all my life would be wonderful.						
3	The best argument for an idea is how you feel about it at the moment.						
4	My trouble is that I'm easily distracted.						
5	It's never easy to decide between competing points of view.						
6	It bothers me when people rely on weak arguments to defend good ideas.						
7	The truth always depends on your point of view.						
8	It concerns me that I might have biases of which I'm not aware.						
9	I always try to understand the question clearly before I attempt to answer it.						
10	I'm proud that I can think with great precision.						
11	We can never really learn the truth about most things.						
12	If there are four reasons in favor and one against, I'd go with the four.						
13	Men and women are equally logical.						
14	Advice is worth exactly the effort you made to get it.						
15	Most college courses are uninteresting and not worth taking.						
16	Tests that require thinking, not just memorization, are better for me.						
17	I can talk about my problems for hours and hours without solving anything						
18	Others admire my intellectual curiosity and inquisitiveness.						
19	Even if the evidence is against me, I'll hold firm to my beliefs.						
20	You are not entitled to your opinion if you are obviously mistaken						
21	I pretend to be logical, but I'm not.						
22	It's easy for me to organize my thoughts.						
23	Everyone always argues form their own self interest, including me.						
24	Open-mindedness (tolerance) has limits when it comes to right and wrong.						
25	It's important to me to keep careful records of my personal finances.						
26	When faced with a big decision, I first seek all the information I can.						
27	My peers call on me to make judgments because I decide things fairly.						
28	Being tolerant of divergent views means you don't know what's true and what's not.						

29	Banks should make checking accounts a lot easier to understand.						
30	It's important to me to understand what other people think about things						
31	I must have grounds for all my beliefs.						
	Reading is something I avoid, if possible.						
33	People say I rush into decisions too quickly						
34	Required subjects (service courses) in college waste time						
35	When I have to deal with something really complex, I totally get frustrated..						
36	Foreigners should study our culture instead of us always trying to understand theirs.						
37	People think I hesitate about making decisions.						
38	People need reasons if they are going to disagree with another's opinion.						
39	Being impartial (unbiased) is impossible when I'm discussing my own opinions						
40	I pride myself on coming up with creative alternatives						
41	Frankly, I am trying to be less judgmental.						
42	Frequently I find myself evaluating other people's arguments.						
43	I believe what I want to believe.						
44	It's just not that important to keep trying to solve difficult problems.						
45	I shouldn't be forced to defend my own opinions						
46	Others look to me to establish reasonable standards to apply to decisions.						
47	I look forward to learning challenging things.						
48	It makes a lot of sense to study what foreigners think.						
49	Being inquisitive is one of my strong points.						
50	I look for facts that support my views, not facts that disagree.						
51	Complex problems are fun to try to figure out .						
52	I take pride in my ability to understand the opinions of others.						
53	Analogies (comparisons) are not so useful.						
54	You could describe me as logical.						
55	I really enjoy trying to understand (figure out) how things work.						
56	Others look to me to keep working on a problem when the problem gets tough.						
57	Getting a clear idea about the problem at hand is the first priority.						

58	My opinion about controversial topic depends a lot on who I talk to last.						
59	No matter what the topic, I am eager to know more about it.						
60	There is no way to know whether one solution is better than another.						
61	The best way to solve problems is to ask someone else for the answer.						
62	Many questions are just too frightening to as.						
63	I'm known for approaching complex problems in an orderly way.						
64	Being open-minded about different world views is less important than people think.						
65	Learn everything you can, you never know when it could be used.						
66	Life has taught me not be too logical.						
67	Things are as they appear to be.						
68	If I have to work on a problem, I can put other things out of my mind.						
69	Others look to me to decide when the problem is solved.						
70	I know what I think, so why should I pretend to spend much time thinking about my choices.						
71	Powerful people determine the right answer.						
72	It's impossible to know what standards to apply to most questions.						
73	Others are entitled to their opinions, but I don't need to hear them.						
74	I'm good at developing orderly plans to address complex problems.						
75	To get people to agree with me I would give any reason that worked.						

Appendix-B

The California Critical Thinking Skills Test - 2000

DIRECTIONS: Read each question carefully. When answering select the *best choice from among those provided.* There are 34 questions. Each question is of equal value, so use your time wisely. You may write in this test booklet if you wish.

1. The teams in the city's youth recreational soccer program are meant to be evenly matched. Yet some teams are a little better than others. Suppose that last Saturday a team called the Sparklers defeated one called the Wildflowers. Suppose that the previous Saturday the Wildflowers had defeated a team called the Mustangs. What is likely to happen next Saturday when the Sparklers play against the Mustangs?

A= The Sparklers will certainly win.
B= The Sparklers will probably win, but might lose.
C= The Sparklers will probably lose, but might win.
D= The Sparklers will certainly lose.
E= The soccer game will end in a tie.

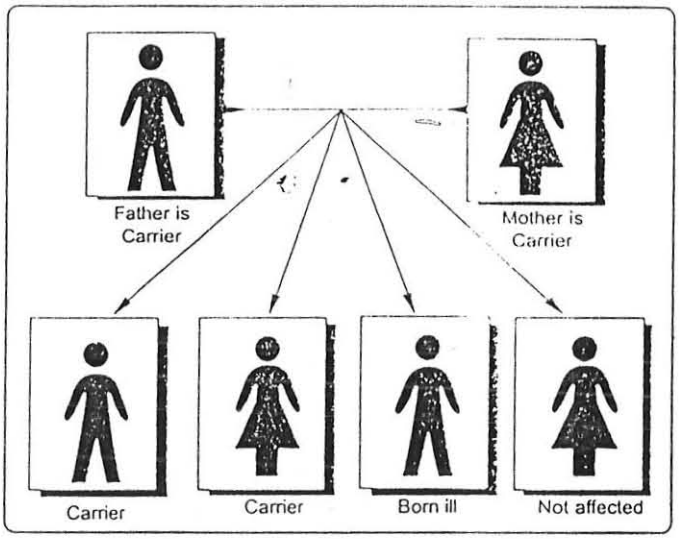
2. Consider the claim: "Even Thomas Jefferson used evasive language sometime," as this claim relates to the following reason: "After all, every politician has to please a constituency. And Thomas Jefferson, even though he was a great statesman, was also a politician. But nobody can please a constituency without, at least on some occasions, using evasive language." Assuming all the statements made as part of the reason are true, the initial claim

A= could not be false.
B= is probably true, but may be false
C= is probably false, but may be true
D= could not be true.

3. Suppose "Only those seeking challenge and adventure should join the Army" were true. Which of the following would express the same idea?

A= If you seek challenge and adventure, you should join the Army.
B= If you join the Army, you should seek challenge and adventure.
C= You shouldn't seek challenge and adventure except by joining the Army.
D= You shouldn't join the Army unless you seek challenge and adventure.

For questions #4 uses this diagram



4. Tay-Sachs is a genetic disease. The genes for this disease can be passed from a parent who is a carrier to that person's biological child. The diagram above indicates the probable pattern of passing Tay-Sachs from parents to their biological children. If both parents are genetic carriers of Tay-Sachs, their biological children have roughly a 75% chance of being affected. The probabilities break down this way: each biological child of two Tay-Sachs carriers has about a 50% chance of being a carrier and about a 25% chance of actually having the disease. Assume that Harvey and Sharon, who are married, are thinking that they want to have a child. When Harvey and Sharon undergo a Tay-Sachs screening test, they learn for the first time that they are both Tay-Sachs carriers. Given the information presented here, it follows that:

A= Their biological child will either have Tay-Sachs or be a Tay-Sachs disease carrier
B= Although the risks are high, it is possible that their biological child will be unaffected
C= Harvey and Sharon will think about the risks and decide not to conceive a child
D= Harvey and Sharon will still want to be parents and decide to adopt a child

5. "Ezerinians tell lies," means the same thing as:

A= If anyone is Ezerinian, then that person is a liar.
B= If anyone is a liar, then that person is Ezerinian.
C= There is at least one person who is an Ezerinian who lies.
D= People don't lie unless they are Ezerinian.
E= All of the above mean the same thing.

6. "Not all the candidates are qualified to serve," expresses the same idea as:

A= None of the candidates are qualified to serve.
B= Some candidate is not qualified to serve.
C= Someone qualified to serve is not a candidate.
D= All candidates are not qualified to serve.

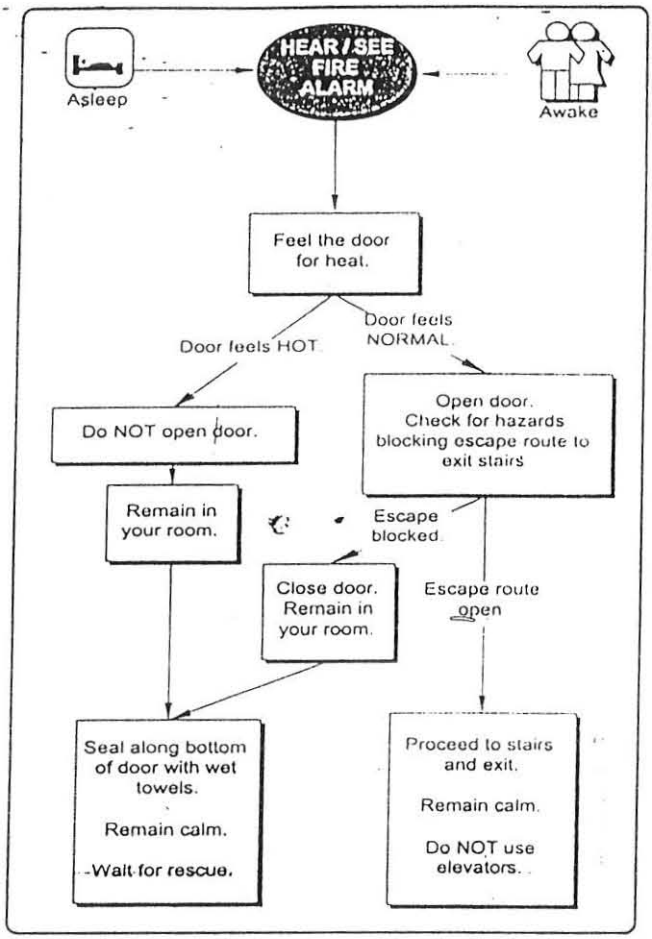
7. Passage: "The microorganisms in this pond are of the kind which generally reproduce only in water with a temperature above the freezing point. Now it's winter time and this pond is solid ice. So, if there are any microorganisms of the kind we are researching in the pond, they aren't reproducing right now." Assuming all the supporting statements are true, the conclusion of this passage

A= could not be inaccurate.
B= is probably accurate, but may be inaccurate.
C= is probably inaccurate, but may be accurate.
D= could not be accurate.

8. Consider this group of statements: "Nero was emperor of Rome in the first century AD. Every Roman emperor drank wine and did so using exclusively pewter pitchers and goblets. Whoever uses pewter, even once, has lead poisoning. Lead poisoning always manifests itself through insanity." Which of the following must be true if all of the above are true?

A= Those who suffer from insanity used pewter at least once.
B= Whatever else, Emperor Nero was certainly insane.
C= Exclusive use of pewter was a privilege reserved for Roman emperors.
D= Lead poisoning was common among the citizens of the Roman Empire.

For questions #9 and #10 use this diagram



9. Based on the chart above, if you were in your room on the fourth floor of a ten floor hotel watching television and you heard the fire alarm sound, you probably should

A= exit by the stairs.
B= go to sleep.
C= exit by the elevator.
D= remain in the room.
E= feel the door.

10. Suppose you wake up to the sound of the fire alarm and when you check the door it feels normal. Then you check the hallway. In the hall on the floor by each door you see a folded copy of the morning's newspaper. Next to one door you see some glasses, cups and dirty dinner dishes stacked on a room service tray. And, you see a few people with their suitcases calmly getting on the elevator to go down. And suppose the elevator is closer to your room than the stairs. In this case, you probably should

A= exit by the stairs.
B= remain in your room.
C= pack your suitcase
D= go down on the elevator
E= phone the desk for advice

11. "Many new and very specialized departments have been created recently within the corporation. This proves that the corporation is very interested in more sophisticated approaches to reaching the marketplace." This passage is best described as missing the unstated

A= conclusion, "The corporation will soon do a better job of reaching the marketplace."
B= conclusion, "Management wanted to come up with new approaches to reaching the marketplace."
C= premise, "The corporation was failing to reach the marketplace before these new departments were developped."
D= premise, "These new departments are working on sophisticated, new approaches to reaching the marketplace."
E= conclusion, "Corporations exist primarily, if not exclusively, to serve the interests of their owners."

12. "Research at the Happy-Days Preschool on the campus of State College showed that four-year-old children who attended the Happy-Days Preschool all day for 9 months averaged 58 points on a standardized test of kindergarten readiness. The research showed also that those four-year-olds who attended only in the morning for 9 months averaged 52, and those four-year-olds who attended afternoons only for 9 months averaged 51. A second study of four-year-olds who attended Holy Church Preschool all day for 9 months showed these children averaged 54 on the same kindergarten readiness test. A third study of four-year-olds who attended no preschool and were all from low income households showed an average score of 32 on the same test. The difference between 32 and the other scores was found to be statistically significant." Initially, the most plausible scientific hypothesis regarding the data is that

A= a child who scores 50 or higher is ready for kindergarten.
B= more testing is needed before a plausible hypothesis can be formed.
C= preschool attendance is not related to kindergarten readiness.
D= there should be funding for four-year-olds to attend preschool.
E= attending a preschool is correlated with kindergarten readiness.

13. Consider this passage: "(1) Poland was not a monarchy in 1926. (2) Indeed, many European historians regard the First World War as marking the end of viable European monarchies. (3) A generation later, when World War II started, there were no monarchies in Europe or the western hemisphere, except those which were purely ceremonial. (4) However, it would be a mistake to think we have seen the last of ruling monarchs without taking a serious look at the Middle East." The above passage is best described as:

A= An attempt to show that sentence (1) is true.
B= An attempt to show that sentence (2) is true.
C= An attempt to show that sentence (3) is true.
D= An attempt to show that sentence (4) is true.
E= None of the above because no attempt at proof is made.

Questions 14 and 15 are based on the following fictional situation: A college has exactly seven student clubs -- 1, 2, 3, 4, 5, 6, and 7. The college dean must pick exactly five club members, each from a different club, to serve on an important committee. Any combination of five people will do, except that if someone from 1 is selected, no one from 5 can be selected. Also, if someone from 3 is picked, someone from 5 must be picked. And, if someone from 2 is put on the committee, a member of 6 must also be put on the committee

14. Here are five possible combinations of people for the committee. Which is the only combination that meets all the conditions?

A= 1, 2, 4, 5, 6
B= 2, 3, 4, 5, 6
C= 2, 3, 4, 6, 7
D= 1, 4, 5, 6, 7
E= 1, 2, 3, 6, 7

15. Assume the dean decides not to select someone from club 7. In that case, which other club cannot be represented on the committee?

A= 5
B= 4
C= 3
D= 2
E= 1

16. "The cost of jet fuel has risen dramatically since the 1989 Exxon oil tanker disaster in Alaska and the 1991 war in the Middle East. In that same time the costs of several petroleum derivatives have also gone up sharply. These two facts establish that jet fuel is a petroleum derivative." The best evaluation of the speaker's reasoning is

A= good thinking, because jet fuel is a petroleum derivative.
B= good thinking, but not all the facts are stated accurately.
C= bad thinking. The cost of food has gone up in the same time, but that does not prove that jet fuel is food.
D= bad thinking. One can draw no conclusions about jet fuel, given facts about petroleum derivatives.

17. "In the half-light of predawn, little Christopher Joseph sat quietly with his nose pressed against the cool glass of his bedroom window. He wanted very much for it to be morning so he could go outside and play baseball. Concentrating very hard, he wished and wished for the sun to appear. And as he wished, the sky began to brighten. He kept wishing. And, sure enough, the sun moved right up over the horizon and into the morning sky. He was proud of himself. Christopher thought about what had happened and decided he could make any cold and lonely night turn into a bright and happy summer day, if he wanted." The best evaluation of Christopher's reasoning is

A= poor. That it happened after he wished it doesn't mean it happened because he wished it.
B= poor. The sun goes around the earth with or without his wishing it.
C= good. Christopher is only a child.
D= good. What evidence does he have that if he had not wished it, it would not have happened?

18. Suppose a botanist lecturing about garden plants said, "The rose offers many colors." Which would be the best interpretation of this claim?

A= There is a rose which is more than one color.
B= There is a thing that is more than one color and it is a rose.
C= All roses are more than one color.
D= Not every rose is the same color.
E= All of the above are equally acceptable interpretations.

19. "There seem to be two popular arguments in favor of the death penalty. One is that the cold fear of being put to death will deter others from committing the same terrible crimes. The second is that the death penalty appears more economical than the alternative, which is life in prison. But every scientific study conducted so far shows that the economic realities strongly favor life imprisonment. That people in general think the death penalty saves money doesn't change the economic facts! So, the death penalty should be abolished." The speaker's reasoning is best evaluated as

A= poor. It did not show the relevance public opinion.
B= poor. It did not address the argument about deterring others from crime.
C= good. It shows the death penalty probably should be abolished.
D= good. But it is factually mistaken about abolishing the death penalty.

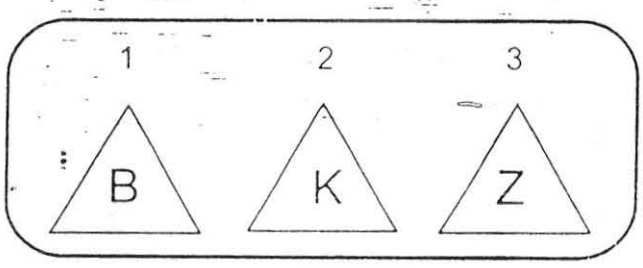
20. Passage: "Terry, don't worry about it. You'll graduate someday. You're a college student. Right? And all college students graduate sooner or later." Assuming all the support statements are true, the conclusion

A= could not be false.
B= is probably true, but may be false.
C= is probably false, but may be true.
D= could not be true.

Question #21 relates to the diagram below.

21. There are three triangle shaped cards on the table. Each has a letter of the alphabet printed on both sides. Which card or cards must you flip over to prove that the claim "If there is a K on one side then there is a B on the other," is always true?

A= Card # 1 only.
B= Card # 2 only.
C= Cards # 1, # 2, and # 3.
D= Cards # 1 and # 2, but not # 3.
E= Cards # 2 and # 3, but not # 1.



22. "In a study of high school students at Mumford High, it was found that 75% of those students who drank two or more beers each day for a period of 60 days experienced measurable liver function deterioration. That these results could have occurred by chance was ruled out experimentally with high levels of confidence." If true, the Mumford High information would confirm that

A= Drinking is statistically correlated with liver deterioration in adolescents.
B= Drinking causes liver deterioration in adolescents.
C= Sex is not a factor in the relationship between alcohol and liver deterioration.
D= The researcher had a personal reason to want to prove young people should not drink.
E= The drinking age laws are out of date and should be changed.

23. Consider this argument: "Person L is shorter than person X. Person Y is shorter than person L, but person M is shorter than Y. Therefore, person Y is shorter than J." What information must be added to require that the conclusion be true, assuming all the premises are true?

A= Person L is taller than J.
B= Person X is taller than J.
C= Person J is taller than L.
D= Person J is taller than M.

24. "A standard deck of 52 playing cards contains exactly four kings, four queens, and four jacks. For our purposes we will say that these twelve cards are the only 'face-cards' in the standard deck. The other cards are numbered ace through ten. For the sake of simplicity we can call these other cards the 'numbered-cards.' Now, suppose you are handed a well- shuffled standard deck of 52 cards. So, from what we know now, we can conclude that among the 52 playing cards in a standard deck there are precisely four each of jacks, queens, and kings." The author's way of demonstrating this conclusion is best evaluated as

A= poor. It proves nothing; as in "The sky is blue because it's blue."
B= good. The conclusion is an accurate restatement of the given facts.
C= good. The reasoning fully considers each card in the standard deck.
D= poor. It fails to consider the odds of drawing a face-card.

25. "Confidentiality is an important part of the relationship between doctor and patient. But protecting innocent people from serious harm is also important. Nobody can say with certainty which value is the more important of the two. This can create some agonizing dilemmas. For example, a doctor may know that a patient is going to harm someone or be harmed by someone, as in the case of suspected child abuse. This puts the doctor in a difficult situation regarding whether to maintain confidentiality or to inform the proper authorities about the suspected danger." The best evaluation of the speaker's reasoning is

A= good thinking, because confidentiality cannot be compromised.
B= good thinking, because in the abstract these values conflict.
C= poor thinking, because in practice doctors do choose one value over another.
D= poor thinking, because the law clearly says protecting the child is more important.

Questions #26 and #27 are related.

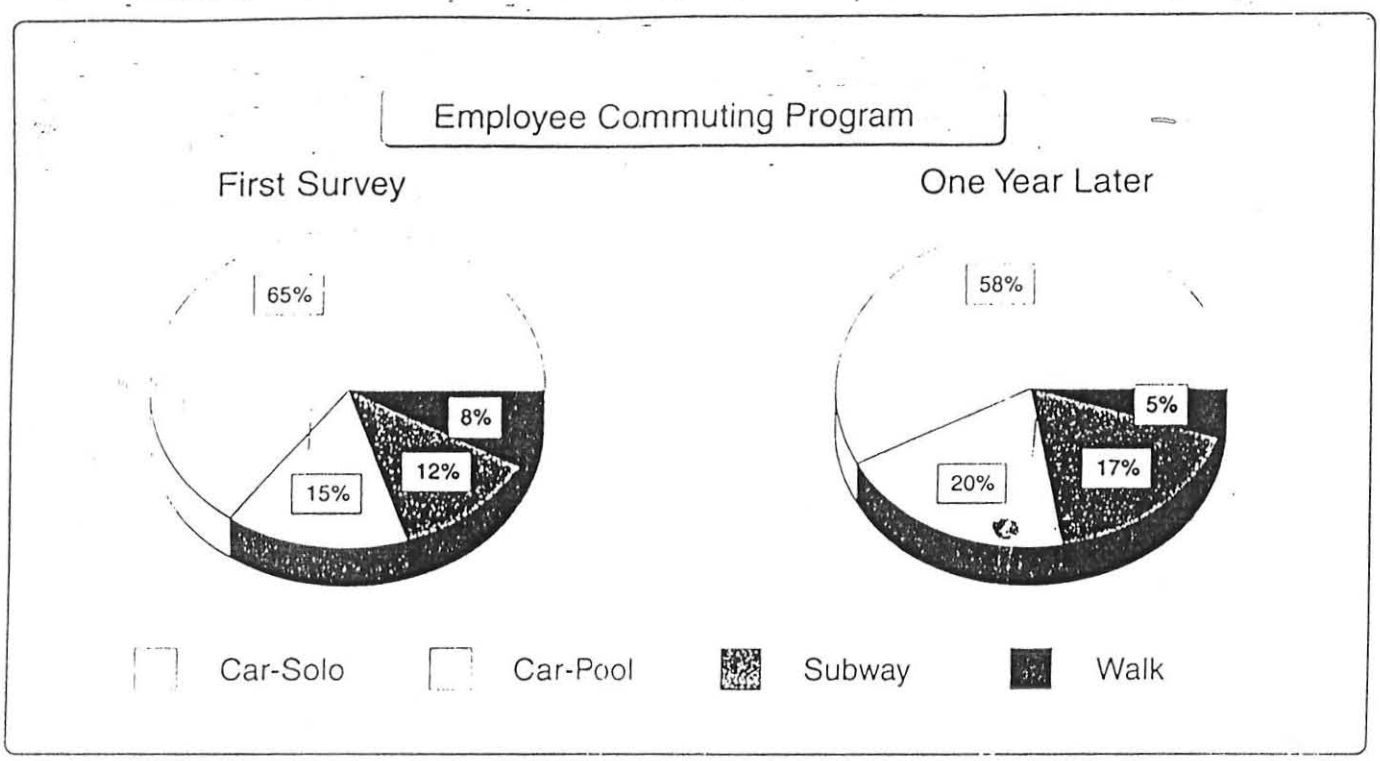
26. The bus between the airport and the rental agency can carry no more than ten passengers. There are 36 people waiting at the rental agency to go to the airport and 14 people waiting at the airport to go to the rental agency. If the bus starts at the airport and no additional people show up to go in either direction, how many trips between the airport and the rental agency must the bus make to deliver all 50 people where they want to go?

A= 5
B= 6
C= 7
D= 8

27. After the bus departed the second time with passengers bound for the car rental agency, 25 more people arrived at the airport bus stop wanting a ride to the rental agency. How many additional trips in each direction must the bus now make to accommodate the additional 25 people?

A= 0
B= 1
C= 2
D= 3

Questions #28, #29, and #30 are related to the two pie charts in "Employee Commuting Program"



28. From *First Survey* to *One Year Later*, the proportion of employees who commute solo by car has decreased

A= to 89% of its original size.
B= to 93% of its original size.
C= in proportion to the growth in subway and car-pool use.
D= in proportion to the reduction in walking.

29. The size of the increase in car-pooling can best be described as

A= a 33% growth in the use of car-pools.
B= a 25% growth in the use of car-pools.
C= a 5% shift from driving alone to car-pool use.
D= proportionately greater than the growth in subway use.

30. One week after gathering the data for the first survey, the company instituted an incentive program to encourage car-pools and commuting by subway as alternatives to commuting solo by car. Which of the following is the <u>least</u> consistent with the data as presented?

A= Solo commuting by car has decreased substantially.
B= The incentives for car-pooling and subway use seem to be working.
C= The proportion of total employees who use the subway has increased.
D= Nearly half of those who walked before now use the subway.

31. Assume that whenever it is snowing, streets and sidewalks are wet and slippery. Given that assumption, which of the following must also be true?

A= If the sidewalks and streets are slippery or wet, then it is snowing.
B= If it is not snowing, the streets and sidewalks are not slippery.
C= If the sidewalks are wet or the streets are slippery, it is snowing.
D= if the sidewalks are slippery but the streets dry, it is not snowing.
E= It is snowing, the sidewalks are wet and the streets are slippery.

Questions #32, #33, and #34 are all based on this scenario about being told to fire someone:

Although instructed by you to do so, your assistant fails to send an important package. You learn that the package never arrived at its destination. At first, when you ask your assistant about the package, he gets angry, insisting that he sent it on time. But eventually he realizes that you do not believe that. Then he says that he misplaced the package, and offers excuses about being very busy doing all the other things you had assigned him to do. Two hours later he comes to you saying that he has found the package under a pile of other things and it has now been sent to its proper destination. Uncertain what to do, you seek your supervisor's advice. Your supervisor says, "Fire that assistant." You disagree saying, "I don't think losing the package warrants being fired. Beside, we cannot fire him without first giving him a written warning as is required by our contract with the labor union." Your supervisor replies, "Fire your assistant anyway. And when you do it, you must tell the assistant it was you who insisted on the firing."

32. Consider this: If there is trouble over a possible contract violation due to firing the assistant, your supervisor wants to be able to say that it was your idea, not hers. In view of the scenario, that statement is

A= definitely the case.
B= plausible, but may not be the case
C= implausible, but may be the case.
D= definitely not the case.

33. A friend who does not work with you tells you, "Setting aside the union contract for a moment, there is sufficient reason for firing your assistant. He has lied. He is disorganized and loses important things. He did not even check with you about sending the package late, once he found it." The friend's reasoning is

A= poor, because the friend does not know the circumstances of work in your office.
B= poor, because the friend has not given the assistant the chance to defend himself.
C= good, because the assistant's poor work has hurt your business and your reputation.
D= good, because the assistant has performed in exactly these substandard ways.

34. Your twelve year old daughter says to you, "So, if you fire your assistant you will get in trouble with the union; but if you do not, you will get in trouble with your boss! No matter what, you will get in trouble eventually." Your daughter's reasoning is

A= poor, because a twelve year old cannot be expected to understand.
B= poor, because you cannot be sure what the union will do.
C= good, because right now there seem to be no other options.
D= good, because you always have the option of resigning from your job.

That was the last question.

If time permits, you may go back and check your answers.

Declaration

I confirm that this thesis is my original work

Name Fikirte Hlmariam

Signature

Date of submission June 18, 2005

This thesis has been submitted for examination by my approval as a university advisor.

Name TILAHUN SINESHAW

Signature

Date of submission 18 June 2005