

Critical Thinking for Instructional Effectiveness: The Model

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Abstract

Critical thinking and instructional effectiveness is a politically and culturally sanctioned theoretical and empirical scientific philosophy of higher learning in the academy. Politically, the external and internal organizational mechanisms for setting policy, providing resources for policy implementation, and the outcomes resulting from policy inputs, the processes of learning, practice and praxis regulated by supervisory administration are systematically and structurally political in substance. In addition, the political process is cultural because the culture of learning is cognitively scientifically, socially and technologically transmitted from one generation to the next, from the more mature, well educated, experienced and intellectually articulate group to the younger academic neophytes. These learners receive educational wisdom, moral empowerment, professionally related scientific training, culture and information that is essential for learner acquisition of knowledge, productivity and survival in collegiate and competitive workplace settings. These behaviorally, cognitively, humanistically oriented elements of universal academic pragmatism and developmentally constructivist values are influenced by the pentagonal realms of the nature and character of the individual learner, informed through the procedural quality and quantity of the integrative components of critical thinking, philosophies and methods of teaching, theories of learning and the evaluative standards for instructional effectiveness.

Introduction

The topic on critical thinking for instructional effectiveness in higher learning particularly in the age of globalization, regionally based economic and political competition and cyber infrastructure is both complex and analyzable. Critical thinking for instructional effectiveness does not happen in a vacuum or in separate niches of state institutional agencies vice-avis colleges and universities. But, the discussion on CTIE is a higher education issue that broadly concerns accountability and institutional autonomy on the one hand and the relationship between state institutional agencies and higher education institutions on the other. This relationship, which is also a policy partnership for both and between them, is intended to articulate issues of economic development, assessment, regulation/deregulation mechanisms, programs, gubernatorial and legislative involvement, lobbying and the satisfactory fulfillment of a variety of accreditation standards. In essence, higher education is no longer only decentralized and self-governing, but rather, it is a partnership that accountably places emphasis on educational reform, quality and instructional excellence, economic development, funding and effective governance, and the clarification of institutional missions. In other words, higher education institutions have to be meaningfully and functionally relevant in order to substantively create internal reforms that can enhance change via critical thinking and instructional excellence. In this endeavor, states can try to employ incentive financing measures that connect levels of appropriation to measurable institutional outcomes. The same states also create “set-a side” funds for exemplary institutional practices of which “faculty training, technological development and partnership with business and industry(Hines,1988) are paramount. Also, assessment as a policy issue controlled by state legislatures, focuses on quality in terms of demonstrated improved learning, student outcomes and program effectiveness determined through midlevel and exit comprehensive examinations. Further still, most public colleges and universities are charged with the responsibility for admitting minority students, increasing retention, improving graduation rates, and hiring more minority role model administrators, faculty and staff.

These kinds of solutions are conducive to the improvement of conditions that increase opportunities for minorities. Finally, state-institutional relationships do not only straddle the issues of accountability and autonomy, but, they also have become the glue that neutralizes feelings of institutional discontent arising from the tendency for these relationships to be negatively and institutionally viewed for their invasiveness in internal affairs.

In this arena, critical thinking intellectual and academic values are employed by academic administrators to provide educational excellence not only by articulating educational aims and purposes (teaching, learning, research and service), but also by rationalizing communal and self-regulatory accreditation requirements that are standards for quality, access and affordability (Duderstadt, 2009). The accreditation standards for maintaining quality may include but are not limited to the definitional prescriptive model, the mission objective model, the program professional model, external professional associations model, the separate accrediting teams model, and according to Millard, the institution specific standards-especially the “goals, programs and the success with which they are communicated to prospective or actual students” (Hegarty,1983:84) model. Though accreditation teams are largely concerned with institutional” resource allocation, access, consumer protection and productivity” (p.85), their prescribed regulatory philosophy is enhanced by a variety of institutionally implemented external standards such as the GRE, LSAT, MCAT, ACT SAT which are reinforced by individual learner’s GPA standards. The US has about 4400 higher institutions of learning that are viewed as either elitist or egalitarian “multiversities”. These colleges and universities differ in curricular reconstruction, managerial philosophy, operational standards, cyber instructural variation, institutional missions and different evolutionary historical trajectories in terms of academic traditions. Although their practical and empirical operations appear to be modern inventions, the roots of their contemporary functionalism radiate from the mists of Antiquity-Africa, Asia, Europe and more recently, North America(Sagini,1996). In the U.S., comprehensive research reflection on public policy as regards higher education attainment process in terms of student’s academic readiness for college education, it’s affordability, learning, and completion has been articulated in the social sciences academic arena. (McLendon and Perna 2014.) Through this analysis, U.S. State Boards and other higher education policy analysis strongly believe that:

- 1.) The states are the primary arenas in which improvements in higher education attainment can best be leveraged.
- 2.) Public policy is the appropriate and needed subject of research because policy is the principle vehicle by which states may accomplish substantial improvements in higher education attainment.
- 3.) Policy-makers and researchers stand to benefit most from scholarship that is inherently comparative, meaning that which draws on rigorous comparisons between and among states (McLendon, Cohen-Vogel, and Wachen 2014);
- 4.) Public policy as it relates to higher education attainment is multifaceted, requiring multidisciplinary perspectives and multiple research methods for understanding it;
- 5.) Learning how state policies can best improve higher education attainment requires deepened insights into the conditions that enable the design and implementation of effective policies;
- 6.) Improving higher education attainment requires attention to multiple intermediary student outcomes, including academic readiness for college; the ability of students to pay for college; the availability of information about college prices, financial aid, and academic readiness; and college completion (Perna 2006);
- 7.) Whether by design or by default, the choices that states make about the allocation of scarce public resources, such as spending decisions around state financial aid programs and general fund appropriations, hold notably important consequences for higher education attainment; and
- 8.) Improving higher education attainment requires attention not only to public policies per se, but also to the development of a public agenda for higher education and to the state-level leadership that is needed for sustaining that agenda (Perna and Finney 2014 and McLendon and Perna, 2014:11)

Critical Thinking

Critical Thinking is the ability to utilize rationality to think reflectively and independently in order to cognitively solve intellectual and academic matters in the academy. For instance, a critical thinker is a professor, student, administrator or professional who understands logical connections between and among ideas. In the process, the critical thinker has the ability to identify, construct and evaluate arguments. The same thinker can recognize inconsistencies and obvious errors in reasoning. The thinker provides solutions to problems in a systematic way.

He/she identifies relevant and major ideas in order to justify his/her beliefs and values (<http://philosophy.hku.hk/think/critical/ct.php>) and is able to differentiate factual, normative, interpretive and causal statements and arguments (<http://www.facultyfocus.com/articles/instructional-design/assignment...>).

Fundamentally, critical thinking evaluative systems such as Boards of Regents, managerial and instructional regimes tend to theoretically integrate the humanistic philosophical, psychological and cognitive theories of learning that explain how learners learn in order to cognitively solve problems. In this regard, critical thinking learners tend to be sensitive to classroom note-taking exercises, clear thinking strategies, reasoning, reading, memory, chunking, listening, and classroom discipline-based techniques that promote maximum learning. At this juncture, a conducive learning atmosphere for problem solving is introduced. Problem solving, as a cognitive process is set in motion. The process involves several learning stages of perception, reasoning, thinking, memory, chunking, analysis, synthesis, intuition, and imagery. Collectively, all variables in the learning process aid transfer. Transfer of learning is the capacity to employ previous knowledge to solve problems in a new setting.

Even though the majority agrees that critical thinking is a major skill to have, the same majority of people do not know, or are not challenged enough to improve their critical thinking skills. The majority are unable to develop their critical thinking because the process is a meta-thinking skill or ability that requires logical principles of reasoning, internalization and conscious but regular application of them. It requires long, concentrated and notoriously thorough training. Watson and Glaser are two psychologists whose critical thinking model is used for psychological testing concerning critical thinking ability. The authors of this model have defined critical thinking to mean:

“...a composite of attitudes, knowledge and skills. This composite includes: (1) attitudes of inquiry that involve an ability to recognize the existence of problems and an acceptance of the general need for evidence in support of what is asserted to be true; (2) knowledge of the nature of valid inferences, abstractions, and generalizations in which the weight or accuracy of different kinds of evidence are logically determined; and (3) skills in employing and applying the above attitudes and knowledge”.

Also, Dr. Peter A. Facione (1990) has defined critical thinking from an assessment and instructional perspective that has been annualized by the American Philosophical Association, a professional society. It reads as follows: Precision, consistency, relevance, sound evidence, good reasons, depth breadth, and fairness. It entails the examination of those structures or elements of thought implicit in all reasoning: purpose, problem, or question-at-issue, assumptions, concepts, empirical grounding; reasoning leading to conclusions, implications and consequences, objections from alternative viewpoints. We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteria logical, or contextual considerations upon which that judgment is based. Critical thinking is essential as a tool of inquiry. As such, critical thinking is a liberating force in education and a powerful resource in one's personal and civic life. While not synonymous with good thinking, critical thinking is a pervasive and self-rectifying human phenomenon. The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit. Thus, educating good critical thinkers means working toward this ideal. It combines developing critical thinking skills with nurturing those dispositions which consistently yield useful insights and which are the basis of a rational democratic society” (<http://philosophy.hku.hk/think/critical/ct.php>).

In addition, Michael Scriven and Richard Paul of the National Council for Excellence in Critical Thinking, an authoritative professional organization, also assert that:

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. In its exemplary form, it is based on universal intellectual values that transcend subject matter divisions: clarity, accuracy, and frame of reference (<http://philosophy.hku.hk/think/critical/ct.php>).

For his thoughts on critical thinking, Henry Van Dyke has described the critical thinking professor by saying that: “I sing the praises of the unknown teacher. Greek generals win campaigns but it is the unknown soldier who wins the war. Famous educators plan new systems of pedagogy, but it is the unknown teacher who delivers and guides the young. He lives in obscurity and contends with hardship. For him, no trumpets blare, no chariots wait, no golden decorations are decreed. He keeps the watch along the borders of darkness and makes the attack on the trenches of ignorance and folly. Patient in his duty, he strives to conquer the evil powers which are enemies of youth. He awakens sleeping spirits. He quickens the indolent, encourages the eager, and steadies the unstable.”

Dyke was a classmate of President Wilson. He became an author, lecturer and minister in both temporal and spiritual environments. Like his friend, he was a Princeton scholar.

Hollis and Carter (1948), writing about Reason and Knowledge in the *European Thought in the 18th Century*, which was the age of Enlightenment argued that:

“Reason is like a monarch who, when he comes to power, determines to disregard those provinces which he feels he cannot rule effectively and to concentrate on those which he is sure he can control. When it encounters anything that is doubtful or obscure, it sets to work, it examines, weighs, collates, and compares; it applies a common measure, it sifts the facts again and again, and finally it delivers its verdict. There is no higher faculty than reason. It disentangles truth from falsehood. Science and philosophy depend on it...When an experiment is used, for the purpose of strengthening reason, various intellectual limitations under which previous generations of inquirers labor are corrected. Reason is self-sufficing. Reason perfects the arts and sciences; reason is light which brings the salvation of men.”

Instructional Methods, Theories and Philosophies

Most professors employ a variety of classical, modern and contemporary instructional methods and theoretical philosophies for learning. They use the methods and theories as tools that make learning more easily manageable, interesting or exciting and meaningful to students, institutions and society. Educational progress is a dimension in terms of what is taught, who is taught, who teaches, why a particular type of content of knowledge is transmitted to a body of students who are governed by “accepted cultural values and practical objectives”; and how knowledge is taught, “depending on evolving professional practices and institutional frameworks and on the state of knowledge, the aptitude of students, and the hierarchy of purposes” (McKeon, 1959:1).

The most recent and dynamic form of instruction is what Duderstadt (2009) calls cyber infrastructure. The web-based internet technological language of communication has for an instructional method is a critical thinking way or procedure of doing, demonstrating, illustrating, or explaining something in an orderly, and well planned manner that is systematically organized to elicit effective communication and understanding (*New Webster's Dictionary and Thesaurus of the English Language* (1992). Within the human services industry, effective communication is cross-culturally multicultural interaction that “involves understanding cultural habits, understanding the communication process, trusting people, asking questions, expressing oneself with simplicity and clearness, being linguistically selective, listening attentively, respecting differences, and adapting to situations with a sense of flexibility” (Sagini,2001:378). Effective teachers and professors selectively and qualitatively use many acts, structures, and devices in the classroom or outside it. For instance, a professor may employ an individualized self-pacing instruction strategy, or instructional systems that depend on technology, or observations between the professor and teacherless means of instruction such as testing or writing. Professors may use programmed instruction which helps students to learn on their own. They can use slide projectors, film strips, audio and video tapes because they are easily incorporated, they can use books, handouts, research articles and the blackboard. The various types of self-paced instruction include contingency management, precision teaching, personalized system of instruction, computer assisted instruction such as the power point system of instruction, self-paced supervised study, mastery learning, modular instruction, contract teaching, positive learning reinforcement system, and performance-based instruction (Eble, 1982). Use of radio and the television instructional technology cannot be underrated either.

For the first time in 6,000 years changed the way all organizations, including higher learning carry out their business including teaching, research and learning. The use of cyber infrastructure for teaching, learning, research and public service is superior, contemporary, effective and creative form of critical thinking.

Some of the cyber infrastructure technological skills that are currently in use in the world of work including academia are not limited to video conferencing, instant messaging, webcast(web-conferencing), skype, face-time(I phone communication), face book(social networking strategy), twitter which has 140 characters for sending messages over the web because you subscribe to it, email that is used to send electronic mail, p interest for exchanging pictures, sound cloud that is a social network for sound, googlet is google's version of face book, Pandora-over the web electronic music, drop box is a mechanism for storing files from multiple devices, webex are web conferencing applications, youtube regulates all electronic videos. I-tunes is where all music is electronically purchased today. App-store is the from which all applications on I pod are acquired. And podcast which is the audio. (Paul Sagini, 2013, Computer engineer General Motors). Other methods of teaching in colleges and universities include but are not limited to the following:

These methods vary from place to place and situation to situation:

- Discussions
- Questioning Strategies – Better communication between teacher and student
- Inquiry-Based Learning – For shared discovery and innovative learning
- Problem-Based Learning – Inside and outside of the classroom
- Active Learning – Not passive
- Case Study Method – Real and hypothetical
- Cooperative Learning – Promotes positive interdependence
- Team Projects – Structured teams accomplish a lot
- Term Paper
- Library Research
- Interviews
- Models, Drama, Story telling
- Lab Experiments
- Chalkboard (Instructor)
- Diagrams, Tables, Graphs, and Charts
- Slider Film Strips
- Reading Aloud

There are many skills, methods and ways of communicating instructional methodologies as there are professors willing to use them for pedagogical effectiveness. In his *The Craft of Teaching: A Guide to Mastering the Professor's Art* (1982), Kenneth E. Eble refutes ten common assumptions about teaching practices. These include the beliefs that teaching is not doing, that the popular teacher is a bad teacher, that knowledge of the subject is all that is necessary for teaching. He discusses how to establish the right classroom atmosphere by circumventing rigid routines; how to use diverse methods to conduct discourse as an alternative to lecturing. He also places emphasis in using new ways for dealing with, assignments, grading tests, and choosing texts. He offers humane and candid suggestions for dealing with classroom cheating, plagiarism, soury classes particularly those in which students confront the teacher. In spite of these types of instructional challenges, effective professors tend to vary the diversity of their instructional techniques by avoiding to use rigid methodological fixations such as using the lecturing method only. Professors need to learn how to apply critical instructional methods by observing, working with and learning from students and other teachers and professors. Of significant interest is the fact that the center of all teaching and learning is the interaction between the professor and the student. The challenge of both the professor and the student is in creating a climate for the learner to manage the conflicting relationship between freedom and the discipline both of which are demand a lot from the learner's side. If the student merges both by internalizing them, the learner does not only eliminate role conflict in this case, but that element of avoiding confusion will arouse the pleasure of learning in the face of standards, order, rules and rigor.

Critical thinking instructional approaches are philosophically pluralistic as opposed to unitary. Creative and effective professors tend to make attempts to learn and master some instructional methodologies. Individual personality and character of each teacher says a lot about his/her teaching influence on students. In essence, the professor creates an environment for learners to learn. The same teachers do not only learn by teaching, but he /she "cannot teach except by constantly learning" (Eble,1982:8).

Critical thinkers like to view assumptions about teaching as false mythology. The following ten statements are false; Teaching is not doing. The same teaching is performing art. Teaching should exclude personality. The worst teachers become better later. The popular teacher is a bad teacher. Teachers are born and not made. Good and bad teaching cannot be identified. Research is complementary to teaching. Teaching a subject matter requires only that one knows it. College/university teaching is not a profession.

Effective critical thinking teachers use many methods for teaching and learning. The common ones are “the lecture, lecture - discussion, the lecture-laboratory, the lecture-recitation, the lecture-with problem sets, the lecture-demonstration” (p.42). Although the lecture-discussion is more effective for teaching, it is, like the Socratic dialogue, time consuming but faster than the Socratic one. The lecture may also exclude some students from the learning process. Seminars are excellent for teaching small group classes of mature students especially seniors and graduate students. The seminar is also effective for research classes. Small classes have 10-15 students. The tutoring method is not popular in America because professors do not have resources for teaching individual students. In its place, American academic institutions offer independent-study programs. Also, advising, which is popular in the U.S., tends to enhance institutional collegiality between students and faculty. However, both advising and counseling are elements of classical in-loco-parentis doctrine coming back in a new way that is dictated by guidance requirements. Counseling and advising skills, like teaching, can be learned and applied practically. The learned skills are useful in dealing with the disturbed, depressed, paranoid or suicidal students (Eble, 1982).

Professors should use original, primary and stimulating sources for teaching because they may serve as texts. Serious students should participate in the selection of texts. Considering the cost, size and quality of the text is essential for effective learning. The text should not be the only “Bible” in the classroom. Assignments such as the outside readings, book reports, short and long essay papers, individual and team projects and reports tend to enrich the learning process of students. Term papers and other essays should be given a physical format such as the requirement that they be typed in a double space, clean and fully documented format in terms of sources and methods, footnotes, references and specific writing manuals e.g. APA, LMA, Turabian and Chicago. To write effectively, students should be advised to employ better writing techniques such as *Bloom's Taxonomy of Educational Objectives* (1956) which is a critical thinking learning strategy for solving cognitive, affective and psychomotor problems in the light of (knowledge, comprehension, application, analysis, synthesis and evaluation (conclusion). Also Francis Bacon's empirical five step *Scientific Method* (1626) that deal with the hypothesis/theory, experiment, analysis, results and conclusion are an element of scientific critical thinking, learning and problem solving instructional methodology. Benjamin Bloom and Francis Bacon have given us two important instructional and critical thinking techniques which minimize the tendency to plagiarize. Plagiarism can be curtailed by:

1. providing students with meaningful real world lessons and examples,
2. making research assignments to be a learning process rather than an end,
3. students should do reading and summarizing tasks,
4. students should show how to use citations for writing/documentation,
5. they can keep a journal, write down sources, thoughts and questions.
6. using chunking enables them to develop critical analysis skills,
7. students can be taught how to search using search engines,
8. they should be taught to evaluate online content of all media types,
9. they should be encouraged to use wikipedia and Ed Tech Teacher/webnar,
10. and therefore promote academic integrity in learning (*file:C: Documentsand settings/Kathy/Desktop/HowtocombatSt...*).

The wise utilization of instructional methods, theories, and philosophies contributes to effective student production, transmission, and learning of knowledge.

Testing and Grading

Regardless of their advantages and disadvantages, tests, for the most part are used to see if teaching goals and developmental objectives have been achieved. In addition, the tests also are assessment measures associated with the results of the critical thinking effectiveness derived from instructional goals and objectives in respect to the delivery and mastery of content and other institutionally and societally established norms.

Institutional performance tests can be used for admission, classification, exemption or credit. The major theories that influence student learning are the classical imitation, repetition and Pavlovian conditioning. Also, modern theories of behaviorism, cognition and reinforcement are products of humanistic, cognitive and experimental psychology. Irrespective of the heuristic nature of these theories, professors think that student learning largely is a “conceptual, ideational, verbal and independent of specific doing”(Eble:107). More recently, The evolutionary development of computer technology and its web-based and utilitarian, virtual, and digital infrastructure has revolutionized human life in industry, business, labor, government and academia particularly in the arena not only critical thinking and instructional learning, but also in testing, grading and scoring endeavors. Conclusively, professors should use a variety of testing methods that address the needs diverse populations and abilities. They should give feedback regularly. They should use tests for learning and motivation rather than for measurement, threatening and punishment. The absolute worth of testing should be regarded with suspicion. Some tests, should not be graded particularly if they are not reliable and valid. Professors should openly, honestly and fairly clarify test objectives for students before and after the tests. Students should participate in making and taking tests. Trivial matters of content should not be tested if its learning ability is worthless. We need to know that surprise quizzes and tests that cannot be completed may serve the professor’s ego rather than the learner’s interests. Above all, test givers who teach should be imaginative, careful, balanced, precise and generous.

Using critical thinking strategies and methods of teaching, learning and research does not complete the learning process without testing and grading, and in the absence of cyber infrastructure(Duderstadt,2009). As it is commonly known, testing promotes student learning through emphasis, reflection, and reinforcement of learning cues while grading tends to serve as a motivator of learning. Customarily, testing and grading connotes the “ideas of competition, accomplishment, advancement, superiority and recognition(Eble:110). But, these ideas are disliked by students because they keep them from what they want to learn and inhibit the students’ choice of classes. Research has demonstrated that pernicious effects such as the encouragement of “cheating, limiting the choice of classes, creation of an unhealthy competitive atmosphere and promotion of conformity” rather than creativity in learning (Warre, 1971) are discouraged. Grades hardly show evidence of later competence.

After conducting 46 research studies in business, teaching engineering, medicine, and scientific research that was theoretically, experimentally and statistically designed, evidence demonstrated that college grades” have little or no relationship to any measures of adult accomplishment” (Hoyt, 1966:3 and Eble, 1982”113). Either sometimes or much more often, institutional practices, departmental norms, statistical observations, and curves are used for guidance rather than as directives. Therefore, the debate on testing and grading may question the professors’ “competence” (p.116). In essence, “course grades should be considered as earned by the instructor and student alike” (Gold,1966:3). Experienced professors tend to throw away the lowest scores, they use written comments, self-grading exercises that are corrected but not graded, individual conferences, scores and letter grades. Above all, students should have familiarity with the professor’s expectations. Students want to believe that they are evaluated fairly, with respect and with an accurate and an unbiased mindset.

Some students do extra work to raise their grades. Others retake the tests. Some do little to change their grades. Above all, this debate between “miserliness and generosity” (Eble:118) can be concluded that good grades are better than bad ones or failure. Through the learning process, teachers should make sure that differences do not become barriers to learning that might result in “ego confrontations” (p.131). However, professors who practice caution, trust, professional ethics, respect and love based on “caritas rather than Eros” (p.133) understand the limits of their calling and tend to deliberately maintain a professional distance than pretending to be a priest or psychiatrist. Professors can be accused by students, faculty, administration and the public concerning student grades. Before the situation attains “critical mass”. Teachers should exercise “openness, patience, consideration, tolerance, and generosity” (p.134).

The qualities of a university professor include but are not limited to the “...general ability to profit from advanced study, evidence of self-motivation, perseverance, curiosity, strong interests, and ability to work hard independently Eble, 1982:150.” This kind of ability is the one demanded when working to give test scores and grades. In other words, Teaching requires one to possess plenty of physical, mental and spiritual energy. Discipline related specialists should be engaged in scholarly research in which specific methodologies and interdisciplinary research is conducted. These scholars should be conversant with learning theory. Learning theory is chiefly characterized by the following principles discussed by Kenneth E. Eble (1982) in page 150.

Learning is an active and continuous process. This process is purposive action that is more meaningful than mere repetition. Often times humans learn about many things they do not need to know. Learning takes place in a stimulus and response logical connection known as classical and operant conditioning. Catching and maintaining the learner's attention provides the necessary condition for a desired stimulus to evoke a response. Learning is affected by the learner's set-that is, a predisposition to react to some stimuli in a unique way. Learners can be motivated in many ways in order to learn about specific knowledge. In this process conflicting motivation may get in the way of learning and reduce its effectiveness. Time and conditions affect learning greatly. Individuals vary greatly in the time they take to learn something because of their differences in ability. Association is an important aspect of learning. Identifying, grouping, and sequencing assist learning. Reinforcement is the general term for stimuli introduced to reinforce behavior that stimulates further learning. Rewards seem to affect a wider range of learning more favorably than does punishment. Relearning is much easier than original learning. Recall is different from retention. Given the right stimulus, learners can recall more than they commonly suspect. Progress in learning is not uniform, but it frequently reaches valleys and plateaus where the rate of learning slows respectively. Interference is common cause for forgetting. New and similar learning can interfere with the old. Learning about something well helps to counteract interference. Interfering responses may inhibit learning; therefore, they may have to be removed to foster learning. Transfer of learning is using learned knowledge to learn more new knowledge and solve more problems or learn to learn.

Although learning theory is both instrumental and heuristic, the critics of the theories of learning do not like them because these critics like the status quo. New theories in particular, tend to displace the traditional paradigms of learning and by so doing, infringe on their freedoms by creating new problems. Broadly speaking, the major theoretical paradigms of learning include but are not limited to behaviorism, which focuses on observable behavior; cognition, which sees learning as purely a mental or neurological process; humanistic, which deals with what role emotions and affect play in learning and why and how social aspects life enable humans to excel in group activities.

Table 1: Theories of Learning

| Theorist | Theory | Description |
|----------|----------------------------------|--|
| Ausubel | Subsumption Theory | Mechanism by which new material presented in academic settings (lectures) can be integrated into existing mental structures. For subsumption to occur, the presentation of new knowledge should be preceded by "advance organizers." |
| Bandura | Observational Learning Theory | Behavior can be learned through observation of other. |
| Bruner | Constructivist Theory | Individuals actively construct knowledge by comparing new ideas or concepts with their current knowledge (schema or mental models). |
| Comenius | Pansophism (Universal knowledge) | The idea that learning, emotional, and spiritual growth are interwoven. Proposed teaching through stimulation of the senses, not merely through memorization. Considered the "Father of Modern Education." |
| Dewey | Learning by Doing | Learning occurs through experience and experimentation. |
| Erikson | Socioemotional Development | Erikson's "Eight Stages of Man" describes a series of crisis individuals pass through at different ages. The stages begin with "trust versus mistrust" in infancy and continue through a series of paired outcomes for each age through older adulthood. |

| Theorist | Theory | Description |
|-----------|--------------------------------------|--|
| Festinger | Cognitive Dissonance | Inconsistencies between behaviors and beliefs motivate people to change. One basis for constructivism. |
| Freud | Levels of Consciousness | The mind operates at different levels: conscious versus unconscious. He further subdivided the mind into the id (primitive motivations), ego (logical portion of the mind which acts to satisfy the id – when possible), and the super-ego (the conscience) |
| Gagne | Conditions of Learning | For different kinds of learning (motor skills, verbal skills) different conditions are needed, so different strategies should be used. |
| Gardner | Multiple Intelligences | Each individual possesses seven distinct and measurable forms of intelligence: linguistic, logical-mathematical, spatial, body-kinesthetic, musical, intrapersonal, and interpersonal. |
| Kohlberg | Stages of Moral Developing | Pre-Conventional – based on self-centered interests Conventional – based on conformity to local expectations Post-Conventional – based on higher principles. |
| Locke | Tabula Rasa | The idea that individuals are “blank states” on which teachers could “write” knowledge. A forerunner of behaviorism. |
| Maslow | Hierarchy of Needs | Humans naturally strive to satisfy needs. The five levels of needs, from lowest to highest, are: physiological, safety. Love. Esteem, self-actualization. Lower level needs must be satisfied before the individual can move on to satisfy higher level needs. |
| Miller | Information Processing Theory | Short term memory can only hold 5-9 “chunks” of information at a time. A chunk can be any meaningful idea like a word, an identifiable image, or a digit. |
| Pavlov | Classical Conditioning (Behaviorism) | The associations of new responses with existing stimulus-response pairs. Classic example is pairing the ringing of a bell with presentation of food to dogs. After repeated pairing, the dogs will salivate upon hearing the bell (even if food is not presented). Original stimulus (S) response (R) pair is food – salivate. New S-R pair is bell – salivate. Such behavior is a reflex action. |
| Piaget | Genetic Epistemology | Developmental stages of child development: 0-2 years: “Sensorimotor” - motor development 3-7 years: “Preoperation” – intuitive 8-11 years: “Concrete Operational” – logical, but not non-abstract 12-15 years: “Formal Operations” – abstract thinking Humans generate knowledge developmentally. |
| Rogers | Experiential Learning | Two types of knowledge: academic and experiential. Unlike academic knowledge, experiential knowledge is acquired to meet the needs of the learner, usually to complete an important, real-life task. Example: Learning to drive a car. |

| Theorist | Theory | Description |
|------------|------------------------------------|--|
| Skinner | Operant Conditioning (Behaviorism) | Learning is the result of changes in behavior. As stimulus-response cycles are reinforced, individuals are “conditioned” to respond. Distinguished from Connectionism because individuals can initiate responses, not merely respond to stimuli. Antecedents influence consequences, e.g. punishment, reward or reinforcement, This is radical behaviorism. |
| Thorndike | Connectionism (Behaviorism) | Learners form associations or connections between a stimulus and a response through trial and error, rewarded responses would be strengthened. This is a form of connectivism. |
| Vygotsky | Social Development Theory and ZPD | Social interaction is critical for cognitive development. Related to this is the idea of a “Zone of Proximal Development (ZPD).” Some skills, an individual can perform independently. Other skills can be performed if the individual has assistance. Skills that can be performed with assistance are said to be within an individual’s ZPD. The ZPD is the theoretical basis for scaffolding. |
| Watson | Behaviorism | Proposed that most human learning and behavior was controlled by experience (not genetically pre-determined). Believed the only behavior that should be studied are the “observable” ones. He also believed in Locke’s Tabula Rasa. |
| Wertheimer | Gestalt Theory | Some ideas can only be understood as part of a “bigger picture” Important in problem-solving. |

Generally, teachers, as Aristotle has taught us, possess the spirit of generosity and magnanimity (benevolence, overlooking faults, not subject to resentment or envy). Generous and magnanimous teachers shuck off feelings of superiority and arrogance. They are wiser and less judgmental. They feel confident and more honest with themselves and their students when studying the subject matter. When they take risks by showing forth without showing off, they reveal how great they are. Great teachers are impatient with ignorance without being appalled by it. Great teachers shun hypocrisy, defensiveness, and vanity. They do not sympathize with the “intransigent, the bullheaded, the inflexible, and the self-righteous”(Eble, 1982:166). Despite the many challenges associated with the teaching, research and public service profession of teachers, it can be improved with a reward system that takes into consideration the services loyally offered by superior professors. The reward system includes promotion, salary increases and tenure.

Superior professors serve their institutions effectively because through their service they articulate the mission of the university. Overall, the criteria for teaching effectiveness includes evaluations by chairs, deans, colleagues, students, alumni, and self. Also, scholarly research and publications, grade distributions, course syllabi and examinations, attendance at university committees, classroom visits by colleagues, chairs or deans, student examination performance, enrollment in elective courses, long-term follow-up of students and committee evaluation. In addition, the criteria for promotion, salary increase or tenure may also be based on classroom teaching, personal attributes, length of service in rank, research, supervision of graduate study, publications, student advising, campus committee work, activity in professional societies, public service, competing job offers, supervision of honors program and outside consulting. All institutions and schools use most of these attributes and values for faculty evaluation, promotion and tenure and articulation and historically rooted evolutionary development of the mission of higher learning(Scott,2006).

Conclusion

The discourse on critical thinking and instructional effectiveness concerns how, when, where and why academic organizations are organized and structured for the purpose of reflectively using analytical and comparative standards of quality about theoretical critical thought, scientific theories of learning and instructional and methodological philosophies to elicit constructive and effective performance. First, critical thinkers are self-guided, self-disciplined, open and fair-minded rational individuals.

As rational thinkers, they employ reason and empathy rather than egocentrism or sociocentrism to analyze, synthesize and evaluate learner performance. As teachers and academics, they treat their learners with a sense of integrity. They are habitually humble enough in order to be civil and just for the purpose of inspiring or motivating young minds to develop confidence in learning to learn. Though they may be internally and externally be subject to elements of irrationality, prejudice, bias, distortions, undigested regulations and taboos, some of which may be dominated by vested interests, these teachers are humanistic reconstructionists who desire a better world and civilization for all. These types of teachers and critical thinkers are broadminded, life-long learners and scholars who emulate the academic and empirical virtues of Socrates, Aristotle, Plato, Locke, Mazrui, and W.E.B. DuBois.

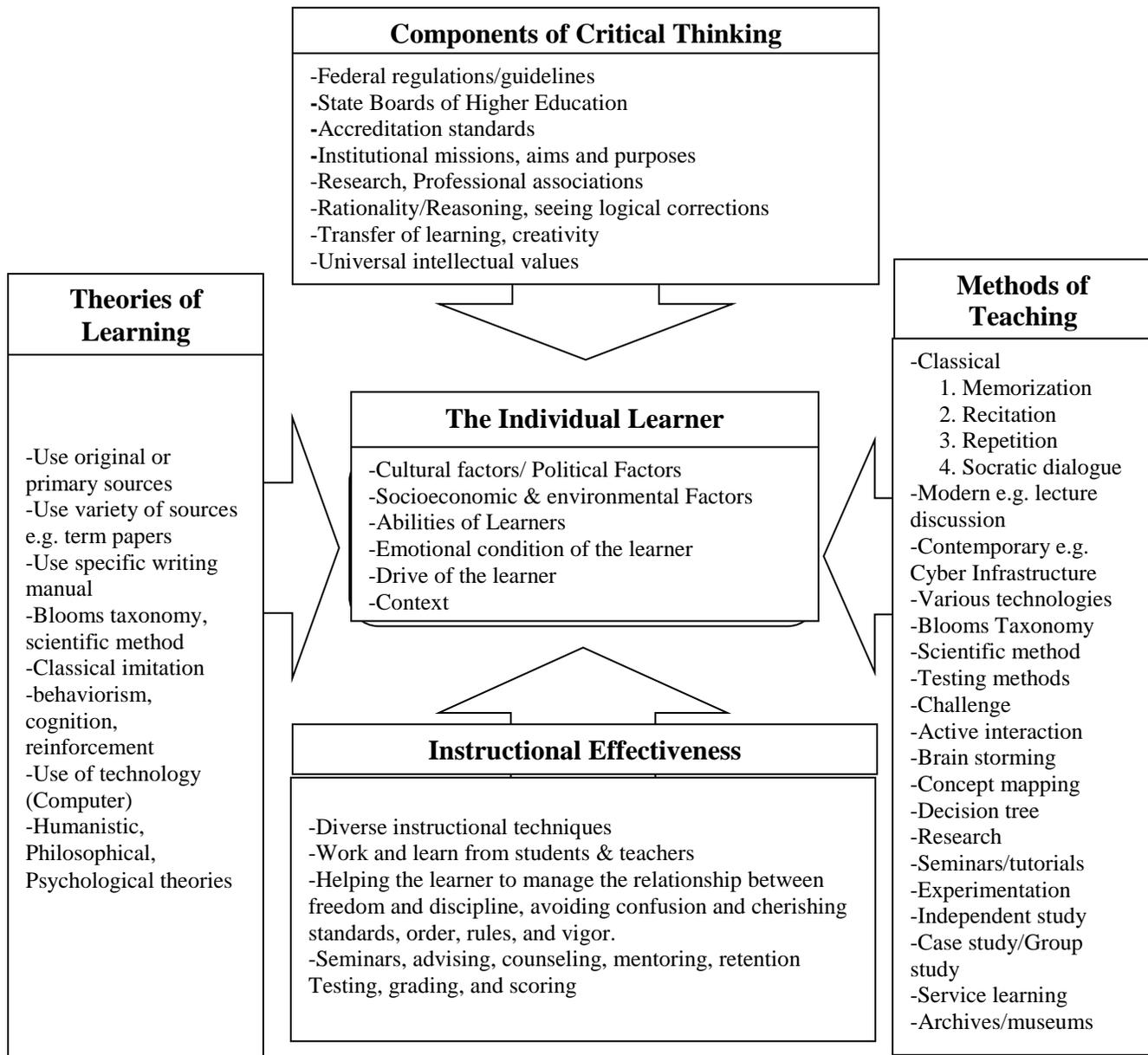
Second, critical thinkers tend to study and digest a variety of theories of learning that become heuristic conceptual frameworks for effective instructional activities. In addition, these theories of learning tend to serve as the learners' "intellectual fertility" for the synaptic and creative development of multineurocentric procedural (manipulating) and (declarative (data-based) production of knowledge. They teach in complex internal and external environments both of which are comparatively competitive, conflictual and incongruent at times. In this arena, cognitive, emotional and environmental factors, as well as age and prior experience, tend to collectively influence how learners acquire, retain and use knowledge and skills for which they have been trained.

Third, Behaviorists view learning to be an aspect of conditioning. This view influences them to advocate a system of rewards and targets or specific goals in education. On the other hand, educators who embrace cognitive theory believe that the definition of learning means change in behavior, which is rather narrow. These educators prefer to study the learner rather than his/her environment. To understand learner behavior more effectively, they study the complex processes of human memory. Humanists place more emphasis on the importance of self-knowledge and interactive relationships in the learning process. The constructivists believe that the learner's ability to learn relies on what he/she already knows and understands. Also, the acquisition of knowledge should be an individually tailored process of construction and reconstruction of knowledge. The multiple intelligences theory neuroscientifically assured phenomena argue that the brain has more than 70 functional areas each with its own individual strengths and weaknesses in each learner. Understanding of this nature has a lot of implications on the behavior of learners particularly in respect to their ability to study, learn and take tests.

Methodologically, teachers who think critically tend to use more than one method for teaching in order to address the different learning abilities in the intellectual diversity of their learners. In doing that they theoretically and empirically try to reach out to each individual learner's cognitive learning opportunities. For example, as a method of instruction, lecturing by itself does not effectively motivate learners to excel. However, if it is used as a lecture-discussion and supplemented with handouts, useful material on retention (Marks and Miller, 1964), information rehearsal (Bassey, 1968), avoiding attention decrement (Lloyd, 1968 and Scerbo et al., 1992), it can be very effective indeed. Evidence has shown that continuous lecturing makes students to progressively take less and less notes because they do not obtain feedback, or maintain active learning (Meltzer and Manivannan, 2002). Given the condition of its failure to motivate students to think, change their attitudes, or learning and behavioral skill training (Elliot, 2005), the lecture will remain to be a less effective method of instruction. On the other hand, if it is supplemented with smaller discussion groups, observation, practical observation, case studies, tutorials and laboratory experiments, seminars and workshops, experiential learning, active learning, and computer-based instruction particularly the open online courses (MOOCs), then the lecture is likely to be an effective instructional method. Overall, the lecture method of teaching is also used in many other social, political religious and business circles. Some prominent academics do not use it. Mark Twain once said that "college is a place where a professor's lecture notes go straight to the student's lecture notes, without passing through the brains of either". This sarcastic remark shows that it is not only complex to employ the lecture for academic pursuits, but those who use it for instructional purposes should not only understand when, where, how and why they use it, but also, with/for whom they use it and at what cost.

In brief, influential theories of learning and environmental influence, and experience for attaining, enriching, or reconstructing one's knowledge, skills, values, attitudes, behavior, and world views. These learning theories are models for constructing hypotheses that explain how the process works.

Figure 1- Critical Thinking and Instructional Effectiveness Model:



According to Andy Stanfield, director of the Center of Teaching and Learning Excellence at Florida Institute of Technology is a proponent of using Mayer’s Cognitive Theory of Multimedia Learning to improve instructional design. This theory posits the following: the brain processes auditory and visual information differently, there are limits to how much auditory and visual information people can process, and people must be actively engaged in order to move knowledge from working memory to long-term memory. This theory has some very practical implications for online course design, Stanfield argues that auditory input goes directly into the auditory channel for processing. With written language, the visual symbols must go through visual channel and be converted to the auditory channel, which creates an extra level of processing that could inhibit learning.

Stanfield’s recommendations for achieving this efficiency, short, focused lessons- As an instructional designer, and subject matter experts should not try to incorporate too much content into their courses. If it took professors decades to learn this stuff, and oftentimes they want their students to know everything they know, but it’s impossible. “Instructors should try to get the students the basic skills and the get them to have such a love of [the subject] that they want to make the effort to develop the mastery of the subject. Telling students every little anecdote may be interesting, but not effective. It may actually distract the learner from the learning objectives.

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