LUIGI GIUSSANI
INSTITUTE OF
HIGHER EDUCATION

CRITICAL THINKING

Activation model

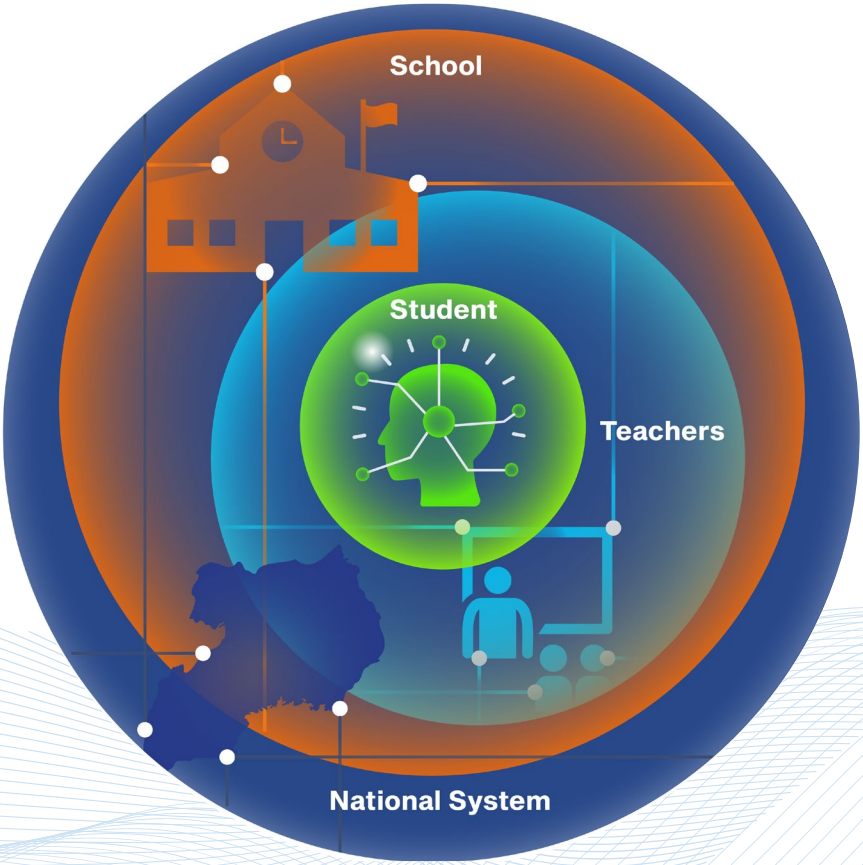


Table of Contents

1 **Introduction** 5

1.1 The Importance of Critical Thinking in the Ugandan Education Context 6

2 **Historical Conceptualization of Critical Thinking** 7

2.1 Definitions of Critical Thinking 7

3 **Dimensions in Critical Thinking** 10

3.1 Skills and Critical Thinking 12

3.2 Disposition and Critical Thinking 15

3.3 Knowledge and Critical Thinking 19

4 **Critical Thinking Nurturing** 19

4.1 Generic or Content Specific Critical Thinking Debate 19

4.2 Infusion, Immersion and Mixed Approaches to Nurture Critical Thinking 20

4.3 Evidence on What Works 20

4.4 Nurturing Critical Thinking in Schools 21

4.5 Effectiveness of Strategies to Foster Critical Thinking 24

4.6 Teaching Teachers 25

5 **Critical Thinking and the Context** 27

5.1 Critical Thinking and Culture 28

5.2 The relationship between language and culture and its contribution to thinking 29

5.2.1 How language shapes critical thinking 30

5.3 Contextualization of Critical Thinking in Sub-Saharan Africa 32

6 Contextualization Study: A Grounded Theory 33

6.1 The Definition of Critical Thinking in Uganda 34

7 LGIHE Critical Thinking Activation Model 39

7.1 Systemic collaboration in the critical thinking model 40

7.1 Roles at each level 41

7.2.1 National systems level 41

7.2.2 School level 42

7.2.3 Teacher level 42

7.2.4 Student level 45

1

Introduction

It is becoming patently clear that outdated emphasis on rote learning does not prepare students for an ever changing, automated, and information-saturated world. Studies conducted in various countries emphasize these main competencies that every educational system ought to develop to meet 21st century challenges: creativity, critical thinking, problem solving, and decision making (Kautz, Heckman, Doris, ter Weel, & Borghans, 2017; Wechsler et al., 2018). Traditionally, education systems and settings have focused on passive consumption of knowledge while programming student thinking for routine, habitual and fixed procedures. Learning thus resulted in the knowledge of how to do something: repeating procedures over and over while re-applying the same knowledge.

With the dawning of the 21st Century, we are facing more numerous and complex problems which require a radically different form of thinking: thinking that matches the complexity of the problems and demonstrates greater adaptability and sensitivity to divergent points of view. Our world is constantly changing, we are caught up not only in an increasing whirlwind of challenges and decisions, but threats, too. It is difficult to anticipate the knowledge or skill set needed to be successful at work, since we can no longer predict the types of jobs we will be doing. The complexity, speed of change and intensifying threats of contemporary life reveal the inadequate nature of traditional methods of learning. We need constantly to re-think, re-evaluate and re-learn the way we live and work. We are facing a new era and we need to empower our minds to engage in meta-analysis and self-reflection, not only to succeed in the workplace but perhaps for our very survival (R. W. Paul & Elder, 2002).

In a world where we are daily faced with a glut of information often packaged to serve special interest groups instead of building the common good, citizens need to take charge of their own minds, to recognize their own deepest values, and to take action that contributes to their good and the good of others. In order to be able to do so, we must learn how to continually upgrade our knowledge and become lifelong learners (Green, 2015). People who improve their critical thinking skills and abilities will contribute to a nation's ability to survive, both economically and politically (Ennis, 1996, 2016; Moseley et al., 2005; Siegel, 1989).

Uganda is one of the fastest growing countries and has the world's youngest population. Educating young people to think critically is paramount not only for healthy growth of individuals, but also for the development of a democratic and just society.

1.1 The Importance of Critical Thinking in the Ugandan Education Context

The challenges that the 21st century is posing to all societies call for a shift in the quality of educational encounters students have. There is urgent need to move beyond viewing learners as passive consumers of received knowledge, to pedagogical strategies that provoke them to actively seek out and carefully examine all knowledge-claims way (Halpern, 2001; Marin & Halpern, 2011). Students need to learn that knowledge-claims must be questioned, personally verified, and not blindly accepted (Beattie, Collins, & McInnes, 1997; Dunne, 2019; Niu, Behar-Horenstein, & Garvan, 2013).

The general perception is that, while critical thinking in education should be one of the major concerns of stakeholders, few attempts have been made to focus on how it should be fostered, incorporated and applied in throughout the formal educational path. There is need of educating explicitly to critical thinking from within the education systems (Davies & Barnett, 2015).

The Ugandan Ministry of Education and Sports' Strategic Report 2004-2015 highlighted the fact that students are not acquiring "the knowledge and skills they need to participate as citizens and productive workers" (2004, p. 9). Whereas different bodies and organisations, such as the Uganda National Examinations Board (UNEB), have tried to assess student learning outcomes at secondary school level, the assessments have not given a full picture of the learning outcomes especially in the area of higher order thinking skills. "Too many students who are successful in school do not learn enough of the skills and knowledge aligned with the current and future needs of employment and the further development of Uganda's economy" (Allen, Elks, Outhred, & Varly, 2016, p. ii). The methods of teaching do not foster deep understanding of the subject and do not help learners to understand the connection between the subject and their personal life. Education is superficial and uncritically based on mere rote learning (Allen et al., 2016; Mitana, Muwagga, & Ssempala, 2018). Even though policy makers and educators understand the importance of developing critical thinking in students, they seem to lack specific strategies to foster its growth and the tools to measure its effect on student learning.

It also seems evident that the Ugandan school system is not fully preparing students capable of participation in society as citizens in the broadest sense (Allen et al., 2016). The HEART report, one of the most thorough studies conducted on assessment in Uganda, clearly states that students are constantly subjected to examinations at various points in the scholastic term, but there is little evidence of assessments being used for formative purposes, to critically reflect or provide individualised feedback to students. Most Ugandan schools administer commercially available tests (starting from nursery) that are designed to reproduce the sorts of items to be found at the end of cycle examinations (Allen et al., 2016). Mitana et al. (2018) show how the level of taxonomy of the questions of the primary leaving examination is skewed towards the lower levels of Bloom's Taxonomy, making the teaching and learning experience in class wholly superficial. Deep knowledge and understanding of concepts, questioning techniques, evaluation, analysis and creativity are, consequently, almost absent in the Ugandan classroom experiences.

There is a clear gap between the learning outcomes achieved by Uganda students by the end of their formal education and the expectations of the society. Labour market surveys conducted in Uganda (Omala, Mitana, Giacomazzi, & Ariapa, 2016) highlight the demand for a work force possessing soft skills and higher order thinking skills for employability and better life outcomes. For Uganda to have a more productive labour force, education ought to shift to a system that enables learners to engage, analyse and apply knowledge. The education system should emphasize life skills acquisition like critical thinking, problem solving, decision making, collaboration and social awareness, all of which have been identified by the World Economic Forum as crucial for the enhancement of not only employment, but of general productivity and efficiency.

In this context therefore, it is valuable to form teachers on higher order thinking skills (with specific reference to critical thinking) and adapt simple instruments for fostering formative assessment at classroom level while assessing critical thinking in learners.

2

Historical Conceptualization of Critical Thinking

The works of John Dewey (1910, 1913, 1938) were probably the most influential in the understanding of critical thinking and of its nature. His constant reference to authors like Francis Bacon, John Locke, and John Stuart Mill show how his elaboration of the development of a scientific attitude of mind as an educational goal were rooted in centuries of philosophical tradition. Actually, many scholars date the intellectual roots of critical thinking back to the teaching-practice and vision of Socrates who recognised the importance of asking profound questions before accepting ideas as being worthy of believing (R. W. Paul, Elder, & Bartell, 1997). Socrates, like Plato and Aristotle after him, investigated human thinking and laid the foundation for the modern critical thinking paradigm. Though the term "critical" was not directly used by them, its etymology comes from the ancient Greek word "kritikos" meaning able to judge, sieve, select or choose (Giussani, 2001; Padmanabha, 2018).

Dewey's education theories focus on concepts of inquiry-based learning, problem-based learning, reflective inquiry and experiential learning in the context of the classroom, school and community. Dewey, in his book How We Think (1910), states that reflection or reflective thinking is the examination of an idea "in light of the grounds that support it and the further conclusions to which it tends" (1910, p. 1). Dewey believes that critical thinking is reflective thinking based on logic (Davies & Barnett, 2015). In his view, reflection is the cognitive inquiry process that aims at finding ways which will lead to production of new knowledge.

2.1 Definitions of Critical Thinking

Since the onset of last century (Dewey, 1910), several authors have attempted to arrive at a definition of critical thinking in all its complexity. The various conceptualizations are influenced by the tradition an author ascribes to, though several commonalities are also identified. What follows is a review of the prominent definitions of critical thinking categorized, as far as possible, by the traditions (philosophical, phycological, educational, sociological).

The philosophical approach, primarily focuses on the description of the ideal critical thinker, enumerating the characteristics of the person rather than the behaviours or actions the critical thinker can perform (Lewis & Smith, 1993). This focus on the ideal thinker, however, does not always correspond to reality (Sternberg, 1986). By emphasizing what people should be doing or aiming for, these definitions risk depicting unrealistic situations or failing to describe how people actually think (Lai, 2011).

Writing in this ideal vein, Dewey states that "the essence of critical thinking is suspended judgment" (Dewey, 1910, p. 74). He argues that high quality thinking is "the accurate and deliberate instituting of connections between what is done and its consequences" (Dewey, 1910, p. 177). Dewey's idea of quality thinking is that it should be intentional, based on accepted standards for evaluation which test the results of one's conclusions. Glaser, too, focuses on the characteristics of the critical thinker as

a person who is "(1) being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences (2) knowledge of the methods of logical inquiry and reasoning, and (3) some skill in applying those methods" (1941, p. 5). Glaser's definition underscores the relevance of the intellectual dispositions, described as the open-minded attitude or willingness to investigate problems and issues relevant to the personal life. The author, similar to Dewey, further highlights the importance of thinking according to well-founded reasons rather than having one's thinking being directed by bias or social desirability.

Toward the middle of the 20th century, philosophers began to define critical thinking in more practical terms. Smith describes it as the process we engage in when we want to find out what a "statement means and to determine whether to accept or reject it" (1953, p. 130) or according to Ennis it is "the process of correctly assessing statements" (1962, p. 82, 1963, p. 17). In his subsequent deliberations, Ennis elaborates on the practical nature of critical thinking stating that it is a process of making informed decisions that affect the way one lives. It is based on a pragmatic examination of the beliefs and actions that guide one's living: it is "reasonable, reflective thinking that is focused on what to believe or do" (1985, p. 45, 1989, p. 4). Scriven and Paul define the characteristics of this intellectual process in term of skills like "conceptualizing, applying, analysing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action…" (1987), and attitudinal dispositions such as being "self-directed, self-disciplined, self-monitored, and self-corrective thinking" (1987). The skilling aspect of the critical thinking process has been emphasised by Facione in the landmark American Philosophical Association Delphi Report. It describes the consensus reached on the now iconic definition of critical thinking as "purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based" (P. A. Facione, 1990, p. 3).

Another recurrent theme in various definitions of philosophical approach is the element of judgment (Dewey, 1910; P. A. Facione, 1990). This aspect seems central and numerous theorists qualify the kind of judgement critical thinking entails: suspended, self-reflective (Dewey, 1910), self-regulatory (P. A. Facione, 1990) or "good judgement" as Lipman simply calls it (1988, p. 3). He maintains that a judgment "1) relies on criteria, 2) is self-correcting and 3) is sensitive to context" (1988, p. 3). Lipman introduces the use of intellectual criteria to better define and classify the controversial meaning of 'good judgment'. This resonates with both Facione's (1990, p. 3) theorization which speaks of "criteriological" judgment and Paul, Elder and Bartell's (1997) which emphasize the standards and criteria underpinning critical judgment; it is a process which requires the application of rigorous and appropriate standards and their proper command (A. Fisher & Scriven, 1997; Scriven & Paul, 1987).

Critical thinking is crucial for a person's maturity and independence of mind as it aims at overcoming "our native egocentrism and sociocentrism" (Scriven & Paul, 1987) and it "refers to a way of reasoning that demands adequate support for one's beliefs and an unwillingness to be persuaded unless the support is forthcoming" (Tama, 1989, p. 1). According to McPeck, the process requires an appropriate use of reflective scepticism; a step which goes beyond the mere raising of questions to obtain more information or "indiscriminate scepticism" (1981, p. 7). Bailin, Case, Coombs, and Leroi claim we need to "apply appropriate criteria and standards to what we or others say, do, or write" (1999, p. 285). Similarly, Johnson defines it as "thought evaluating thought", and he further elaborates that "critical thinking is the articulated judgment of an intellectual product arrived at on the basis of plus-minus considerations of the product in terms of appropriate standards (or criteria)" (1996, p. 226).

To summarize, the definitions of critical thinking according to the philosophical perspective mostly revolved around the identification of the skills, dispositions and values that describe the ideal critical thinker and the elaboration of the process of verifying an assumption, infering a conclusion, solving a problem or "making informed decisions" (Brookfield, 2011, p. 1). Subsequently, educational philosophers elaborated further on the need for reflective judgement that uses appropriate criteria and that also implies

a personal “engagement towards sincerity and truth” (Dominguez et al., 2019, p. 18).

The psychological approach contrasts with the philosophical perspective in two ways. First of all, psychologists tend to concentrate on what critical thinkers do – on their behaviour more than underlying the characteristics of the person who thinks critically – and on lists of dispositions or skills the person who thinks critically should display (Lewis & Smith, 1993). Moreover, cognitive psychologists tend to concentrate on the cognitive processes that the critical thinking ignites (Sternberg, 1986).
Certainly, this approach too has its limitations. According to philosophers, the psychological tendency of over emphasizing the steps or procedures to be followed is a reduction of what critical thinking entails. There is need to consider that going through the steps of critical thinking might not necessarily mean that the person has engaged in a critical thinking activity (van Gelder, 2001).

In Sternberg’s view, critical thinking is an application of the cognitive system people use to select between environments, whereas creative thinking is used to shape the environment. According to him, critical thinking can be conceptualized as “the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts” (1986, p. 3). Also Halpern refers to it as a set of cognitive strategies that “increase the probability of a desirable outcome” (1998, p. 450). In his view, critical thinking is “purposeful, reasoned, and goal-directed. It is the kind of thinking involved in solving problems, formulating inferences, calculating likelihoods, and making decisions” (1998, p. 450).

Siegel’s focus in defining the concept is on the appropriate use of reason. “To be a rational person is to believe and act on the basis of reasons” (Siegel, 1989, p. 21). He maintains that critical thinkers have a character inclined to search and seek for reasons; they reject partiality and arbitrariness, and objectively evaluate relevant evidence

Theorists that have contributed to the educational perspective on critical thinking mainly concentrate on the taxonomy of learning outcomes or skills. The educational tradition relies on the extensive experience matured in the classrooms and on observation of how learners acquire knowledge and increase their skills. Of course, even this approach has some limitations. Taxonomies often lack clarity and are not easily applicable by practitioners. They often lack flexibility and, at the same time, they have not been investigated and tested as extensively as the taxonomies of the other traditions (Sternberg, 1986).

The sociological perspective has openly argued that critical thinking reveals its importance when the individual engages in relations with society. This tradition emphasizes an ethical position reflecting consistency in thinking and doing. According to these theorists, critical thinking should extend towards critical doing: doing whatever is possible and desirable for others and the world (Davies & Barnett, 2015). The surrounding world represents the setting where the person lives and towards which the critical action is directed (Moseley et al., 2005). It is in this world that the individual and the society interact, building a complex and reciprocal relationship (Jane, Jarvis, & Moran, 2001). People are born into a society with a specific tradition and culture which are paramount for their growth and personal development. As they grow more independent, people need to process the external cultural and traditional inputs, internalize and retain what they deem important and reasonable and, by their action, mould the society and transform it.

These dynamics change, shape and revolutionize societies. Freire maintains that society can be transformed through dialogue. And dialogue must be guided by critical thinking of a kind “which discerns an indivisible solidarity between the world and the people and admits of no dichotomy between them—thinking which perceives reality as process, as transformation, rather than as a static entity” (1970, p. 92). It is a way of thinking which is not separated from action, but that is constantly immersed in action (Barnett, 1997).

3

Dimensions in Critical Thinking

Critical thinking is concerned with discerning and recognizing faulty information (A. Fisher & Scriven, 1997) generated by the observation of the reality (R. W. Paul et al., 1997), better understanding and deepening the causes of problems for finding solutions (E. M. Glaser, 1941; R. W. Paul & Elder, 2002), or even reflecting on the subject of the matter (N. C. Facione & Facione, 1996) or simply on what we, or others do, or say (Bailin et al., 1999). Educationalists have great interest in having more practical understanding of the various skills and dispositions that the construct of critical thinking entails. Navigating the myriad conceptualizations is not easy, and the result can be unclear and not of immediate application. This lack of clarity constitutes a problem, especially if we consider that critical thinking is one of the most advocated learning outcomes in our education system and that many curricula have incorporated it in their design (Barnett, 1997).

An extensive review of the literature has identified the strong tendency among theorists to divide educational goals into three categories: knowledge, skills, and attitudes or values, and to assign critical thinking to the category of skills (Bailin et al., 1999). Thomas and Lok (2015) also build on Ramsden's (2003) idea of qualitatively different levels of learning, with critical thinking assigned to the most abstract level. According to Thomas and Lok, critical thinking has three dimensions or thematic groups, namely cognitive skills, dispositions, and knowledge. The framework proposed by these authors offers a very useful operational schematization of the various components that describe and detail the concept and, at the same time, promotes a unitary vision of the critical thinker by encompassing and highlighting high levels of intellectual and ethical competence, and self-awareness. It therefore emphasizes the 'doing component' but without detaching it from the 'being component.' Thus, conceiving critical thinking as a skill in this sense implies more than viewing the individual as competent or proficient in thinking (Davies & Barnett, 2015). Figure 1 shows the conceptualization of critical thinking attributes as developed by Thomas and Lok (2015, p. 98) and adopted in this study.

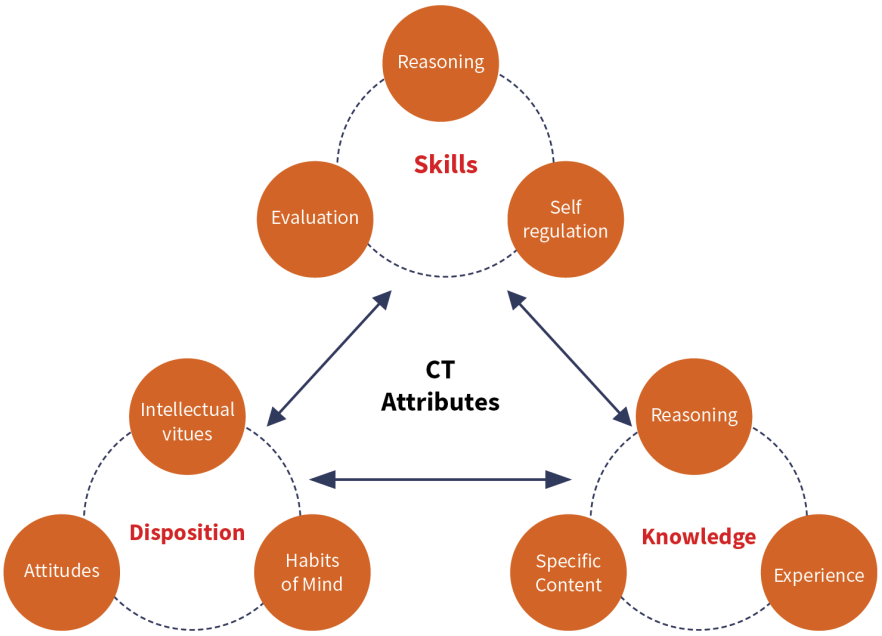


Figure 1.1. An Operational Framework (Thomas & Lok, 2015)

This operational framework presents a set of three interconnected attributes, each one of them presenting three subsets. In the process of contextualizing this framework, the subsets of dispositions and skills were modified and adapted.

The skills component was subdivided into four main subsets:

- General inquiry skills (i.e, Information gathering, remembering);
- Organization skills (or Lower thinking) (i.e., Organizing, analysing, explaining);
- Evaluation skills (or Higher thinking) (i.e., Inferencing, integrating, evaluating, strategizing); and
- Thinking about thinking skills (i.e., Self-regulation, metacognition).

The disposition components include three subsets as proposed by Barnett (2015):

- Arising in relationship to Self;
- Arising in relationship to Others; and
- Arising in relationship to the World.

The knowledge related component was retained as conceptualized by Thomas and Lok, comprising:

- General information and basic facts to enable valid evaluation;
- Specific content-based knowledge related to discipline-specific and contextual information; and
- Experience, which includes intellectual development and knowledge gained from life and work experiences.

A presentation of the three tables summarizing all the elements of each dimension and a brief elaboration of each thematic group follows.

3.1 Skills and Critical Thinking

Leading theorists, as mentioned in the previous chapter, conceptualize critical thinking mostly as a set of skills (Bailin et al., 1999). According to Hamby (2015, p. 78), "critical thinking skills are those cultivated abilities that a person must have to engage in critical inquiry." Facione (1990) speaks of the cognitive skills of interpretation, analysis, evaluation, inference, explanation and self-regulation. Paul (1985) and Siegel (1989) refer to the variety of reasoning skills needed to be a critical thinker.

Lai (2011) contends that, notwithstanding the differences in the various perspectives presented, there is substantial agreement and overlapping in the definition of critical thinking skills. Researchers mostly agree on specific skills and subskills as part of the definition of critical thinking:

- Gathering information and formulating questions (Ennis, 1984; Glaser, 1941; Hughes, 1986; S. M. Jones, Bailey, & Nelson, 2019; Lipman, 2003; Marzano et al., 1988)
- Analysing arguments (Beyer, 1987; Ennis, 1989; P. A. Facione, 1990; P. A. Facione, Sanchez, Facione, & Gainen, 1995; Glaser, 1941; Halpern, 1998; Hughes, 1986; S. M. Jones et al., 2019; Marzano et al., 1988; R. W. Paul, 1992; Rankin & Hughes, 1987; Sternberg, 1986);
- Making inductive or deductive inferences (Beyer, 1987; Brookfield, 1987; Dewey, 1910; Ennis, 1989; P. A. Facione, 1990; Fischer, 1980; Glaser, 1941; Marzano et al., 1988; R. W. Paul, 1992; R. W. Paul & Elder, 2008; Pithers & Soden, 2000; Sternberg, 1986);
- Evaluating or judging (P. A. Facione, 1990; P. A. Facione et al., 1995; Glaser, 1941; Hughes, 1986; Lipman, 2003; Marzano et al., 1988; Rankin & Hughes, 1987); and
- Strategizing or solving problems (Ennis, 1985; Glaser, 1941; S. M. Jones et al., 2019; Nardi & Wales, 1985; Willingham, 2008).

An additional set of abilities that finds consensus among many theorists are abilities linked to self-regulation (Bandura, 1986; Beyer, 1987; Dewey, 1910; Ellerton, 2015; P. A. Facione, 1990; P. A. Facione et al., 1995; Glaser, 1941; Nardi & Wales, 1985; R. W. Paul, 1992; Schunk, 2005; Sternberg, 1986) and metacognition (Ellerton, 2015; P. A. Facione, 1990; P. A. Facione et al., 1995; Nardi & Wales, 1985).

The categorization presented in Table 3.1 draws its conceptualization from the framework developed by Nardi and Wales (1985). Subdividing the skills into these four categories suggestive of varying levels of difficulty in the thinking process should not imply that these skills are consecutive or incremental. Surely some skills are more sophisticated than others (Davies & Barnett, 2015).

GENERAL INQUIRY SKILLS	ORGANIZATION (LOWER THINKING) SKILLS	EVALUATION (HIGHER THINKING) SKILLS	THINKING ABOUT THINKING SKILLS
Critical thinkers show the ability to: **INFORMATION GATHERING** • Observe • Gather relevant data • Formulate questions • Questions self • udge the credibility of a source • Seek clarification on ill-defined concepts • Ask that claims are supported with evidence • Recognize stereotypes and clichés • Recognize bias, ethnocentricity, propaganda, or emotional factors in a presentation • Recognize situational differences • Identify central issues • Identify underlying assumptions • Identify conclusions • Identify similarities and differences even when not superficially apparent • Identify arguments • Identify irrelevant issues • Aware that one's understanding is always limited • Report as observer • Record statement and data • Corroborate data • Deep question about the world around • Comprehend and use language with accuracy, clarity and discrimination	Critical thinkers show the ability to: **ORGANIZING** • Organize thoughts and articulate them concisely and coherently • Compare similarities and differences among ideas or events • Classify items according to rational criteria • Distinguish between verifiable and unverifiable data • Distinguish between relevant and nonrelevant data • Distinguish between essential and incidental • Recognize the adequacy of data • Determine whether facts support a generalization • Order • Represent • Represent different viewpoints without distortion or exaggeration • Categorize • Decode • Examine plausible alternatives • Explore logical implications and consequences • System thinking: understand the complexity of systems and actors • Process information efficiently	Critical thinkers show the ability to: **GENERATING/ INFERENCING** • Draw suitable inferences using inductive or deducting reasoning • Predict future outcomes • Elaborate • Draw warranted conclusions or inferences • Draw applications to a different context **INTEGRATING** • Summarize • Synthesize claims • Restructure • Support reason with convincing arguments • Offer appropriate analogies • Provide examples and counterexamples • Relate cause and effect **EVALUATING** • Evaluate arguments • Evaluate likelihood and uncertainty • Make balanced evaluations and evaluative judgements • Balance, weigh and decide • Judge whether a theory is warranted • Judge whether a statement is overvague or overspecific • Make informed judgments	Critical thinkers show the ability to: **SELF REGULATION** • Self-assess • Self-examine • Aware of his own biases • Self-judgment • Self-correct • Reflect on past thoughts and actions **METACOGNITION** • Think about personal learning • Show originality in thinking • Monitor the quality of own thought

GENERAL INQUIRY SKILLS	ORGANIZATION (LOWER THINKING) SKILLS	EVALUATION (HIGHER THINKING) SKILLS	THINKING ABOUT THINKING SKILLS
REMEMBERING • Recall • Encode stimuli **REMAINING OPEN** • Avoid sweeping generalizations • Accept reasonable criticism • Listen carefully and build on ideas of others • Respect others as persons • See both/multiple sides of the issue • Recognize and understand multiple perspectives	**ANALYZING** • Identify attributes and components • Identify relationships and patterns • Make relevant distinctions and connections • Identify main ideas • Identify errors • Analyse claims, evidence and arguments • Distinguish facts from opinion and reasoned judgment • Map arguments • Determine validity or soundness of an argument • Interpret data **EXPLAINING** • Develop explanatory hypotheses • Make value statement • Conceptualise situations and issue reasonably • Present findings and conclusions • Justify potential responses • Exhibit explanatory skills	**EVALUATING** • Evaluate arguments • Evaluate likelihood and uncertainty • Make balanced evaluations and evaluative judgements • Balance, weigh and decide • Judge whether a theory is warranted • Judge whether a statement is overvague or overspecific • Make informed judgments • Suspend judgment in absence of sufficient evidence • Establish criteria to judge possible solutions • Verify • Evaluate reliability of data • Evaluate Hypothesis • **STRATEGIZING** • Generate solutions • Cooperate effectively • Avoid reasoning fallacies • Plan processes needed to solve a problem • Evaluate options for solving a problem • Solve problems • Monitor progress in solving a problem • Apply problem-solving techniques appropriately in domains other than those in which they were learned • Make decisions • Build theories	

3.2 Disposition and Critical Thinking

The ability to think critically does not necessarily imply the willingness to do so. Several researchers have identified the need for a distinction between critical thinking skills and dispositions (Davies, 2013; Dewey, 1933; Ennis, 1985, 1987, 1996; N. C. Facione & Facione, 1996; P. A. Facione, 1990; McPeck, 1981; Norris, 1985, 1988, 1989; R. W. Paul & Binker, 1990; D. Perkins, Jay, & Tishman, 1993; Resnick, 1987; Siegel, 1989). Dispositions can be described as "affective states" (Davies & Barnett, 2015, p. 13), intellectual virtues (Hamby, 2015) or habits of mind (P. A. Facione et al., 1995).

Dispositions comprise the attitudes and awareness of a person's psychological readiness to be a critical thinker; they are deeply rooted in one's personality or character. Though I might have an ability to do something, unless I possess an inclination to do so, "my ability will not characteristically be employed toward achieving the ends proper to it" (Hamby, 2015, p. 79). As with many other activities, to be a critical thinker, one needs to possess both the skill to perform the task and the willingness to engage in that activity; i.e., the character attributes, the personal qualities that actually move the person to employ those skills. We could suppose the case of a very skilled critical thinker who has a well-developed habit of reasoned judgment but who constantly manifests intellectual laziness or lack of care; this person will end up not being a critical thinker (Hamby, 2015).

Several are the taxonomies of critical thinking dispositions developed by theorists. The number of dispositions and sub-dispositions identified is also impressive. D'Angelo (1971) identified ten attitudes that the critical thinker should have as necessary conditions for the development of critical thinking: intellectual curiosity, objectivity, open-mindedness flexibility, intellectual scepticism, intellectual honesty, being systematic, persistence, decisiveness and respect for other viewpoints.

The Delphi Report identifies 19 such affective dispositions which the good critical thinker should possess that can be grouped into two main categories and that have subsequently been clustered into seven mega-dispositions: "Truthseeking; Open-Mindedness; Analyticity; Systematicity; CT [critical thinking] Self-Confidence; Inquisitiveness; and Maturity" (N. C. Facione & Facione, 1996, p. 5).

Perkins, Jay and Tishman have developed an elaborate list of seventy dispositions (including inclinations and sensitives) that can be summarized into seven main ones: "1. To be broad and adventurous; 2. Toward sustained intellectual activity; 3. To clarify and seek understanding; 4. To be planful and strategic; 5. To be intellectually careful; 6. To seek and evaluate reasons; 7. To be metacognitive" (1993, p. 6). Ennis (1996) introduces two more important dispositions: willingness to be well-informed and to take a position when the evidence and reasons are sufficient to do so. By adding these two, Ennis aims at responding to the critics of McPeck (1990) and others that feel that this aspect of knowledge is often neglected from among the dispositions. Further, the second added disposition of taking a position encourage the avoidance of scepticism. Each broad disposition has several sub-dispositions. Thus, Ennis proposes a system that has three basic sets of macro-dispositions: "(l) to "get it right" to the extent possible, (2) to represent a position honestly and clearly, and (3) to care about the dignity and worth of every person. The first two are constitutive, the third correlative" (1996, pp. 169–170). By making explicit the criteria of caring for the dignity of every person, the author aims at underscoring the fact that the "good" of the critical thinking process has a perspective that is wider than the mere selfish attribution of a judgment and should always care about every person's worth and dignity.

More recently, Thomas and Lok suggest three main subsets of dispositions: "attitudes such as being open-minded and fair-minded; intellectual virtues such as truth seeking and curiosity; and habits of mind that include cultural- or trait-induced bias and the tendency toward black-and-white (dichotomous) thinking" (2015, p. 99).

Davies and Barnett (2015), as we have seen in the previous sections, contend that there is a prevailing tendency in the literature to look at critical thinking as an individualistic act of reason. The authors argue

that critical thinking has both an individual dimension as well as a wider sociocultural dimension. In their view, critical thought uses knowledge as an endeavour to collective truth-searching, an inter-relational way of understanding (Barnett, 1997). They propose a taxonomy that subdivides the dispositions into three major categories: “dispositions arising in relation to the self, in relation to others, and in relation to the world” (Davies & Barnett, 2015, p. 13).

In the realm of this report, the last categorization of dispositions seems to more holistically embrace and represent both the personal and external dimensions (i.e. others and world), so for this reason it was adopted as the proposed categorization of critical thinking dispositions.

Table 3.2. Summary of Dispositions Associated with Critical Thinking

Arising in relationship to the Self	Arising in relationship to the Others	Arising in relationship to the World
Critical thinkers show: • Ability to plan and be strategic • Accuracy • Adaptive flexibility • Analyticity • Awareness • Broadness of mind and readiness for adventure • Clarity about intended meaning • Clarity in purpose and reasons • Cognitive maturity • Commitment • Consistency • Curiosity • Decisiveness • Ethical standards • Habit to use plan and suppress impulsive activity • Imagination • Integrity • Intellectual courage • Intellectual honesty • Intellectual humility • Logic • Mindfulness • Motivation • Objectivity • Passion • Perseverance /Persistence • Precision • Relevance/relate to the matter at hand • Respect for high quality product and performances • Self-confidence • Self-discipline • Self-efficacy • Self-identity • Sensitiveness • Significance (focusing on the important) • Sustained intellectual ability • Systematicity and rigorous scrutiny • Tentativeness • Tolerance of ambiguity • Use credible sources and mention them • Use of own critical thinking abilities • Willingness to be guided by principals • Willingness to be guided by reason • Willingness to be metacognitive • Willingness to engage in complex tasks • Willingness to look for alternatives • Willingness to self-correct • Willingness to take a position • Wonder	**Critical thinkers show:** • Acceptance of reasonable criticism • Appreciation of individual differences • Awareness of social realities • Empathy • Fair-mindedness • Flexibility • Freedom of mind • Impartiality • Independence of mind/ Intellectual autonomy • Intellectual carefulness • Intellectual cooperation • Intellectual scepticism • Open-mindedness • Respect for alternative viewpoints • Respect for others • Sensitivity to others' feelings and level of knowledge • Withhold judgement	**Critical thinkers show:** • Care • Desire for truth • Inquisitiveness • Interest • Seeing both sides of an issue • Willingness to change a position when evidence and reason are sufficient to do so • Willingness to go in deep (depth) • Willingness to take into account context and the big picture

Source: Adapted from (Davies & Barnett, 2015)

3.3 Knowledge and Critical Thinking

Another fundamental dimension of critical thinking is knowledge. The connection between knowledge and critical thinking is recognized as important by many theorists (Lai, 2011; K. Thomas & Lok, 2015). "Knowledge then is the indispensable condition of expansion of mind, and the instrument of attaining to it" (Newman, 1996, p. 10). Background knowledge is clearly identified as being directly related to thinking abilities and essential for showing the critical thinking competences (Pithers & Soden, 2000; Willingham, 2008).

Though several theorists state the importance of background knowledge for critical thinking, many of them still separate knowledge from critical thinking skills (Bailin et al., 1999). Skilled competence in thinking cannot be separated from knowledge (Kurfiss, 1988); for example, interpreting or predicting, though generic as skills, will greatly vary in accordance with context, knowledge and understanding of the task. Similarly, interpreting a poem is far different from interpreting a map. Of course, the debate about specific and generic skills has contributed much to further to this discussion (Ennis, 1990; McPeck, 1990). While recognizing the transferability across domains of some critical thinking skills, domain-specific knowledge is paramount in critical thinking because each domain requires a specific epistemological approach (P. A. Facione, 1990, p. 10).

Knowledge can be a condition or the means of the process of enlargement of mind that critical thinking should foster (Newman, 1996). For this reason, formal education plays a strong enabling role in developing critical thinking (Kimmel, 1995), while experience linked to knowledge is thought to determine the overall quality of reasoning (R. W. Paul & Elder, 2005).

Table 3.3. Summary of Elements of Knowledge Associated with Critical Thinking

GENERAL INFORMATION	SPECIFIC CONTENT	EXPERIENCE
Critical thinkers show:	**Critical thinkers show the ability to:**	**Critical thinkers show:**
• Background knowledge • Critical reflection • Cultural knowledge • Ethical competence • General Knowledge • Intellectual development • Knowledge about the world • Knowledge from others	• Apply discipline content • Avoid assumptions or ambiguity • Conditional knowledge (when and why) • Consider rival causes • Declarative knowledge (what) • Discipline knowledge • Domain knowledge • Ensure validity of conclusion • Improvise • Procedural knowledge (how) • Think systematically (not event based)	• Knowledge about the world • Knowledge from observation • Life experience • Political knowledge • Reflective awareness • Understanding the role of content knowledge

Source: Adapted from (Lai, 2011; K. Thomas & Lok, 2015)

4

Nurturing Critical Thinking

"Generalizability" and "transferability" are two further issues that characterize critical thinking (VanderStoep & Seifert, 1994, p. 30). The former deals with the existence of thinking skills that can be universalized beyond original domains of application, while the latter concerns the possibility of teaching and learning, i.e., transferring, those generalizable skills in different settings and situations. The first part of this section presents the generic vs context-specific debate; a contentious theme that has inflamed the discussion among theorists for many years but is now progressively reducing its vigour. The second part instead addresses the nurturing aspect by presenting some of the most acknowledged strategies or programmes for fostering critical thinking.

4.1 Generic or Content Specific Critical Thinking Debate

Defining critical thinking and its dimensions is extremely useful to gain entrée to the subject matter, though it is still not enough. In an educational context, it is important to navigate through the debate linked to the transferability of critical thinking skills. The debate swings between two views: those of the domain specifist and the generalist (Lipman, 1988; McPeck, 1990; Miller & Halpern, 2014; van Gelder, 2015). Supporters of the former view claim that critical thinkers need substantial domain specific knowledge in order to be critical in specific disciplines (McPeck, 1990; Willingham, 2008). Conversely, generalists maintain that there exist general critical thinking skills that are applicable across fields of enquiry (Gelder, 2005; Halpern, 1993, 2014; Lipman, 1988).

The initial conceptualizations of critical thinking build on the logical reasoning tradition, which is rooted in the generalist view. Dewey, for example, believes that the way people think reflectively "can be told, and can be described in their general features" (Dewey, 1933, p. 4). Even Ennis (1962, 1964), discussed the existence of general thinking strategies that could be applicable to any argument. Over the years, many theorists have held the generalist view arguing that critical thinking is a common construct that is applicable to any situation. Scriven and Blair (2019), for instance, have argued that critical thinking is characterized by some aspects which are common to all domains.

In the last few decades, literature has stepped away from the general versus specific dichotomy. Most authors have argued that, despite the interdependence of skills and knowledge and the central role played by knowledge of the subject matter, there are general principles of critical thinking that go beyond specific subjects and can be applied to more than just one single subject (P. A. Facione, 1990; Gibson, 1995; Tsui, 1999). However, this does not imply that such skills can be acquired in isolation from the subject matter (ten Dam & Volman, 2004).

4.2 Infusion, Immersion and Mixed Approaches to Nurture Critical Thinking

The various fields of study generally require both general critical thinking dispositions and abilities and more specific ones. The problem however might not lie in which skill is generic and which skill is subject-specific. The question is rather how students can best acquire critical thinking while engaging with the subjects they are studying. Different philosophies of thought have developed in the attempt to define the best approaches to teaching of critical thinking at classroom level.

Ennis (1989) suggests applying the labels “infusion” and “immersion” to two different approaches in order to incorporate critical thinking in subject matter instruction. Infusion requires that critical thinking principles be explicit, while immersion leaves those principles implicit. In infusion, it can either be the educators or the students, perhaps at the invitation of the educator, to make them explicit. The educator is always responsible for ensuring that principles are clear and explicit. Ennis (2013) advocates the infusion approach because it explicitly facilitates the transfer of critical thinking to other contexts by giving students something clear that they can remember. This stands in contradiction to the immersion approach where the educator is not required to make sure that critical thinking principles are made explicit. According to the latter approach, it is the practice or application of critical thinking sub-skills that enables students acquire them. This last approach is endorsed even by McPeck (1990).

Paul and Elder (2005), very pragmatically, while promoting a generalist approach, start from the specific discipline for constructing critical judgments. According to them, each academic discipline is an area of thinking in which humans employ specialized concepts. To learn the core concepts of a discipline, one must construct them in the mind as an ordered system of relationships. In the process, it is important to build both foundations, and the notions derived from those foundations. In addition, critical judgment is necessary to all acts of construction; and at the same time all acts of construction are open to critical assessment (R. W. Paul & Elder, 2005, 2008).

Paul and Elder’s approach resonates with what Ennis calls the third alternative: the “mixed approach” (Ennis, 1989, p. 5). In the mixed approach, critical thinking is taught as an independent track within a specific domain. This approach has some advantages. Firstly, it provides broader examples of the application of critical thinking principles with respect to the separate-course approach. Secondly, it provides applications that students will find significant, assuming they find the content of their subject matter courses significant. Lastly, it presents and explains, in an depth manner, the general principles of critical thinking that students will require in their everyday lives and in their fields of study (Ennis, 2013).

Thinking critically within a given discipline requires specialized disciplinary knowledge, understanding, techniques, language, and grammar since each discipline has its own rules for seeking and testing knowledge. Donald (2002; 2009) has detailed thinking patterns in a variety of disciplinary contexts, highlighting that an expert thinker in a particular field needs to comprehend the organizing patterns within that field to be able to find a way through them. Thus, critical thinking is learned according to particular rules in particular contexts and it could therefore be possible to say that skills linked to one particular context/subject can inform another (Kreber, 2009). But this is an assumption that must be treated with caution because the question of transferability is highly controversial, and without cautious scaffolding, that is, overt unpacking of ideas, clear expectations, transparent examples, and opportunities to practice, it should not be assumed that skills can easily be transferred from one context to another (A. Jones, 2015).

4.3 Evidence on What Works

This section will give an overview of studies that assessed the efficacy of the various approaches to teaching critical thinking as per Ennis's (1989, 2013) categorization – general, infusion, immersion, and mixed approach.

Analysis from meta-analysis (Abrami et al., 2015, 2008) studies reveal that of all approaches to teaching critical thinking the mixed approach produced the largest effects, while the immersion approach yielded the smallest. Moderate effects characterized both the general approach, and the infusion approach. The smallest effects that were found in the immersion method were such because critical thinking skills were not an explicit course objective. This is a significant finding for the design of courses and highlights the importance of making critical thinking requirements clear and explicit.

Educators must act to make critical thinking objectives explicit in courses and to include them in both preservice and in-service training and faculty development. In fact, it was noticed that the impacts of the interventions were better when instructors received specific training in preparation for teaching critical thinking skills or when administration extensively observed instructors' critical thinking teaching practices. Conversely, impacts were smaller when there were no such efforts in terms of professional development or elaboration of course design and implementation. This suggests that better outcomes can be obtained through active, purposeful training and teacher support both at the preservice and in-service levels. The results also demonstrate that peer collaboration seems to provide some advantage in the development of critical thinking skills, however this effect is minor compared with other instructional study features. Recent literature on distance and web-based education highlights a positive relationship between critical thinking and online collaboration (Garrison, 2016; C. Perkins & Murphy, 2006).

There are more methodological and substantive features that deserve to be explored, including treatment duration, subject matter, student characteristics, instructor characteristics, and so on. One of the most important, aspects of the work to be completed concerns the quality of critical thinking interventions. Findings from initial studies in these areas seem to contradict some of the previous reviews that have stated that instructional interventions have little effect on the development of critical thinking skills and dispositions (Bernard et al., 2008).

4.4 Nurturing Critical Thinking in Schools

Embedding critical thinking in the school curricula is a great opportunity for teachers to nurture learners' thinking skills (Costa, 1985; Costa & Kallick, 2009; Dwyer, Hogan, & Stewart, 2014). One way of nurturing critical thinking in the classroom is to foster specific subskills while teaching the curricular content (Fogarty & McTighe, 1993). Deliberately planning for a conceptual infusion of critical thinking approaches at subject level instruction offers unique opportunities for an integral learning experience, potentially more effective and protracted in time than a pre-packaged critical thinking course (Atkinson, 1997; Bissell & Lemons, 2006; Holmes, 2012; Marzano, Pickering, & McTighe, 1993; Staib, 2018; Swartz, 1986). Integrating critical thinking in learning requires deliberate effort, but often teachers are not sufficiently supported with adequate professional development opportunities (Bailin et al., 1999; Elder & Paul, 2001; C. Perkins & Murphy, 2006; Stein & Haynes, 2011).

This methodological shift in the learning experience at classroom level requires a refocusing from teacher centred approaches to learner centred ones (Alexander & Murphy, 1998; Bailin et al., 1999; Costa, 1985; Heiman & Slomianko, 1987; Lewis & Smith, 1993), with a greater emphasis on cognitive and metacognitive factors, motivational and dispositional elements, and social and individual differences in learners (Murphy & Alexander, 2000). The traditional role of the teacher is progressively shifted to that of a facilitator of learner's growth and a guide to the acquisition of thinking skills. Teachers are required to implement appropriate pedagogical practices that create opportunities for learners' own thinking, reflection, analysis and evaluation (Lampert, 2001; Marin & Halpern, 2011; Marzano et al., 1988; Miller & Halpern, 2014; D. Perkins

et al., 1993; Russell, 2005). Teacher's adoption of certain behaviours in class can invite or enhance student's thinking. Costa (1985) presents these behaviours in four main categories: questioning learners to facilitate the process of gathering information, processing it, and establishing meaningful relationships; structuring classroom management practices that optimise use of resources and facilitate learners' thinking; helping learners in the process of extending and becoming more aware of their thinking; modelling the desirable cognitive behaviours in facing arguments or problems.

The paradigm shift from traditional pedagogical approaches to an approach that facilitates learning and thinking can be a challenging and demanding experience for teachers (D. Perkins et al., 1993). To accompany teachers on this journey, a transformative and supporting learning environment and school climate that encourages collaboration, self-reflection and free expression of ideas are paramount (D. Fisher & Frey, 2015; Giannakopoulos & Buckley, 2009; Lampert, 2001; Marin & Halpern, 2011; D. Perkins et al., 1993). Principals play a crucial role in generating a nurturing environment that enhances students' full cognitive functioning and development (Costa, 1985). This is made possible through the creation of school conditions that boost intellectually stimulating activities and provide appropriate resources to develop and implement a highly cognitive curriculum (Thies-Sprinthall & Sprinthall, 1987) for learners and teachers, respectively. Teachers need to be stimulated and motivated to collaborate with other faculty members, participate in decision making that affects them, lesson development and student participation in class. Teachers should also be part of the processes for the development of school educational plans and the setting of appropriate indicators to assesses students' growth. Principals should promote collegial supervision (Lepper & Greene, 2015), and constantly remind teachers about the school vision and objectives regarding critical thinking abilities in learners. Monitoring and contributing to the development of a critical thinking curriculum and supporting the teachers in its implementation should be considered a priority of every school administrator (Costa, 1985).

A balanced programme for nurturing thinking skills should teach for thinking, teach of thinking and teach about thinking (Costa, 1985). In a teaching for thinking classroom teachers and administrators ought to strive to create a conducive environment where teachers model critical thinking and provoke with questions that challenge learners to think. The teaching of thinking requires teachers to openly introduce learners to the process of thinking (Marzano et al., 1993). Incorporating thinking skills in the curriculum also requires direct instruction in critical thinking skills (Beyer, 1987; Heiman & Slomianko, 1987; Lipman, 1988) and making learners aware of the needed prerequisite abilities to become skilful thinkers. Lastly, helping students become more aware of their own thinking abilities and consciously planning for their own learning is an effective pedagogical approach (Costa, 1985) to teaching for thinking.

The development of instructional strategies that support critical thinking acquisition at classroom level is paramount in the effort to shift from a teacher centred approach to appropriate pedagogical practices aimed at fostering critical thinking in youth (Beyer, 1984, 1987; Ennis, 2013; Kuhn, 2000; Staib, 2018). According to Costa (1985, p. 143), a teaching strategy is "a sequential pattern of instructional activities that are employed over time and are intended to achieve a desired student learning outcome." The various strategies should adapt to the various thinking skills the teacher aims at developing in students, e.g., remembering, reorganizing, classifying, relating, evaluating, reflecting, etc. (Mosston & Ashworth, 1990). They should also vary according to the students' preferences for learning, i.e., students might prefer individual learning or group learning with or without teacher supervision (Dunn, Griggs, Olson, Beasley, & Gorman, 1995), to various educational goals, e.g., low or high level cognitive achievements (J. W. Thomas, 1980) and the intrinsic motives of learning (Bruner, 2009; Giannakopoulos & Buckley, 2009).

In introducing teachers to the appreciation of their role as contributors in the creation of independent critical thinkers, it is important to help them identify the instructional strategies that contribute to the achievements of a set critical thinking educational objectives (Mosston & Ashworth, 1990). The following section presents some of the most common pedagogical strategies that have proven to be beneficial in the development of critical thinking.

For decades schools have structured learning as an individualistic practice. These traditional models of instruction tend to foster passivity and indifference towards learning instead of provoking curiosity and passion for the reality. More collaborative practices offer the possibility to restructure the learning process and revitalizing the educational path of students in class (Adams & Hamm, 1990). The concept of collaborative learning, the grouping and pairing of students to foster the thinking abilities of learners is widely researched, and subsequently advocated, in the professional literature. Collaborative learning refers to a method of instruction where students work together in small groups or pairs with the aim of performing a task or achieving an objective. Learners are guided to become progressively more independent and responsible for their own learning members of a small community (Gokhale, 1995).

One of the most commonly proposed instructional strategies is modelling, which can be used to explicitly foster the main critical thinking components (Bandura, 1982; B. J. J. Lombard, 2008). Mental modelling allows teachers to demonstrate to students, what they are thinking, how they are thinking what is expected from a critical thinker in terms of abilities to gather information, analyse, infer, evaluate or make decisions (Astington & Olson, 1995; Holmes, 2012; Kloppenborg & Baucus, 2004; Olson & Astington, 1993). In a way, modelling mental processing provides teachers with the opportunity to demonstrate metacognitive practices and foster self-reflection abilities in leaners (Kuhn, 2005; Schunk & Zimmerman, 1996).

Teachers questioning their learners can facilitate interaction among learners and provide the opportunity to hear what they think (Mortimer & Scott, 2003; Scott, Mortimer, & Aguiar, 2006). Concurrently, it allows students to explore topics, interact among themselves, discover more about an issue and argue the reasonableness of their own point of view (Ikuenobe, 2001). Questioning is also a useful technique for formative assessment at classroom level and for activating metacognitive processes that lead to greater efficiency in learning (Doff, 1988; Godfrey, 2001). Questions stimulate thinking and rethinking, helping in delineating issues, generating further questions, elaborating further thoughts and navigating beneath the surface towards deeper complexities (R. Paul & Elder, 2003).

Scaffolding, similar to other teaching strategies, should help enhance the learner's critical thinking abilities. Teachers should always aim at challenging student ideas and help them generate new hypotheses, interpret data, choose criteria for evaluation and use data and analysis for inferencing or strategizing (Pithers & Soden, 2000). 'Scaffolding' is a strategy that uses recursive questioning to assess students' ways of thinking and help it progress.

Inquiry based learning is an instructional pedagogy that builds on the conviction that students should be encouraged to ask their own questions, (Kivunja, 2014; Lampert, 2001), build their own argument (Bailin & Battersby, 2015) and learn how to reflect and build on their own learning (Kuhn, 2005).

Argument and argumentation are concepts widely theorized, with a number of antecedent theories, ranging from dialogism to logic of speech, to rethoric and communication theories among others (Andrews, 2015). Argumentation is central to everyday life and it has a myriad of applications in various fields and disciplines. Connect to this, discussion is consider an effective strategy to promote critical thinking in students (Costa, 1985; D. Fisher & Frey, 2015) both in classroom and in distance learning experiences (Cheong & Cheung, 2008; MacKnight, 2000). Discussion is commonly launched by an open ended question or an essential question and it constitutes an opportunity for learners to reflect on their points of view and develop their own ideas while confronting different perspectives (Mosston & Ashworth, 1990).

Linked to discussion, debate is another effective strategy to involve students in active learning by exposing them to a challenging situation in a protected and supportive environment. Debate, like discussion, provokes learners to question a personal point of view, to deepen their own thinking about a specific topic or dilemma, and contribute to the development of explanatory and oral communication skills (Combs & Bourne, 1994).

Problem based learning is a constructivist strategy that compels learners to discover the solution to a well-designed problem proposed by the teacher. Teachers play a fundamental role in coaching and stimulating learning by posing essential questions (Krynock & Robb, 1999). The process of problem based learning involves three main steps: presenting the problem scenario; information finding; discussion and formulation of the solution to the problem (Barrows & Tamblyn, 1980). It is a style of learning that fosters new and deeper understanding and it is the result of a process of investigation, clarification, analysis, inference and synthesis (Schmidt, 1983).

Narrowness and lack of empathy are natural dispositions of the human mind, especially if one rarely encounters others who think differently Teachers can challenge the natural predisposition of learners who hold acquired systems and beliefs and expand them. Entering sympathetically into the thinking of other people fosters fairmindedness and the ability to take other's perspectives. The ability to reconstruct other people's thinking through role play can be pivotal in education to critical thinking (R. W. Paul et al., 1989).

4.5 Effectiveness of Strategies to Foster Critical Thinking

Meta analytical studies on strategies to develop critical thinking present contrasting results. Some studies, for example, maintain that problem-based learning is an effective way of developing these skills (Chen, Liang, Lee, & Liao, 2011; de Oliveira et al., 2016) but at the same time they call for more research with larger and better quality sample (Kong, Qin, Zhou, Mou, & Gao, 2014). A recent review on concept mapping, for example, has shown promising results, positively affecting the disposition and cognitive skills of students. (Yue, Zhang, Zhang, & Jin, 2017). On the other hand, other meta-analysis shows that problem-based learning does not have greater effects than traditional methods of education (Ngudgratoke, 2018); instead, concept mapping, inquiry, games and computer aided instruction presented positive results.

Shim and Walczak's (2012) study highlighted that, although there was not a great deal of research on the impact of specific strategies of instruction on critical thinking acquisition, two proved to be the most effective practices: challenging students with open questions and exposing students to comparison and contrast of tasks to facilitate the growth of multiple perspectives analytical skills. Tsui's (1999) research concentrates on how ordinary class experiences impact students' critical thinking. Tsui used a self-reported instrument in her study. Her results revealed that development in critical thinking is associated with having a paper critiqued by an instructor, undertaking an independent research project, working on a group project, giving a class presentation, and taking essay exams, but it is not associated with taking multiple choice exams. Overall findings, however, indicate that the impact of classroom experiences has a far weaker impact on students' critical thinking abilities than one might expect or hope. The findings offer some insights with respect to which instructional techniques that might be used to enhance critical thinking in students, but experimental design studies are necessary to determine the impact of particular teaching methods. Garside (1996) analysed one of the few examples of empirical research which studied the direct relationship between a specific teaching method and critical thinking development. An experimental investigation with a pretest–posttest design was carried out to determine whether group discussion encourages the development of critical-thinking skills more than traditional methods of instruction such as lectures. However, no significant difference was found between the ways in which the two instructional methods formed critical-thinking skills. Garside blames this on students' lack of experience. Karabenick and Collins-Eaglin (1996) realized in a survey study (54 college classes) that in classes characterized by greater emphasis on cooperation and less emphasis on grades, college students were more likely to use critical thinking skills and higher-order learning strategies.

'Discussion' and 'dialogue' seem to play an important role in the majority of studies on instructional procedures focused on secondary and higher education (Abrami et al., 2015) especially when discussions are led by teachers in groups or in plenary. Abrami's et al. (2015) also maintain that exposing students to authentic instruction methods and problem-based learning is another important step in the promotion of the critical skills, especially when accompanied by role playing or problem solving cases. These strategies appear to be more effective when paired with a coaching programme (Pellegrino, 2007; Yang, Newby, &

Bill, 2008). Notwithstanding these interesting results in connection between instructional strategies and critical thinking acquisitions, they call for further study and assessment.

The connection between critical thinking instruction and content-specific critical thinking learning outcomes shows that nurturing this skill is more effective when the pedagogical strategy integrates critical thinking in the content if the learning objectives of the lesson are not skewed to learning factual knowledge only. The results of the studies seem not to capture any significant differences in the acquisition of critical thinking across different learners' age. Possibly, the instruments used are not capturing the subtle differences, but there is also the possibility that the differences in the acquisition of these skills at different ages might not be as relevant as expected (Abrami et al., 2015) calling for further investigation into the aspect.

4.6 Teaching Teachers

Teaching critical thinking is more effective when educators model critical thinking and deliberately incorporate critical thinking elements in their lessons (Walsh & Paul, 1986). Regardless of the subject being taught, learner curiosity and wonder should be provoked by teacher questioning and other strategies implemented for content delivery and acquisition. Even the assessment strategies can directly influence and enhance the critical thinking abilities of students (P. A. Facione, 1990; Hager & Kaye, 1992).

Emphasizing critical thinking programmes for teachers' education will have a cascade effect on learners in schools who need to be prepared for facing academic and life challenges (Elder & Paul, 1994). In the late 1980s, Walsh and Paul (1986) had already denounced one of the main challenges in teaching teachers to become critical thinkers. Teacher education was replicating the outdated teaching strategies implemented at primary and secondary levels with heavy emphases on content and a lack of focus on strategies for fostering critical thinking.

Every teacher should be helped to reach their fullest potential both in and out of the classroom by engaging them in critical thinking enhancement activities that can later be transferred to learners in the classroom. This calls for a concerted effort from teachers and all actors in the teacher-education system. There are several challenges teacher face that need to be addressed to ensure teachers' maximum participation in implementing a critical thinking augmented curriculum. The first of these is linked to shifting teachers' attitude and mentality from traditional practices to learner centred pedagogies (Woolfolk, 1998; Woolfolk Hoy, Davis, & Anderman, 2013); however, abandoning these acquired methods that teachers have relied on for decades requires a monumental effort. To achieve this goal, training institutions need to engage teacher trainees in the pedagogy of critical thinking in addition to embedding critical thinking skills in course content. This will enable students to develop stronger skills in critical thinking processes.

For both pre-service education and in-service education, teaching critical thinking should be infused into the preparation programme at all levels and in every course unit. Perspective teachers must be exposed to methodologies that show effective incorporation of strategies that foster critical thinking skills. Furthermore, pre-service and in-service instructors should place adequate value on learner contributions that display active engagement of reasoning and argumentation skills. Teacher mentors should be skilled in teaching for critical thinking and teachers should be accompanied in discovering how critical thinking can be incorporated in lessons, while classroom visits should be promoted to showcase how colleagues are actually implementing effective strategies (Aspfors & Fransson, 2015; Walsh & Paul, 1986). Professional learning communities have proven to be an effective way of fostering teacher collaboration and improving teacher focus on learner centred approaches; teacher collaboration influences the use of instructional practices that can foster reflection and analysis (Hipp, Huffman, Pankake, & Olivier, 2008).

In the attempt to introduce teachers to critical thinking, teachers should be asked to define what critical

thinking means to them and, more importantly, they should be introduced to an operationalized definition of critical thinking. Teachers should be helped to translate the general definition into the practical aspects of teaching and the intellectual behaviours that follow the acquisition of the subskills and dispositions (Aspfors & Fransson, 2015; R. W. Paul et al., 1989). This should encourage teachers to translate critical thinking concepts in a more realistic way into daily work and specific strategies.

Two recent systematic reviews of programmes implementing critical thinking in teacher education (Dunst, Hamby, Howse, Wilkie, & Annas, 2020; Lorencová, Jarošová, Avgitidou, & Dimitriadou, 2019) focused on understanding the effectiveness of critical thinking instruction, and assessing the impact of various instructional strategies. The studies grouped the factors contributing to the enhancement of critical thinking in teacher education programmes into four main categories. The first category, which includes factors that are linked to the preparation and strategies used by instructors, such as the role of questioning in the instruction process, the flexibility and responsiveness of instructors and their ability, as coaches, to give clear directions on how to cooperate and how to analyse were found to be quite pivotal (Dunst et al., 2020). Other enhancing factors in this category were the lecturers' and instructors' awareness and readiness to activate the steps for enhancing critical thinking (Lorencová et al., 2019). A second category, which includes those factors that are related to students: their dispositions, such as willingness to engage in discussions, openness to criticism and availability to learn from others, were perceived as important. Enhancing self-confidence and self-awareness in students is also reported to be foundational (Lorencová et al., 2019). Nevertheless, student field experiences and student self-directed learning have reported only medium level impacts (Dunst et al., 2020). The third category, which includes approaches such as a well thought strategy mix that fosters collaboration among students and the incorporation of self-assessment strategies and metacognitive strategies, have proved impactful (Lorencová et al., 2019). Micro-teaching and peer to peer facilitation has shown the highest levels of impacts (Dunst et al., 2020). Lastly, clarity on course content, the use of a mix of infusion and immersion approaches and long term programmes, beyond the standard ten weeks of duration (Dunst et al., 2020), have the highest impact in fostering critical thinking (Lorencová et al., 2019).

Some proven inhibiting factors need also be considered: student perception of the difficulty of a critical thinking programme and a more general lack of motivation are the most relevant. Other inhibiting factors are the lack of practice in a given theoretical approach to the subject and a lack of time or systematicity in the use of the proposed strategies (Lorencová et al., 2019).

Notwithstanding the centrality of the critical thinking component to the professional preparation of student-teachers, critical thinking is not yet systematically included in teacher education programmes. What can be said is, that from the studies presented, the resulting patterns suggest that practice-based preservice trainings that focuses on the implementation of strategies to foster critical thinking are among the most effective methods to prepare teachers to enable learner acquire these higher order thinking skills. A rich and intense coaching programme accompanied by systematic feedback is also very impactful.

5

Critical Thinking and the Context

Although critical thinking is cited as an important learning outcome in many different national contexts, there is a lack of consensus around whether or not critical thinking is a universal construct. In fact, there is substantial literature that argues that critical thinking is a uniquely Western approach to reasoning. The debate has generally focused on differences between Western and Eastern models of cognition, likely due to the rising numbers of Asian students studying abroad in Western universities. However, there has been little discussion on how critical thinking is or is not manifested in African contexts.

Cultural norms affect the efficacy of critical thinking instruction. In Asia and Africa, governments have declared critical thinking skills to be a major educational priority to increase global economic competitiveness (Hallinger, 1998; Mahyuddin, Pihie, Elias, & Konting, 2004). For example, in 1996, the Malaysian Ministry of Education recommended that critical thinking pedagogy be incorporated in all teacher-training programmes because so many teachers were "not fully capable" of incorporating critical thinking instruction into their classes (Mahyuddin et al., 2004, p. 24). Despite some improvement, concern remains that critical thinking instruction in Malaysia is implicit and teaching for transfer is not emphasized. Other Asian countries face similar issues. Many schools and education systems have not translated government priorities into a revision of traditional curricula and pedagogies; for example, teacher-centred instruction emphasizing rote memorization remains common in the Chinese, Japanese, and Korean education systems (Atkinson, 1997; Hallinger, 1998; McGuire, 2007). In African countries, critical thinking has become an educational priority to promote economic, political and cultural independence from the legacies of colonialism (Grosser, 2006; Grosser & Lombard, 2008; Ijaiya, Alabi, & Fasasi, 2010; B. J. J. Lombard & Grosser, 2004). For example, the South African government in 1997 stated that students should no longer be viewed as "empty vessels… to be filled with knowledge" (South African Qualifications Authority, 1997, p. 30, as cited in M. M. Grosser & Lombard, 2008, p. 1365). Similarly, Nigeria's national education policy has prioritized critical thinking skills so that citizens can "acquire an objective view of the local and external environment as well as become useful members of the society" (FRN, 2004, as cited in Ijaiya et al., 2010, p. 380). Worldwide, educated citizens are viewed as productive human capital. Yet change has occurred slowly, if at all. Pre-service teachers continue to perform poorly on standardized assessments of critical thinking and exhibit low levels of critical thinking disposition due to an emphasis on factual recall over more advanced cognitive skills like synthesis and evaluation (Grosser & Lombard, 2008; Ijaiya et al., 2010; Temel, 2014).

In non-Western cultural contexts, problems in teaching critical thinking may occur if students or the faculty perceive a discordance between existing cultural norms and practices and new pedagogical or curricular models (Atkinson, 1997; Egege & Kutieleh, 2004; Grosser & Lombard, 2008; Lun, Fischer, & Ward, 2010; McGuire, 2007; Simpson & Courtney, 2002; Stapleton, 2001; Zhang & Lambert, 2008). Among these norms are religious/ideological and gender constructs.

5.1 Critical Thinking and Culture

Culture refers to all the beliefs, behavioural patterns, institutions, and knowledge that collectively and normatively regulate the way of life of a people. It is automated, performative, and unconscious (Geertz, 1973). Culture affects cognitive development by shaping people's view of the world and the way they interact with it. Adults in a society pass along to children cognitive tools that help them interpret, experience, and face problems.

Barbara Rogoff (1990, 2003) has written broadly on the role of culture in cognitive development. Firmly grounded in the situated cognition tradition, Rogoff argues that cognitive development can only be understood in light of cultural practices, as cognitive functions develop in different ways depending on cultural circumstances. She also asserts that cultural practices change over time and that individuals are often concurrent members of multiple cultural groups, meaning that cognitive development can never be assumed to progress in a similar way across – or even within – cultures.

Rogoff highlights a myriad of cultural practices that can influence cognitive development, including the relative importance of independence versus interdependence – or cooperation versus competition – within a society and the norms surrounding discipline and child rearing. Cross-cultural psychologists have observed differences between cultures in terms of the willingness of students to distinguish themselves from others (Philips, 1992), the interpretations of problems that need to be solved and the proper methods for solving them (Goodnow, Young, & Kvan, 1976), and the definition of what constitutes 'intelligence' (Wober, 1972). There are also cultural norms surrounding the appropriateness of challenging authority figures, leading to significant differences in interactions between instructors and students in various cultural contexts (Omokhodion, 1989; Super & Harkness, 1986). Rogoff (2003) concludes that cultural processes are of crucial importance in human development. She argues that cognitive development not only involves skills and knowledge at an individual level but also is a collective and collaborative endeavour, involving other people around an individual who are part of his or her immediate environment. She describes learning as a process of 'guided participation' shared by the child and other adults in the community.

A number of theorists argue that such cultural differences lead to fundamental dissimilarities in cognition. Nisbett et al. (2001), for example, maintains that epistemology is strongly influenced by culture, suggesting that there are fundamental differences between Western and Asian systems of thought. Norenzayan et al. (2002) claim that Western and Asian students differ in their preference for using formal or intuitive reasoning, suggesting that such differences are likely to be the result of dissimilarities in cultural norms and pedagogical practices. In her analysis of the critical thinking ability of Asian students in the U.K., Durkin (2008) observes that Asian students were less likely to demonstrate criticality in their academic work, not because of a lack of ability but because of an aversion to critique, which they tended to see as a confrontational, and therefore offensive practice. Culture has also been found to impact what individuals remember, an important element of cognition (Deregowski, 1970).

However, some scholars disagree that prime differences exist between cognition and cultures. Chan and Yan (2007) argue that, although preferences regarding the use of reasoning are culturally based, reasoning itself is a human attribute that cannot differ across cultures. In their view, the preference to use a particular type of reasoning is entirely dependent on the scenario in question. As cultural expectations are connected to the particulars of specific scenarios, preferences would tend to differ between cultures.

People are equally likely to form logical judgments, regardless of their culture of origin, depending on their level of education and their exposure to the use of reasoning to address problems. Ryan and Louie (2007) present a similar argument, suggesting that it is problematic to conflate Asian students' disposition to use critical thinking with their critical thinking ability. As disposition relates to behaviour, they argue, it is likely that culture influences disposition. However, it does not follow that differences in ability fall along cultural lines. Studies of problem solving in different cultures support such a differentiation between ability and disposition, as different cultural groups have been found to use the same cognitive functions

but to manifest such functions in different ways depending on context (Cole, 1990).

Although the disposition to use critical thinking skills is likely to be affected by cultural influences, there is little evidence that critical thinking ability is a culturally specific construct. However, there is no doubt that education is a cultural process. As a result, it is highly likely that the fostering of critical thinking skills through education differs between cultures. Culture can both help and hinder cognitive development. For example, in the U.S., students are taught to value what they think more than the reasoning behind their thinking, which can be a significant barrier to the teaching of critical thinking skills in American classrooms (Kuhn, 2005). Education can also foster differences in dispositions, as instructors tend to model the use of critical thinking skills in different situations. Classroom practices can, therefore, encourage or discourage the use of critical thinking skills in various domains and contexts (Okagaki & Sternberg, 1990). Cultural norms can also influence classroom behaviour, which in turn can affect the development of critical thinking skills. Active participation in classroom discussions or small group projects can have a significant influence on critical thinking. However, cultural norms may prevent students from actively participating in such activities, thereby limiting the influence of such practices in certain contexts.

5.2 The relationship between language and culture and its contribution to thinking

Language and culture are intertwined; they have a close but complex relationship difficult to describe. In fact, language expresses culture and culture shapes language. They generate each other, but they also influence each other. To fully understand a culture, one has to first understand language. Language is learned, which means it can be culturally transmitted and conversely culture is transmitted in a large part, by language, through written and spoken communication. Language is a sort of mediation tool between the outside world and the person who is speaking. Through language, a person self-expresses and also makes sense of what is said (Duranti, 1997), moreover, using language “we also enter an interactional space that has been partly already shaped for us”; the world has specific features because “every choice we make is partly contingent on what happened before and contributes to the definition of what will happen next” (Duranti, 1997, p. 5).

For this reason, it is somehow impossible to isolate and study language separately from culture. “To know a culture is like knowing a language. They are both mental realities. Furthermore, to describe a culture is like describing a language” (Duranti, 1997, p. 27).

Talking about language means talking about something that has multiple forms. The fundamental distinction within language is between written and oral language. This distinction has paramount importance because it radically shapes cultures and forms of thought. Language is first of all an oral phenomenon; we communicate through spoken words first and “articulated sound, is paramount. Not only communication, but thought itself relates in an altogether special way to sound” (Ong, 1967, p. 6). To support this, Edmonson (1971) reports that among many thousands of languages spoken during the course of history only 106 of them have a commitment to writing that leads to literature. Among the roughly three thousand spoken languages currently in use, only seventy-eight have literature. The passage from oral language to literature is related to a mental process that requires a higher level of abstraction; our thoughts have always a degree of analyticity but it is through written language that individuals can achieve higher levels of abstraction, classification and systematic explanation and investigation of phenomena (Ong, 1967). Therefore, even the analyticity required by the study of critical thinking is fully expressed through writing. Writing is linked to the richness of a culture: oral cultures are incredibly rich in wisdom, but they do not “study” the contents of this wisdom because it is not an object of that analyticity proper to written languages.

Language study has, over time, mostly focused on written texts rather than orality due to easiness of comprehension and form: writing is analytic in nature, and hence breaks down its subject into various comprehensible parts. In other words, all that can be written can be studied and this leads to a deeper awareness and understanding of content. Oral discourse, on the other hand, is more expansive and

descriptive, literary discourse is more efficient and more analytic. Speech has always captivated human beings by the way it manifests itself in oral literature. For instance, proverbs from cultures world over are replete with observations regarding the human phenomenon of speech, about its powers, its beauties, its dangers. Speech, in other words, increases the ability to think consciously because it is always the expression of an experience (Ong, 1976). Speech resembles the manner our mind works; it is more natural in comparison to writing which is more artificial. Speech produces a conservative mind while writing produces a more speculative mind. Though writing, too, is conservative in its own ways, "the text frees the mind of conservative tasks, that is, of its memory work, and thus enables the mind to turn itself to new speculation" (Ong, 1982, p. 41).

In addition, while writing preserves knowledge, the same cannot be said about speech. In oral cultures, un-conceptualized knowledge can be easily lost because if it is not repeated aloud. This inhibits intellectual development and positive manipulation of knowledge. Thought requires some sort of continuity. Writing ensures this continuity; in case of a distraction of the mind from the material being read, the thought can be realigned by a glance at the same material. In oral discourse, the situation is different. There is nothing to revisit outside the mind, for once an utterance is made, it vanishes. Writing makes thought more analytic (Ong, 1967). For orality, learning or knowing require close, empathetic, communal identification with the known (Havelock, 1963); writing separates the knower from the known and thus sets up conditions for 'objectivity', in the sense of personal disengagement or distancing.

5.2.1 How language shapes critical thinking

There is an enabling relationship between language and thinking. Language enhances people's cognitive abilities to think critically which is a fundamental step for effective action. "Enriching the complexity and specificity of language simultaneously produces more effective thinking" (Costa, 2001, p. 83). Critical thinkers should refrain from unjustified generalizations and use specific and appropriate terminology, supporting their statements with data (Hale, 2012). Developing critical thinking thrives with a constant need and command of effective language: "clear thinking results from the disciplined use of language and is therefore a necessary condition for critical thought" (Johnson, 1996, p. 78). Efficient knowledge and usage of language revitalizes an individual's thinking capabilities to relay thoughts in a clear and meaningful way but is dependent on context: it is a manifestation of well-planned constructive thinking. Skilful use of language is a "hallmark of proficient critical thinkers" (Lipman, 1988, p. 14); the mastery of language is the ability to organize words in an elaborate meaningful way that conveys clear meaning as required in a given context.

The appropriateness in language use guides thinking as it motivates students to explore ideas that introduce them to the logical content analysis for either personal or academic purposes (Costa, 2001). Introducing learners to this critical use of thought, somehow redesigns the role of the teacher. The mission contained in teaching is not merely to transfer information but to guide learners toward an aware and responsible use of their thinking skills. Indeed, this ability to organize words, together with refraining from overgeneralization leads to a specific conception of reality guiding people to responsible actions. Teachers ought to equip their learners with sufficient knowledge to interpret reality and avoid manipulation (Moseley et al., 2005).

Even if the connection between language, culture and thought is evident, cultures influences the development of language (and consequently of thought) according to different patterns. Several language-related explanations have been proposed for the apparent differences in critical thinking performance manifested by students from different cultural backgrounds. The first explanation is based on the structure of the student's native language. Due to a student's native language structure, there may be constraints in the ease with which certain thinking skills are expressed. This explanation is referred to as Sapir-Whorf hypothesis or the linguistic relativity hypothesis: "If a language encodes a particular experience of the world, its use might predispose its speakers to see the world according to the experience encoded in it"

(Duranti, 1997, p. 56). The hypothesis claims that the structure of a language affects its speakers' world view or cognition, and thus people's perceptions are relative to their spoken language. According to this hypothesis, a particular language influences the way one thinks about reality. For instance, formulating counterfactual hypotheses is typical in the framework of some languages than in others (Bloom, 1981). Understanding the relationship between language and critical thinking in a person who is speaking a second language becomes even more challenging. Indeed, the culture and, consequently, the use of language of the learner influences the use of critical thinking in the new language acquired. The language structure affects the ease with which thinking takes place and later on is expressed. Itakura and Tsui (2004) report an interesting example about book reviewers: they use different strategies to convey critical evaluation when writing in Japanese compared to English. They notice that, in Japanese, criticism is usually expressed indirectly and it is most often preceded by an apology. This is not just an issue of form: there are cultures where expressing criticism is recognized as a richness because it leads to a deeper understanding of what is already known. In these cultures, teaching and using critical thinking will be more spontaneous. In others, however, criticism can suggest offense or even challenge; in them the teaching of critical thinking will be less spontaneous.

Teaching and learning critical thinking has always to be contextualized in each culture because it is connected to the culture itself and consequently to the language of the learners. There are indeed learners whose native language is indisposed to critical thinking while a second one is easily compatible. Similarly, it is necessary to clarify whether students who have good critical thinking skills in the native language can easily transfer them to the second language

The use of critical thinking in a second language is culturally based but the proficiency in the second language plays a key role. Indeed, there are languages and cultures that facilitate the learning and teaching of critical thinking but it is very difficult to transfer it without adequate linguistic knowledge (Floyd, 2011; Lun et al., 2010). This explanation is based on the observation that the foreign students in English speaking countries possess various levels of critical thinking competence levels.. It suggests that, since students must use a second language in their host environment, they may lack adequate proficiency in that language, hence fail to perform some tasks that require critical thinking. Studies demonstrate that the use of a foreign language has adverse effects on students' performance in various tasks; the experience gained in using critical thinking in the native language is not immediately transferable to the second language unless experience and proficiency are gained in both the written and spoken second language (Floyd, 2011; Lun et al., 2010; Takano & Noda, 1993; Uesaka & Manalo, 2014). Only students with higher language and intellectual competences score highly in critical thinking evaluation tasks that require and L1 and L2 proficiency (Ackerman, 1986; Neisser et al., 1996). Processing a language requires cognitive resources and working memory. At the beginning stages of the second language acquisition, there is a very low proficiency which requires a lot of cognitive resources. Thinking critically requires the use of working memory to compare and judge. Therefore, when proficiency is not acquired there are limited resources available in working memory because disproportional efforts have already been expended on utilizing a language. In other words, there may not be adequate resources remaining for the satisfactory execution of critical thinking (Baddeley, 1983).

5.3 Contextualization of Critical Thinking in Sub-Saharan Africa

In sub-Saharan countries, critical thinking has become an educational priority to help citizens become aware of their social, political and economic environment and useful members of society (Grosser, 2006; Grosser & Lombard, 2008; Ijaiya et al., 2010; B. J. J. Lombard & Grosser, 2004). Nevertheless, educational practices still favour memorization and rote-learning; examination-oriented education (Allen et al., 2016; Mitana et al., 2018) and a classroom pedagogy that emphases factual recall over more advanced cognitive skills like synthesis and evaluation might influence the African students' thinking patterns (Grosser & Lombard, 2008; Ijaiya et al., 2010; Temel, 2014).

A recent integrative systematic review (Giacomazzi, Fontana, & Camilli Trujillo, 2021), analyzed the extent to which the concept, implementation and assessment of critical thinking has been contextualized in sub-Saharan Africa. The purpose of the study was to synthesize the scientific evidence on the contextualization of critical thinking in sub-Saharan African countries to improve the educational practice of teachers and education professionals in those countries.

According to the results of this study, the national policies in many countries since mid-1990s started aligning their priorities to need to nurture students who can think independently (Ijaiya et al., 2010). The kind of policies and curricula designed accommodate critical thinking as a focal aspect to achieve quality education. Several examples are reported in the reviewed articles. In South Africa, for instance, before 1994 the curriculum was focusing mostly on transfer of content with students being requested to passively accept the information handed over by teachers and lecturers (de Jager, 2012). Following the 1994 elections, the government transformed education into a flexible and outcome-based system aimed at developing the learners' critical capacity (see the South Africa Department of Education, 1997) (Belluigi, 2009; Belluigi & Cundill, 2017; Chabeli, 2007; de Jager, 2012; Grosser & Lombard, 2008; Grosser & Nel, 2013). The establishment of the South African Qualifications Authority (SAQA) has boosted the process of incorporation of critical thinking skills in the learning objectives of the SA curriculum (Grosser, 2006; Grosser & Lombard, 2008; Hindes & Bakker, 2004; B. J. J. Lombard & Grosser, 2004; K. Lombard & Grosser, 2008; Makina, 2010; Mangena & Chabeli, 2005; Matthee & Turpin, 2019; Mogale, Botes, Cur, & Botes, 2001; Ng'ambi & Johnston, 2006; Pieterse, Lawrence, & Friedrich-Nel, 2016). Similarly, in Nigeria the National Policy on Education (2004) openly calls for the inclusion of thinking skills in the educational process to enable learners to actively participate in the society and become effective citizens (Adeyemi, 2012; Domike & Odey, 2011; Luka & Dukku, 2017; Mgomezulu, Shawa, & Wamba, 2014; Olatunji, 2017). Even Ghana (Boso, van der Merwe, & Gross, 2020; Owu-Ewie, 2010), Zimbabwe (Madondo, 2018), Tanzania (Milanzi, 1995), Rwanda (Schendel, 2015) for example, clearly demonstrate commitment to transferring critical thinking in the educational system with the provision in the syllabi of directives for the teaching of critical thinking skills.

The attempts of empirical studies to assess critical thinking in low-income contexts rely solely on assessment instruments imported from other cultural contexts (Schendel & Tolmie, 2017), generating problems of comparability, absence of normative groups and lack of familiarity in adaptation and validation processes. The review raises questions of cultural relevance of the methods used for teaching and assessing critical thinking and highlights the need for localization and adaptation processes that could inform the education system both in secondary and higher education (Giacomazzi et al., 2021).

6

Contextualization Study: A Grounded Theory

The LGIHE team conducted a study to investigate and to compare how Ugandans define and conceptualize critical thinking. The section above documents how critical thinking is a set of skills and dispositions that is in high demand in the labour market and an expected outcome of the education system. Concurrently, the education system in Uganda presents relevant gaps that hinder the enhancement of these high-level cognitive skills. The literature review was crucial to understanding how multifaceted and complex the concept of critical thinking is and its interconnection with various disciplines and fields. However, the systematic review reveals a dearth of evidence and investigation of the critical thinking concept in sub-Saharan Africa, while showing how the conceptualization of critical thinking and methods of assessment are imported from the Global North.

To address this gap in knowledge, the team used a qualitative research design to generate a contextual definition and conceptualization of critical thinking among various stakeholders in Uganda. Considering the limited knowledge and understanding of the variables and constructs that characterise critical thinking in Uganda and based on the need to understand the conceptualization of critical thinking in this specific context, a grounded theory study was implemented. The use of a grounded theory is especially appropriate for understanding a phenomenon whose key variables have not yet been identified or investigated and for facilitating the emergence of significant themes related to it. Grounded theory means “the discovery of theory from data systematically obtained from social research” (B. G. Glaser & Strauss, 1967, p. 2). This research method is particularly useful in developing a theoretical explanation of cognitive, psychological and sociological behaviours in a group of individuals that are of interest or that exhibit a certain behaviour (B. G. Glaser & Strauss, 1967).

The sampling in this qualitative inquiry intended to capture a variability of responses and describe a significant range of experiences of participants (Patton, 1990). For this reason, the participants were identified through the International Standard Industrial Classification of all Economic activities (ISIC) Revisions 4. A purposive sample of 54 KIs was further designed to capture differing market conditions (by industry classifications), demographic contexts, different skill needs, ownership types (private/public) and interest groups, with specific attention to the education sector.

6.1 The Critical Thinking Framework in the Ugandan Context

In Uganda, it is quite common to find the phrase "critical thinking" in curricula, syllabi, official government documents and it is often referred to as "one of the most important expected learning outcomes of the Ugandan education system." The attention towards this high order thinking skill is growing among policy makers and also among parents and employers (Omala et al., 2016).

Several aspects of critical thinking emerged from the analysis of the definitions provided by the participants. The participants mostly refer to critical thinking as a process of thorough thinking accompanied by keen observation of reality and a desire to move beyond the surface to discover the true meaning of things under consideration.

According to participants, critical thinking fosters the ability to overcome challenges in an innovative way, and it is a characteristic of people who can think 'outside the box'. Critical thinking is also shown in the way people behave and react to challenges. Those who possess these skills demonstrate exceptional ability in analysing problems and finding solutions. Moreover, critical thinking is seen as the ability to forma a personal opinion and think independently; thinking is not a matter of "following the rules" (as mentioned by one participant) but to have a personal justification for your choices and actions.

From the analysis of the interviews, it is possible to identify a number of characteristics that the critical thinker should possess that include skills, traits and values. The skills further cluster in two main categories: skills related to the self (self-awareness and self-management) and skills related to the relationship with the others (social awareness).

In regards to the first cluster of skills, the findings show how critical thinking is intertwined with *self-awareness.* A self-aware person is more prone to think and justify self-thinking and decisions but, at the same time, developing critical thinking skills makes the individual feel empowered and discover self-dignity. Enhancing thinking skills makes individuals become more assertive, confident and aware of their emotions. Moreover, a person who is *self-confident* and a good critical thinker can defend choices and decisions, because one has appropriate reasons for holding positions.

According to the participants, one of the relevant characteristics of a critical thinker is the *ability to manage and regulate one self.* They openly mention *self-discipline, perseverance, patience,* and *determination* as being important aspects to describe a person who can think critically. In the context of the study, self-discipline is mostly described as the ability to ponder a situation and consider reactions. This is also related to determination, to having a sense of direction and focus. It is this strong will to achieve an objective that gives a person the ability to find a way around the obstacles. Thus, critical thinking helps people in reaching their goals because it gives adequate reasons to endure hardships.

One of the most relevant characteristics emerging from the interviews is the *social awareness* that critical thinkers demonstrate. Critical thinking also facilitates the ability of the person to relate with the others, to consider their perspectives and to find solutions to the challenges that respond not simply to one's personal good but also to the good of the community. The communitarian perception of Ugandans is a dominant aspect in many of the interviews and it shows how the self is mainly perceived in a relationship with other people. Similarly, a critical thinker has a way of looking at the problems that increases consensus because the solutions or the position the person has toward the challenge is interesting, sensible, and meaningful. To relate well with other people and to be capable of suggesting constructive solutions, it is important for a critical thinker to be *patient* and a *good listener.* A critical thinker should possess good *communication* skills to elaborate the choices or defend positions.

This last point relating to the social skills implies the ability of the individual to take on the personal responsibilities. As stated, critical thinking helps in taking ownership for personal actions and decisions. This ability is quite paramount in Ugandan culture; being *responsible* means to be accountable and bearing

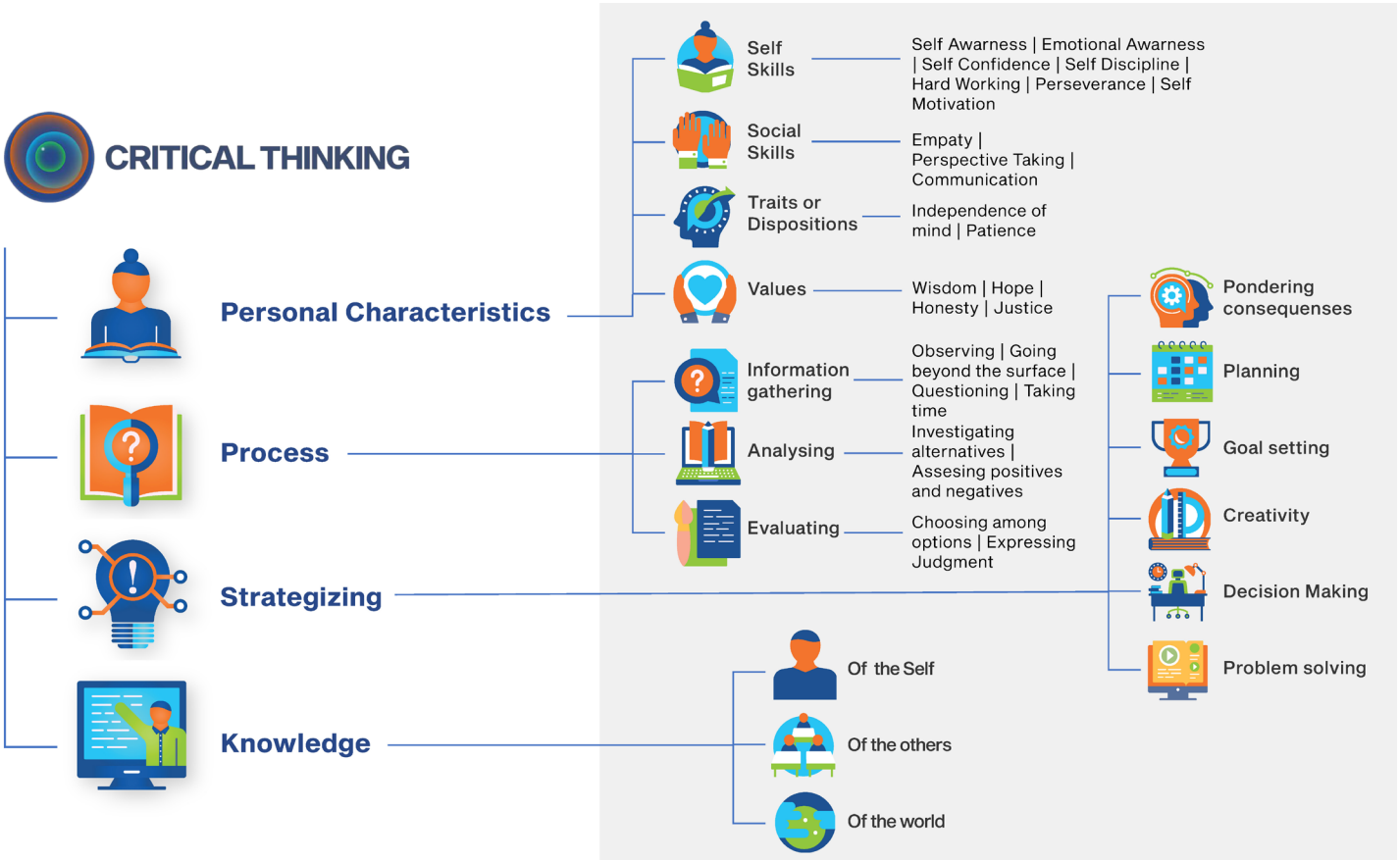
the weight of the consequences.
The relevance of social awareness in critical thinking is also portrayed in the way participants refer to the *care for the community or the family*. In this context, critical thinking is considered instrumental to achieving the good of loved ones and of the community at large. According to some participants, to foster harmony in the people around you is the essence of critical thinking. As expressed in the local language, the word *magezi* relates to someone trying to solve, or to come up with concrete ideas that can benefit the society. The greater good of loved ones constitutes not only one of the most important objectives of the process, but it is also an integral part of the evaluation stage; it is a criterion used in pondering the situation and for making decisions, so much so that the greater good of the society is to be preferred to personal satisfaction.

Furthermore, the analysis of the interviews shows how this cognitive skill is linked to values that are important in the Ugandan society: *justice, truth, hope, honesty, passion* and *motivation*. Critical thinking helps to judge a situation in an unbiased way. The process one follows while thinking critically helps the person to assess a situation and reach a just conclusion. A critical thinking person shows passion and dedication to the others, and for reality: passion and commitment sustain a person in the process of critical thinking, and it can ignite hope for the future.

The traditional culture, promotes *respect* for elders and a strong sense of community. Drifting from these values leads to selfishness and a disruptive pursuit of individual interests (Kassimir, 1998). However, the findings suggest that the pursuit of individual interest should not be necessarily equated to a clash with tradition, rather it displays a quest for maturity. Belonging to a community does not mean renouncing personal exploration and freedom but endeavouring to personally re-discover the values that the community is proposing (Dipio, 2013). Respect for elders is clearly ingrained in the experience of the people who participated in this study. The participants made several references to the relationship with their parents or family members and the relevance of family in the critical thinking or decision-making process. In this regard, the relationship with authority is seen as quite crucial.

The Figure below shows the critical thinking framework that emerged form the contextualization study.

Figure 1.6 Contextualized critical thinking framework



The analysis of the findings displays the complexity of critical thinking skills in the local context. Even though a definition of critical thinking is not uniformly understood by the participants, it is surprising to note how critical thinking skills consistently surfaced in various aspects of everyday life. The associated skills and values are also multiple and composite and would require further study.

The critical thinker in Uganda is required to possess a set of skills related to the social and emotional characteristics of the self (Schonert-Reichl, Kitil, & Hanson-Peterson, 2017; Zins, Bloodworth, Weissberg, & Walberg, 2007), like self-awareness, self-confidence but also skills that pertain to the ability to manage the self, like perseverance, self-discipline and self-motivation. In the Ugandan context, the skills related to self-control or self-management are more prominent than the skills related to the awareness of the self. Similarly, in many African and Eastern cultures, the communitarian approach to life does not encourage an individualistic approach to the challenges of life; the value of each person is conceived of in relationship to the contribution the person gives to the community, as we have seen in the discussion about the Ubuntu culture (Grosser & Lombard, 2008).

From the findings, certain values are deemed important for a critical thinker in Uganda which correlate to those found in traditional culture. Aspects like wisdom, patience, trust and honesty are not as central in the western literature of critical thinking; though they are not absent (Halpern, 2001; Lipman, 2003), they are not the most prominent aspects that are usually highlighted.

Furthermore, a number of other skills that are considered quite relevant in western models of critical thinking do not emerge from the interviews like the desire to be well informed (Carver & Scheier, 2000; Davies & Barnett, 2015; Ennis, 1985; P. A. Facione, 1990); upholding ethical standards (Davies & Barnett, 2015); analyticity (Banning, 2006; Ceolin, Siles González, Del, Solano Ruiz, & Heck, 2017; Ennis, 1996; N. C. Facione & Facione, 1996; P. A. Facione, 1990; P. A. Facione et al., 1995; R. W. Paul, 1985; D. Perkins et al.,

1993); systematicity (Banning, 2006; Brookfield, 1987; D'Angelo, 1971; Ennis, 1985, 1996; N. C. Facione & Facione, 1996; P. A. Facione, 1990; P. A. Facione et al., 1995; R. W. Paul, 1985; D. Perkins et al., 1993) and rigorous scrutiny (Barnett, 1997, 2015); precision (Banning, 2006; Brookfield, 1987; Ennis, 1985, 1996; R. W. Paul & Elder, 2005); self-efficacy (Bandura, 1999; Costa, 1991); and cognitive maturity (N. C. Facione & Facione, 1996; P. A. Facione, 1990; P. A. Facione et al., 1995; R. W. Paul, 1985).

The skills related to intellectual scepticism (D'Angelo, 1971; M. Davies & Barnett, 2015) or carefulness (Ennis, 1996; D. Perkins et al., 1993) are also not mentioned by the participants. These concepts are not simply difficult because of the dense philosophical meanings they bear, but they are not so easily fostered in a collectivistic society like the Ugandan. Some cultural practices and perception of what authority is, make it difficult for persons to develop epistemological beliefs typical of reflective thinking (King & Kitchener, 1994).

The elements of the critical thinking process that the findings underscore are grouped into macro categories that are well aligned with process skills highlighted in the literature. The skills needed for deepening information gathered (Hughes, 1986; Marzano et al., 1988; Rankin & Hughes, 1987), analysing (Beyer, 1987; Chaffee, 1992; Ennis, 1989; P. A. Facione, 1990, 2009; P. A. Facione et al., 1995; Freely, 1993; E. M. Glaser, 1941; Halonen, 1995; Hughes, 1986; S. M. Jones et al., 2019; Marzano et al., 1988; R. W. Paul, 1992; Rankin & Hughes, 1987; Simpson & Courtney, 2002; Sternberg, 1986) and evaluating (P. A. Facione, 1990; P. A. Facione et al., 1995; Halonen, 1995; Hughes, 1986; Marzano et al., 1988; Rankin & Hughes, 1987) are considered to be crucial in the literature and central to the critical thinking process. While the findings are quite elaborate in describing general inquiry skills (i.e., deepening information), they are not as detailed in describing analytical and evaluative skills in the process of thinking critically about a challenge or problem. In particular, the step of elaborating a judgment is rarely explained. When mentioned by the participants, it is not clear how a judgment is formed, and the criterion or standard used for judgment is often unspecified. Only a few of the participants mentioned important elements of love, truth or justice that recall what Lipman (2003) referred to as the mega criteria. The findings show how having a strong criterion underpinning a judgment enables the person to stand against the pressure that comes from the community.

Even in the analysis, the aspect of independence of mind and the critical relationship with the authority are still central. There is evidence of the willingness to execute independent choices but, at the same time, many participants either make decisions that are in line with what an suggests or, if make independent decisions, they might spend years trying to regain the trust or favour of the authority figure.

The relationship between critical thinking and knowledge, though extremely meaningful, is not very prominent in the findings. Even though in the literature various authors underscore the importance of background knowledge for critical thinking, many of them still consider knowledge to be detached from critical thinking skills (Bailin et al., 1999). Kurfiss (1988) believes that skilled competence in thinking cannot be separated from knowledge. Also Facione (1990) maintains that domain-specific knowledge is paramount in the growth of critical thinking skills. Knowledge is thus, even for Ugandans, a means for the enlargement of mind that critical thinking should foster (Newman, 1996) and at the same time critical thinking is a means to increase the knowledge of self, others and the world (Davies & Barnett, 2015; Lai, 2011; K. Thomas & Lok, 2015).

The presentation of the findings helped in the construction of a localized conceptualization model of critical thinking. The various dimensions of critical thinking can be represented in a schematic form as in the Figure 1.7.

Figure 1.7 Critical Thinking Model: Interacting Elements

This model displays the various elements that contribute to a definition of critical thinking in the Ugandan context. Inspired also by the theorisation presented by Alexander et al. (2011), the critical thinker (WHO dimension) should be endowed with self and social skills, dispositions, values and knowledge that are needed to become a better critical thinker and at the same time grow when the person exercises the critical thinking abilities (HOW dimension). The process of critical thinking is ignited by specific circumstances, challenges, or people (WHAT dimension) that are very specific to one's social and cultural context (WHERE dimension).

7

LGIHE Critical Thinking Activation Model

The Luigi Giussani Institute of Higher Education (LGIHE) model of critical thinking adopts a holistic approach in terms of planning, implementation, and assessment that ultimately prepares a learner to face the world in a more meaningful way. This model considers the challenges, needs and resources of the education system, school leaders, teachers, students, and parents in the task of fostering critical thinking. The LGIHE approach facilitates a conducive environment aimed at enhancing the critical thinking competences and academic standards for learners in the Ugandan school system. This prepares a workforce that possesses both soft and high order thinking skills that are in great demanded for employability in the labour market and productive participation in a broader sense in society (Omala et al., 2016).

In a bid to promote quality learning in the Ugandan schools, the Ministry of Education and Sports, through the National Curriculum Development Centre, made curriculum reforms for the Lower Secondary school that emphasise, among other things, the fostering of critical thinking skills that allow young people to develop into life-long learners who can adapt to change and deal with the challenges of life in the 21st century. The reforms seek to bring deep knowledge and understanding of concepts, questioning techniques, evaluation, analysis, and creativity are, almost absent in Ugandan classrooms today.

To strengthen critical thinking throughout the educational landscape, LGIHE's model proposes action at four levels; the national systemic level, institutional/training level, school level and classroom level. The model represents a systemic collaborative process whose major aim is the realization of a self-assured learner who is a protagonist of highly developed judgement, evaluation, and problem-solving abilities in the cognitive, affective, and behavioural aspects of life. It proposes collaborative, dynamic engagements with various partners that LGIHE accompanies at the national, institutional, teacher and learner levels of the education hierarchy, with each level performing towards improved academic and life outcomes.

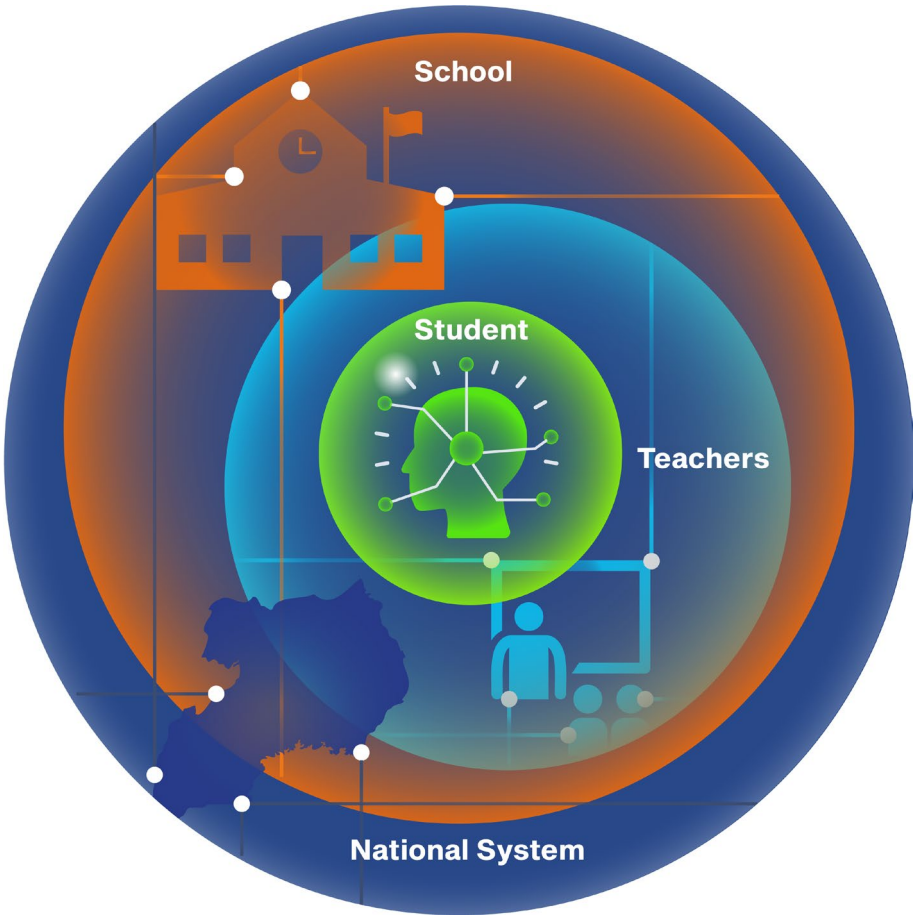
At the national level, Ministry of Education and Sports (MoES), National Curriculum Development Centre (NCDC) and Uganda National Examinations Board (UNEB) formulate and operationalize policies that foster critical thinking skills among learners in Uganda; at the school level, school leaders and administrators create supportive environments for critical thinking skills in the teaching and learning of all subjects taught; at the classroom level, a cordial relationship is created between the teachers and the learner that fosters a positive teaching/learning environment pertinent in the achievement of the lesson objectives and learning outcomes.

7.1 Systemic collaboration in the critical thinking model

While the type of activities that learners engaged in and the level of interaction between teacher and student play a major role in the development of critical thinking, learning activities are inevitably implemented in a specific context (cultural, systemic, institutional, or disciplinary) that moulds and defines the pedagogical choices. Such context is layered and multi-dimensional.

The relationship that exists among the various layers of the context where students interact and are helped to develop their critical thinking skills can be represented as in Figure below.

Figure 1.8 Systemic collaboration in the critical thinking activation model



At the core of this model is the student who is the prime beneficiary of the educational programmes in schools. Students are helped to develop their critical thinking skills mostly in the interaction with teachers. Teachers, on the other hand, can be enabled or hampered in the implementation of effective educational programmes by the school leadership who is responsible for the educational plan of the school and guides teacher actions by setting specific explicit or implicit boundaries. The school leadership is, in turn, influenced by parent expectations that affects the vision, mission and culture of the school. Further, the national educational system has strong implications for school practice and it greatly impacts classroom activities through policies, curricula, and assessment systems.

7.1 Roles at each level

7.2.1 National System level

LGIHE collaborates with some of the key education stakeholders in policy formulation and Implementation.
NCDC, in liaison with UNEB, sets the boundaries of the education content to ensure that curricula and assessment procedures foster critical thinking. These government bodies ensure quality control in the country's education. NCDC is a corporate autonomous statutory body/agency under the Ministry of Education and Sports (MoES) responsible for the development of educational curricula for primary, secondary and some tertiary institutions in Uganda. Its functions include, inter alia, initiating processes for curricula research, review and/or reform, updating, testing and coordinating the implementation of educational curricula at all levels of learning (Primary, Secondary and Tertiary) as well as promulgation of guidance for the implementation of improved educational curricula and pedagogy. UNEB, the national assessment body in Uganda, is mandated to conduct and manage examinations in Uganda for the end of the educational cycle at Primary and Secondary school level and to conduct examination-related research.

The department of MoES in charge of Teacher/Tutor Instructor Education and Training (TIET) is mainly responsible for policy, control, and maintenance standards through control of teacher education curriculum program activities and examinations. It is responsible for training, assessing, and monitoring the teaching programs in the country.

Critical thinking is a complex phenomenon with implied skills and dispositions, which makes its development and assessment intricate. There is, as a result, a need to provide assessment guidelines to teachers and learners, a task performed by NCDC in liaison with UNEB. For formative assessment, the curriculum provides suggested activities for teachers and allows room for the exploration and creativity of activities and practices that foster critical thinking. Some LGIHE staff have received training from the NCDC on the Lower Secondary Curriculum and are collaboratively engaged in interpreting the curriculum to all subject teachers. All education stakeholders need concerted and agreed-on mechanisms to streamline their roles in revitalising efforts toward a more elaborate path to critical thinking. Students too can be involved in the process at the classroom level by keenly observing the challenges they face in classroom learning, as well as in their social life, and by appreciating their commitment to education achievement.

LGIHE collaborates in assessment reforms in national examinations, acting to promote greater inclusion of High Order Thinking skills questions and promoting a formative assessment policy for the end of cycle exams. This is aimed at ensuring that the learners gain knowledge and understanding of concepts, develop skills of questioning, evaluation, analysis, and creativity, which near more intense development and practice in Ugandan classroom. In the process, district education officials and school are engaged in the development of a continuous coaching strategy that facilitate monitoring and fostering of critical thinking pedagogies in the schools. LGIHE is also contributing to the revision of the Teachers Education curricula to promote critical thinking.

7.2.2 School level

The school remains largely responsible for the development of critical thinking skills, a necessity in preparing young people to easily handle real life situations. This requires the school to have clear mission and vision statements recognising critical thinking as an important goal and explaining how it can be accomplished through professional development trainings. Professional development might also take the form of sponsoring projects to foster critical thinking and/or providing institutional teams and resources to support teacher engagement with critical thinking. In this regard, LGIHE is responsible for interpreting the concept of critical thinking and supporting the school leaders and teachers through a coaching system.

The promotion of an educational environment that fosters critical thinking among learners and incorporates it in all education programs/activities should be one of the major goals of each school.

Through its trainings, LGIHE is committed to form school leadership that promotes a school culture where decision makers, teachers, administrators unite to help learners develop critical thinking in all school activities. LGIHE has developed a specialised training for school leaders, such as School Culture, Leadership and Management training that underscores the need for school leaders to put in place leadership and management practices through a culture in which each member of the school is intrinsically valued and motivated to work. This three-day training invigorates the school leaders towards ensuring a comfortable working and learning school environment. The training brings together headteachers and their deputies, Board of Governors (BOG) and Parents Teachers Association (PTA) representatives and it underscores the need for school leaders to intentionally, purposefully, and thoughtfully put in place leadership and management practices through a culture in which each member of the school is facilitated to enhance quality learning. The role of the school management and leadership is fundamental to developing a critical thinking environment in the school. It is at the leadership level that school leader can either support or impede activities and initiatives to implement pedagogies at the teacher level. Therefore, fostering critical thinking at the teacher and learner levels requires supportive school management and leadership that sustain such initiatives and embodies critical thinking (Allen et al., 2016).

7.2.3 Teacher level

Nurturing the thinking abilities of learners is an especially important goal of education, and its most critical responsibility. LGIHE believes that it is the responsibility of educators, especially teachers, to nurture learners in the discovery of their identity, self-worth, and sense of belonging, and to help each learner grow in the ability to think critically, responsibly and independently. To address this, LGIHE has several trainings that are aimed at enhancing teacher ability to fostering critical thinking in the teaching process. These trainings include the following;

The Risk of Education training: In an education system that relies heavily on traditional teacher-centred methods, there is need to engage students and their thinking capacity more directly. The Risk of Education training fosters the awareness of the deep meaning of education. It guides teachers in a greater understanding of the importance of their role as educators in the education system but most especially to the lives of the individual learners by facilitating deep learning, and independent decision making.

Educate While Teaching: This training invites teachers to re-examine their own pedagogical practices and focus on aspects that impede the development of critical thinking abilities and positive behaviour among

learners. In this way, teachers can identify gaps in their methods with the aim of improving instruction. Preparation for teaching and learning is a fundamental skill that enables the teachers to comprehend the content s/he is going to teach. There is need for creating an enabling environment in which the learner – the teacher in this case - is free to dialogue with the instructor or colleagues that enhances an attitudinal readiness to improving the skills and values of interpersonal learning relationships.

Developing appropriate instructional strategies that foster cognitive skills and affective abilities of learners necessitates teachers to have a clear understanding of critical thinking and what it looks like to teach, learn and assess critical thinking in the daily lessons (Ennis, 2013; Stobaugh, 2013), and to incorporate activities that foster critical thinking in lesson plans.

Educate While Teaching is aims at enabling teachers to enhance:

- Positive discipline;
- Participatory teaching strategies;
- Curriculum implementation;
- Effective lesson planning;
- Collaborative learning.

In this training, teachers are tasked to develop lesson plans that practically promote critical thinking as the curriculum highlights. Teachers are provided with a rubric describing knowledge, the critical thinking sub-skills and values, and are further guided on how to foster each during the teaching and learning of respective subjects. The lesson plans developed are not formalities, but rather describe the tasks that learners are involved in at each step, the knowledge, skills and values they will develop, and appropriate strategies that foster critical thinking throughout the lesson. As such, the steps taken in lesson should clearly specify the subject matter that learners ought to know, the cognitive skills to demonstrate and the abilities they should exhibit (Bissell & Lemons, 2006).

Assessment: Assessment can only improve teaching and learning if results are used to refocus classroom activities and reorient student thinking and learning. Assessment thus becomes formative when evidence is actually used to adapt teaching to meet pupils' learning needs (Black & Wiliam, 1998). This training helps to empower teachers to:

- Nurture teacher ability to design and use assessment tools and data;
- Be creative critical thinkers themselves, for example, in questions that challenge learner thinking and understanding, self and peer assessment;
- Improve pedagogical practices of teachers, and student learning;
- Stimulate collaborative learning classrooms;
- Write adequate test items bearing formative assessment taxonomy.

Critical thinking coaching system: This involves purposeful instructional pedagogies and appropriate learning activities that encourage critical thinking abilities among learners. Critical thinking skills are incorporated into the daily classroom instruction, and the criteria for assessment of such skills should be explicit. This requires that teachers select purposeful instructional pedagogies and appropriate learning activities that encourage critical thinking abilities among learners.

Each critical thinking enhancement session will be conducted for three days for all subject teachers.

Introduction to the new curriculum

A brief introduction to the competency-based new Lower Secondary Framework that identifies the generic skills, key learning outcomes and values will be presented to the participants. The new lower secondary school curriculum is the reference point for the whole critical thinking implementation process. Critical

thinking is one of the main generic skills proposed in the curriculum instruction.
The facilitator presents the new lower secondary school curriculum framework showing how the various elements relate with each other towards nurturing life-long learners that are knowledgeable, skilful, and self-conscious.

Introduction to deep learning

LGIHE will conduct coaching to introduce the teachers to the new approaches that foster deeper understanding among the learners of the content received. This coaching provides sample approaches that allow learners to discover on their own as the teacher only plays the role of facilitator of learning. Through this training, teachers get an insight into applying various approaches that facilitate deeper understanding rather than regurgitation what is taught.

Presentation on critical thinking tools: This session introduces participants to the LGIHE Critical Thinking taxonomy that breaks down the skill of critical thinking into subskills that are easily assessed and provides the sample abilities that teachers can observe among their learners to determine that the specific subskills are being developed. It also provides the dispositions that relate to self, others and the world with sample observable behaviours that can be assessed by the teacher. The taxonomy is vital in guiding the teachers to deliberately plan lessons that foster higher order thinking skills and appropriate dispositions/values among the learners.

Participants are also introduced to a topic development plan template that provides step by step teacher activities; learner activity; content, skills, and values; outputs; and assessment strategies. This is aimed at enabling teachers to plan lessons that deliberately develop knowledge, skills and values to be assessed formatively as required by the New Lower Secondary School Curriculum.

The facilitator guides the participants to interpret and understand the taxonomy and topic development plan template. The topic development plan template is used by the teachers to plan detailed presentations and assessments during each step of the lesson. Topics are developed with the guide of the Taxonomy that provides a breakdown of the expected skills and values to be deliberately planned for in the various steps of the lessons.

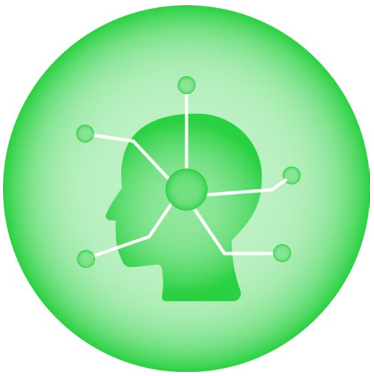
Lesson development

After having undergone the induction training sessions on the background to the new Lower Secondary Curriculum and Critical Thinking tools, teachers will then develop lesson plans that foster critical thinking. Following a period of one week, LGIHE will invite subject teachers to present their lesson plans. Fellow teachers and facilitators will discuss and suggest improvements to suit the learning level, target higher order thinking skills and address relevant values to be developed among learners. The teachers then go back to improve their lesson plans according to the suggestions given. After one week, teachers are invited back to carry out microteaching to determine if the desired knowledge, skills, and values that were planned are actually developed in the lesson. Microteaching employs real teaching situation for developing skills and helps to get deeper knowledge regarding the process of teaching. Each session is recorded for future reference and teacher's self-evaluation in addition to immediate feedback is also provided by facilitators and fellow teachers. The practice lesson is then discussed and where the expected outcome was not achieved, the lesson plan is revised and taught again. There will be two microteaching iterations for every lesson plan developed to ensure that the final version of the plan is suitable for implementation in the classroom with learners.

Classroom Observations

After the process of lesson plan development and microteaching, LGIHE will conduct classroom observations to determine the outcome of the trainings and give feedback to the teachers once per term.

7.2.4 Student level



LGIHE believes education ought to produce independent thinkers. An independent learner is willing to reflect on what s/he is doing and its progress. Asking appropriate questions is an essential part of the critical thinking learning process. One cannot exercise critical thinking skills by mere listening or passive reading. A learner will gain these skills only by engaging actively with the subject matter through asking appropriate questions of the material or issues at hand, investigating solutions to problems, creating new understanding as a result and then reflecting on the knowledge and competencies gained. This is inquiry-based learning. Such a reflective, inquiry-based approach enables the learner to deepen his/her knowledge and skills. With this model, LGIHE envisions students that exhibit skills in the main macro-critical thinking subskills that include, but are not limited to information gathering, interpretation, analysis, evaluation, inference, and strategizing.

References

Abrami, P. C., Bernard, R. M., Borokhovski, E., Waddington, D. I., Wade, C. A., & Persson, T. (2015). Strategies for teaching students to think critically: A meta-analysis. *Review of Educational Research*, *85*(2), 275–314. https://doi.org/10.3102/0034654314551063

Abrami, P. C., Bernard, R. M., Borokhovski, E., Wade, A., Surkes, M. A., Tamim, R., & Zhang, D. (2008). Instructional interventions affecting critical thinking skills and dispositions: A stage 1 Meta-Analysis. *Review of Educational Research*, *78*(4), 1102–1134. https://doi.org/10.3102/0034654308326084

Ackerman, P. L. (1986). Skill acquisition, individual differences, and human abilities. *Proceedings of the Human Factors Society Annual Meeting*, *30*(3), 270–274. SAGE Publications Sage CA: Los Angeles, CA.

Adams, D. M., & Hamm, M. E. (1990). *Cooperative learning: Critical thinking and collaboration across the curriculum.* Charles C Thomas, Publisher.

Adeyemi, S. B. (2012). Developing critical thinking skills in students: A mandate for higher education in Nigeria. *European Journal of Educational Research*, *1*(2), 155–161. Retrieved from https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1086348

Alexander, P. A., Dinsmore, D. L., Fox, E., Grossnickle, E. M., Loughlin, S. M., Maggioni, L., … Winters, F. I. (2011). Higher order thinking and future directions. In *Assessment of Higher Order Thinking Skills* (pp. 47–88).

Alexander, P. A., & Murphy, P. K. (1998). Profiling the differences in students' knowledge, interest, and strategic processing. *Journal of Educational Psychology*, *90*(3), 435–447. https://doi.org/10.1037/0022-0663.90.3.435

Allen, R., Elks, P., Outhred, R., & Varly, P. (2016). *Uganda's assessment system: A road-map for enhancing assessment in education*. Kampala.

Andrews, R. (2015). Critical thinking and/or argumentation in higher education. In M. Davies & R. Barnett (Eds.), *The Palgrave Handbook of Critical Thinking in Higher Education* (First, pp. 49–62). New York: Palgrave Macmillan.

Aspfors, J., & Fransson, G. (2015). Research on mentor education for mentors of newly qualified teachers: A qualitative meta-synthesis. *Teaching and Teacher Education*, *48*, 75–86.

Astington, J. W., & Olson, D. R. (1995). The cognitive revolution in children's understanding of mind. *Human Development*, *38*(4–5), 179–189.

Atkinson, D. (1997). A critical approach to critical thinking in TESOL. *TESOL Quarterly*, *31*(1), 71–94.

Baddeley, A. (1983). Working memory. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *302*(1110), 311–324.

Bailin, S., & Battersby, M. (2015). Teaching critical thinking as inquiry. In M. Davies & R. Barnett (Eds.), *The Palgrave Handbook of Critical Thinking in Higher Education* (First, pp. 123–138). New York: Palgrave Macmillan.

Bailin, S., Case, R., Coombs, J. R., & Leroi, D. B. (1999). Common misconceptions of critical thinking. *Journal of Curriculum Studies*, *31*(3), 269–283. https://doi.org/10.1080/002202799183124

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, *37*(2), 122–147. Retrieved from https://pdfs.semanticscholar.org/8bee/c556fe7a650120544a99e9e063eb8fcd987b.pdf

Bandura, A. (1986). Social foundations of thought and action. *Englewood Cliffs, NJ*, *1986*.

Bandura, A. (1999). Social cognitive theory: An agentic perspective. *Asian Journal of Social Psychology*, *2*(1), 21–41. https://doi.org/10.1111/1467-839X.00024

Banning, M. (2006). Measures that can be used to instill critical thinking skills in nurse prescribers. *Nurse Education in Practice*, *6*(2), 98–105.

Barnett, R. (1997). *Higher education: A critical business*. McGraw-Hill Education (UK).

Barnett, R. (2015). A curriculum for critical being. In M. Davies & R. Barnett (Eds.), *The Palgrave Handbook of Critical Thinking in Higher Education* (First, pp. 63–76). New York: Palgrave Macmillan.

Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-based learning: An approach to medical education* (Vol. 1). Springer Publishing Company.

Beattie, V., Collins, B., & McInnes, B. (1997). Deep and surface learning: A simple or simplistic dichotomy? *International Journal of Phytoremediation*, *21*(1), 1–12. https://doi.org/10.1080/096392897331587

Belluigi, D. Z. (2009). Exploring the discourses around "creativity" and "critical thinking" in a South African creative arts curriculum. *Studies in Higher Education*, *34*(6), 699–717. https://doi.org/10.1080/03075070802644911

Belluigi, D. Z., & Cundill, G. (2017). Establishing enabling conditions to develop critical thinking skills: A case of innovative curriculum design in Environmental Science. *Environmental Education Research*, *23*(7), 950–971. https://doi.org/10.1080/13504622.2015.1072802

Bernard, R. M., Zhang, D., Abrami, P. C., Sicoly, F., Borokhovski, E., & Surkes, M. A. (2008). Exploring the structure of the Watson-Glaser Critical Thinking Appraisal: One scale or many subscales? *Thinking Skills and Creativity*, *3*, 15–22. https://doi.org/10.1016/j.tsc.2007.11.001

Beyer, B. K. (1984). Improving thinking skills: Defining the problem. *The Phi Delta Kappan*, *65*(7), 486–490.

Beyer, B. K. (1987). Pactice is not enough. In M. Heiman & J. Slomianko (Eds.), *Thinking skills instruction: Concepts and techniques* (pp. 77–86). Washington, D.C.: National Education Association.

Bissell, A. N., & Lemons, P. P. (2006). A new method for assessing critical thinking in the classroom. *American Institute of Biological Science*, *56*(1), 66–72. https://doi.org/10.1641/0006-3568(2006)056[0066:anmfac]2.0.co;2

Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in Education: Principles, Policy & Practice*, *5*(1), 7–74.

Bloom, A. H. (1981). *The linguistic shaping of thought: A study in the impact of language on thinking in China and the West*. Hillsdale, NJ: Erlbaum Associates.

Boso, C. M., van der Merwe, A. S., & Gross, J. J. (2020). Critical thinking skills of nursing students: Observations of classroom instructional activities. *Nursing Open*, *7*(2), 581–588. https://doi.org/10.1002/nop2.426

Brookfield, S. D. (1987). Developing critical thinkers: Challenging adults to explore alternative ways of thinking and acting. In *Developing critical thinkers: Challenging adults to explore alternative ways of thinking and acting.* San Francisco, CA, US: Jossey-Bass.

Brookfield, S. D. (2011). *Teaching for critical thinking: Tools and techniques to help students question their assumptions*. John Wiley & Sons.

Bruner, J. S. (2009). *The process of education*. Harvard University Press.

Carver, C. S., & Scheier, M. F. (2000). On the structure of behavioral self-regulation. In *Handbook of self-regulation* (pp. 41–84). Elsevier.

Ceolin, S., Siles González, J., Del, M., Solano Ruiz, C., & Heck, R. M. (2017). Theoretical bases of critical thinking in Ibero-American nursing Integrative Literature Review. *Texto Contexto Enferm*, *26*(4), 3830016. https://doi.org/10.1590/0104-07072017003830016

Chabeli, M. M. (2007). Facilitating critical thinking within the nursing process framework: A literature review. *Health SA Gesondheid*, *12*(4), 69–89.

Chaffee, J. (1992). Critical thinking skills: The cornerstone of developmental education. *Journal of Developmental Education*, *15*(3), 2.

Chan, H. M., & Yan, H. K. T. (2007). Is there a geography of thought for East-west differences? Why or why not? *Educational Philosophy and Theory*, *39*(4), 383–403. https://doi.org/10.1111/j.1469-5812.2007.00346.x

Chen, S.-L., Liang, T., Lee, M.-L., & Liao, I.-C. (2011). Effects of Concept Map Teaching on Students' Critical Thinking and Approach to Learning and Studying. *JOURNAL OF NURSING EDUCATION*, *50*(8), 466–469. https://doi.org/10.3928/01484834-20110415-06

Cheong, C. M., & Cheung, W. S. (2008). Online discussion and critical thinking skills: A case study in a Singapore secondary school. *Australasian Journal of Educational Technology*, *24*(5).

Cole, D. J. (1990). Cognitive Inquiry and the Philosophy of Mind. In *Philosophy, Mind, and Cognitive Inquiry* (pp. 1–46). Springer, Dordrecht.

Combs, H. W., & Bourne, S. G. (1994). The Renaissance of Educational Debate: Results of a Five-Year Study of the Use of Debate in Business Education. *Journal on Excellence in College Teaching*, *5*(1), 57–67.

Costa, A. L. (1985). Developing minds: A resource book for teaching thinking. In *Adolescence* (Vol. 37). Association for Supervision and Curriculum Development.

Costa, A. L. (1991). *Developing Minds: A Resource Book for Teaching Thinking. Revised Edition, Volume 1.*

Costa, A. L. (2001). Habits of mind. In A. L. Costa (Ed.), *Developing minds: A resource book for teaching thinking* (3rd ed., pp. 80–86). Alexandria, Va: Ascd.

Costa, A. L., & Kallick, B. (2009). *Habits of mind across the curriculum: Practical and creative strategies for teachers*. ASCD.

D'Angelo, E. (1971). Critical thinking in reading. *Elementary English*, *48*(8), 946–950.

Davies, M. (2013). Critical thinking and the disciplines reconsidered. *Higher Education Research & Development*, *32*(4), 529–544. https://doi.org/10.1080/07294360.2012.697878

Davies, M., & Barnett, R. (2015). *The Palgrave Handbook of Critical Thinking in Higher Education* (First). https://doi.org/10.1007/978-1-137-37805-7

de Jager, T. (2012). Can first year student's critical thinking skills develop in a space of three months? *Procedia-Social and Behavioral Sciences*, *47*, 1374–1381. https://doi.org/10.1016/j.sbspro.2012.06.829

de Oliveira, L. B., Rueda Díaz, L. J., Carbogim, F. da C., Rodrigues, A., Püschel, V. A. A., Rueda Diaz, L. J., … de Araujo Puschel, V. A. (2016). Effectiveness of teaching strategies on the development of critical thinking in undergraduate nursing students: a meta-analysis. *Revista Da Escola De Enfermagem Da Usp*, *50*(2), 350–359. https://doi.org/10.1590/S0080-623420160000200023

Deregowski, J. B. (1970). Effect of cultural value of time upon recall. *Journal of Social and Clinical Psychology*, *9*(1), 37–41.

Dewey, J. (1910). *How we think*. https://doi.org/10.1017/CBO9781107415324.004

Dewey, J. (1913). *Interest and effort in education* (Riverdale, ed.). Boston, MA.

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process.* Boston: D.C. Heath.

Dewey, J. (1938). *Experience and education*. New York: Collier Books, Macmillan.

Dipio, D. (2013). Traditional leadership wisdoms and their contemporary parallels - the Madi of Uganda. In *Performing Wisdom : Proverbial Lore in Modern Ugandan Society* (Vol. 42, pp. 37–63). https://doi.org/10.1163/9789401210584_005

Doff, A. (1988). *Teach English trainer's handbook: A training course for teachers* (Vol. 2). Cambridge university press.

Domike, G. C., & Odey, E. O. (2011). Teachers pattern of instruction and location on pupils critical thinking in science achievement in Imo State. *Global Journal of Educational Research*, *10*(1), 1–6. Retrieved from https://search.proquest.com/docview/892728712?accountid=14089%5Cnhttps://eu.alma.exlibrisgroup.com/view/uresolver/44UOC_INST/openurl?genre=article&atitle=TEACHERS+PATTERN+OF+INSTRUCTION+AND+LOCATION+ON+PUPILS+CRITICAL+THINKING+IN+SCIENCE+ACHIEVEMENT+IN+IM

Dominguez, C., Jan, E., Jiang, L., Huyghe, S., Verburgh, A., Dumitru, D., … Lorencova, H. (2019). *Promoting critical thinking in European higher education institutions: Towards an educational protocol* (C. Dominguez & R. Payan-Carreira, ed.). Retrieved from https://repositorio.utad.pt/bitstream/10348/9227/1/CRITHINKEDU O4 (ebook)_FINAL.pdf#page43

Dunn, R., Griggs, S. A., Olson, J., Beasley, M., & Gorman, B. S. (1995). A meta-analytic validation of the Dunn and Dunn model of learning-style preferences. *The Journal of Educational Research*, *88*(6), 353–362.

Dunne, G. (2019). *Critical thinking: A neo-Aristotelian perspective* (Trinity College Dublin). Retrieved from http://www.tara.tcd.ie/bitstream/handle/2262/86046/Gerry Dunne thesis 2019.pdf?sequence=3

Dunst, C. J., Hamby, D. W., Howse, R. B., Wilkie, H., & Annas, K. (2020). Research Synthesis of Meta-Analyses of Preservice Teacher Preparation Practices in Higher Education. *Higher Education Studies*, *10*(1), 29–47.

Duranti, A. (1997). *Linguistic Anthropology*. Retrieved from https://login.proxy.unimib.it/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=120205&lang=it&

site=eds-live&scope=site

Durkin, K. (2008). The Middle Way: East Asian masters students' perceptions of critical argumentation in U. K. universities. *Journal of Studies in International Education*, *12*(1), 38–55.

Dwyer, C. P., Hogan, M. J., & Stewart, I. (2014). An integrated critical thinking framework for the 21st century. *Thinking Skills and Creativity*, *12*, 43–52. https://doi.org/10.1016/j.tsc.2013.12.004

Edmonson, M. E. (1971). *Lore: An introduction to the science of folklore and literature*. New York: Holt, Rinehart & Winston.

Egege, S., & Kutieleh, S. (2004). Critical thinking: Teaching foreign notions to foreign students. *International Education Journal*, *4*(4), 75–85.

Elder, L., & Paul, R. (1994). Critical thinking: Why we must transform our teaching. *Journal of Developmental Education*, *18*(1), 34.

Elder, L., & Paul, R. W. (2001). Critical thinking: Thinking with concepts. *Journal of Developmental Education*, *24*(3), 42. Retrieved from https://www.jstor.org/stable/42775835

Ellerton, P. (2015). Metacognition and critical thinking: Some pedagogical imperatives. In M. Davies & R. Barnett (Eds.), *The Palgrave Handbook of Critical Thinking in Higher Education* (First, pp. 409–437). New York: Palgrave Macmillan.

Ennis, R. H. (1962). A concept of critical thinking. *Harvard Educational Review*.

Ennis, R. H. (1963). Needed: Research in critical thinking. *Educational Leadership*, *21*(1), 17–39. Retrieved from https://content.ebscohost.com/ContentServer.asp?T=P&P=AN&K=21641396&S=R&D=ehh&EbscoContent=dGJyMNXb4kSep7E4xNvgOLCmr1Gep7FSrqe4TK6WxWXS&ContentCustomer=dGJyMPGus0i1prBLuePfgeyx43zx

Ennis, R. H. (1964). A definition of critical thinking. *The Reading Teacher*, *17*(8), 599–612.

Ennis, R. H. (1984). Problems in testing informal logic, critical thinking, reasoning ability. *Informal Logic*, *6*(1), 3–9. Retrieved from http://amr.uwindsor.ca/ojs/leddy/index.php/informal_logic/article/download/2717/2158

Ennis, R. H. (1985). A logical basis for measuring critical thinking skills. *Educational Leadership*, *10*, 44–49. Retrieved from https://pdfs.semanticscholar.org/80a7/c7d4a98987590751df4b1bd9adf747fd7aaa.pdf

Ennis, R. H. (1987). *A taxonomy of critical thinking dispositions and abilities.*

Ennis, R. H. (1989). Critical thinking and subject specificity: Clarification and needed research. *Educational Researcher*, *18*(3), 4–10. https://doi.org/10.3102/0013189x018003004

Ennis, R. H. (1990). The extent to which critical thinking is subject-specific: Further clarification. *Educational Researcher*, *19*(4), 13–16. Retrieved from https://www-jstor-org.proxy.unimib.it/stable/pdf/1176383.pdf?refreqid=excelsior%3A1787f3cf519cf8ca853dc2e090c0c85e

Ennis, R. H. (1996). Critical thinking dispositions: Their nature and assessability. *Informal Logic*, *18*(2–3), 165–182.

Ennis, R. H. (2013). *Critical Thinking Across the Curriculum (CTAC)*. Retrieved from http://scholar.uwindsor.ca/ossaarchivehttp://scholar.uwindsor.ca/ossaarchive/OSSA10/papersandcommentaries/44

Ennis, R. H. (2016). Critical thinking across the curriculum: A vision. *Topoi*, *37*, 165–184. https://doi.org/10.1007/s11245-016-9401-4

Facione, N. C., & Facione, P. A. (1996). Externalizing the critical thinking in knowledge development and clinical judgment. *Nursing Outlook*, *44*(3), 129–136. https://doi.org/10.1016/S0029-6554(06)80005-9

Facione, P. A. (1990). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction*. Fullerton.

Facione, P. A. (2009). Facione PA 2009. Critical thinking: what it is and why it counts. Available at www.insightassessment.com/pdf_files/what&why98.pdf. Accessed 4 March 2010. Retrieved January 17, 2020, from Measured Reasons LLC website: www.insightassessment.com/pdf_files/what&why98.pdf

Facione, P. A., Sanchez, C. A., Facione, N. C., & Gainen, J. (1995). The disposition toward critical thinking. *The Journal of General Education*, 1–25.

Fischer, K. W. (1980). A theory of cognitive development: The control and construction of hierarchies of skills. *Psychological Review*, *87*(6), 477–531. Retrieved from https://www.gse.harvard.edu/~ddl/articlesCopy/FischerTheoryCognDev1980.pdf

Fisher, A., & Scriven, D. (1997). *Critical thinking: Its Definition and assessment*. Point Reyes, CA: Edgepress.

Fisher, D., & Frey, N. (2015). *Fostering critical thinking about texts* (pp. 82–85). pp. 82–85.

Floyd, C. B. (2011). Critical thinking in a second language. *Higher Education Research & Development*, *30*(3), 289–302.

Fogarty, R., & McTighe, J. (1993). Educating teachers for higher order thinking: The three-story intellect. *Theory into Practice*, *32*(3), 161–169.

Freely, A. J. (1993). *Argumentation and debate*. California: Wadsworth.

Freire, P. (1970). *Pedagogy of the oppressed* (2005th ed.). The Continuum International Publishing Group Inc.

Garrison, D. R. (2016). *E-learning in the 21st century: A community of inquiry framework for research and practice*. Taylor & Francis.

Garside, C. (1996). *Look who's talking: A comparison of lecture and group discussion teaching strategies in developing critical thinking skills.*

Geertz, C. (1973). Thick description: Toward an interpretive theory of culture. In *The Interpretation of Culture* (pp. 143–168). https://doi.org/10.7767/boehlau.9783205790099.1209

Gelder, T. Van. (2005). Teaching critical thinking: Some lessons from cognitive science. *College Teaching*, *53*(1), 41–48.

Giacomazzi, M., Fontana, M., & Camilli Trujillo, C. (2021). Contextualization of critical thinking in sub-Saharan Africa: A systematic integrative review. *Under Review*.

Giannakopoulos, P., & Buckley, S. (2009). Do problem solving, critical thinking and creativity play a role in knowledge management? A theoretical mathematics perspective. *Proceedings of the European Conference on Knowledge Management, ECKM*, 327–337.

Gibson, C. (1995). *Critical thinking: Implications for instruction*.

Giussani, L. (2001). *The risk of education: Discovering our ultimate destiny* (First Engl). New York: The Crossroad Publishing Company.

Glaser, B. G., & Strauss, A. (1967). *The discovery of Grounded Theory: Strategies for qualitative research*. Chicago: Aldine Publishing Company.

Glaser, E. M. (1941). *An experiment in the development of critical thinking*. Teachers College, Columbia University.

Godfrey, K. A. (2001). *Teacher Questioning Techniques, Student Responses and Critical Thinking.*

Gokhale, A. A. (1995). Collaborative learning enhances critical thinking. *Journal of Technology Education*, *7*(1), 22–30. https://doi.org/10.21061/jte.v7i1.a.2

Goodnow, J. J., Young, B. M., & Kvan, E. (1976). Orientation errors in copying by children in Hong Kong. *Journal of Cross-Cultural Psychology*, *7*(1), 101–110.

Green, P. (2015). Teaching critical thinking for lifelong learning. In M. Davies & R. Barnett (Eds.), *The Palgrave Handbook of Critical Thinking in Higher Education* (First, pp. 107–121). New York: Palgrave Macmillan.

Grosser, M. M. (2006). Critical thinking. *International Journal of Learning*, *12*(9), 359–366. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=eh-h&AN=24953868&site=eds-live

Grosser, M. M., & Lombard, B. J. J. (2008). The relationship between culture and the development of critical thinking abilities of prospective teachers. *Teaching and Teacher Education: An International Journal of Research and Studies*, *24*(5), 1364–1375. https://doi.org/10.1016/j.tate.2007.10.001

Grosser, M. M., & Nel, M. (2013). The relationship between the critical thinking skills and the academic language proficiency of prospective teachers. *South African Journal of Education*, *33*(2), 1–17. https://doi.org/10.15700/saje.v33n2a639

Hager, P., & Kaye, M. (1992). Critical thinking in teacher education: A process-oriented research agenda. *Australian Journal of Teacher Education*, *17*(2), 4.

Hale, E. (2012). Conceptualizing a personal intellectual history/narrative: The importance of strong-sense metacognition to thinking critically. In M. F. Shaughnessy (Ed.), *Critical Thinking and Higher Order Thinking* (pp. 139–164). New York: Nova Science Publishers, Inc.

Hallinger, P. (1998). Educational change in southeast Asia. *Journal of Educational Administration*.

Halonen, J. S. (1995). Demystifying critical thinking. *Teaching of Psychology*, *22*(1), 75–81.

Halpern, D. F. (1993). Assessing the effectiveness of critical-thinking instruction. *The Journal of General Education*, *42*(4), 238–254. Retrieved from https://www.jstor.org/stable/27797197?seq=1&cid=pdf-reference#references_tab_contents

Halpern, D. F. (1998). Teaching critical thinking for transfer across domains: Disposition, skills, structure training, and metacognitive monitoring. *American Psychologist*, *53*(4), 449–455. Retrieved from http://web.b.ebscohost.com.libproxy.temple.edu/ehost/pdfviewer/pdfviewer?vid=1&sid=264f0378-562e-4896-868c-31570ef7531e%40sessionmgr4010

Halpern, D. F. (2001). Why wisdom? *Educational Psychologist*, *36*(4), 253–256. https://doi.org/10.1207/S15326985EP3604_4

Halpern, D. F. (2014). *Critical thinking across the curriculum: A brief edition of thought & knowledge*. Routledge.

Hamby, B. (2015). Willingness to inquire: The cardinal critical thinking virtue. In M. Davies & R. Barnett (Eds.), *The Palgrave Handbook of Critical Thinking in Higher Education* (First, pp. 77–87). New York: Palgrave Macmillan.

Havelock, E. A. (1963). *History of the Greek mind, v. 1*. Cambridge: Harvard University Press.

Heiman, M., & Slomianko, J. (1987). *Thinking skills instruction: Concepts and techniques*. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1006.6819&rep=rep1&type=pdf#page=41

Hindes, C., & Bakker, K. (2004). Between deconstruction and systems thinking - some practicalities of incorporating non-technical skills into curricula using critical thinking as an example. *South African Journal of Higher Education*, *18*(2), 76–86. https://doi.org/10.4314/sajhe.v18i2.25455

Hipp, K. K., Huffman, J. B., Pankake, A. M., & Olivier, D. F. (2008). Sustaining professional learning communities: Case studies. *Journal of Educational Change*, *9*(2), 173–195.

Holmes, V.-L. (2012). Depth of Teachers ' Knowledge: Frameworks for Teachers ' Knowledge of Mathematics. *Journal of STEM Education*, *13*(1), 55–72.

Hughes, C. S. (1986). Teaching strategies for developing student thinking. *School Library Media Quarterly*, *15*(1), 33–36.

Ijaiya, N. Y. S., Alabi, A. T., & Fasasi, Y. A. (2010). Teacher education in Africa and critical thinking skills: Needs and strategies. *The Social Sciences*, *5*(4), 380–385. https://doi.org/10.3923/sscience.2010.380.385

Ikuenobe, P. (2001). Teaching and assessing critical thinking abilities as outcomes in an informal logic course. *Teaching in Higher Education*, *6*(1), 19–32.

Itakura, H., & Tsui, A. B. M. (2004). Gender and conversational dominance in Japanese conversation. *Language in Society*, 223–248.

Jane, M., Jarvis, J., & Moran, M. J. (2001). Helping young children develop higher order thinking. *Young Children*, *56*(5), 31–35.

Johnson, R. H. (1996). The rise of informal logic. In *Newport News*. Newport: Vale Press.

Jones, A. (2015). A disciplined approach to critical thinking. In M. Davies & R. Barnett (Eds.), *The Palgrave Handbook of Critical Thinking in Higher Education* (First, pp. 169–182). New York: Palgrave Macmillan.

Jones, S. M., Bailey, R., & Nelson, B. (2019). Explore socio emotional learning. Retrieved from Easel Lab website: http://exploresel.gse.harvard.edu/

Karabenick, S. A., & Collins-Eaglin, J. (1996). Relation of perceived instructional goals and incentives to college students' use of learning strategies. *The Journal of Experimental Education*, *65*(4), 331–341.

Kassimir, R. (1998). Uganda: The Catholic Church and state reconstruction. In L. Villalon & P. Huxtable (Eds.), *The African state at a critical juncture: Between disintegration andd reconfiguration*. Lynne Rienne: Boulder.

Kautz, T., Heckman, J. J., Doris, R., ter Weel, B., & Borghans, L. (2017). *Fostering and measuring skills: Improving cognitive and non-cognitive skills to promote lifetime success*. https://doi.org/10.1787/19939019

Kimmel, P. (1995). A framework for incorporating critical thinking into accounting education. *Journal of Accounting Education*, *13*(3), 299–318. https://doi.org/10.1016/0748-5751(95)00012-B

King, P. M., & Kitchener, K. S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults. Jossey-Bass Higher and Adult Education Series and Jossey-Bass Social and Behavioral Science Series.* ERIC.

Kivunja, C. (2014). Do You Want Your Students to Be Job-Ready with 21st Century Skills? Change Pedagogies: A Pedagogical Paradigm Shift from Vygotskyian Social Constructivism to Critical Thinking, Problem Solving and Siemens' Digital Connectivism. *International Journal of Higher Education*, *3*(3), 81–91. Retrieved from https://search.proquest.com/docview/1720064813?accountid=16562

Kloppenborg, T. J., & Baucus, M. S. (2004). Project management in local nonprofit organizations: Engaging students in problem-based learning. *Journal of Management Education*, *28*(5), 610–629.

Kong, L.-N., Qin, B., Zhou, Y., Mou, S.-Y., & Gao, H.-M. (2014). The effectiveness of problem-based learning on development of nursing students' critical thinking: A systematic review and meta-analysis. *International Journal of Nursing Studies*, *51*(3), 458–469. https://doi.org/10.1016/j.ijnurstu.2013.06.009

Kreber, C. (2009). Supporting student learning in the context of diversity, complexity and uncertainty. *The University and Its Disciplines: Teaching and Learning within and beyond Disciplinary Boundaries*, 3–18.

Krynock, K., & Robb, L. (1999). Problem Solved: How To Coach Cognition. *Educational Leadership*, *57*(3), 29–32.

Kuhn, D. (2000). Metacognitive development. *Current Directions in Psychological Science*, *9*(5), 178–181. Retrieved from http://www.mx1.educationforthinking.org/sites/default/files/page-image/1-02MetacognitiveDevelopment.pdf

Kuhn, D. (2005). *Education for thinking*. Harvard University Press.

Kurfiss, J. G. (1988). *Critical thinking: Theory, research, practice, and possibilities. ASHE-ERIC Higher Education Report No. 2, 1988*. Retrieved from https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED304041

Lai, E. R. (2011). *Critical thinking: A literature review research report*. Retrieved from http://www.pearsonassessments.com/research.

Lampert, M. (2001). *Teaching problems and the problems of teaching*. Yale University Press.

Lepper, M. R., & Greene, D. (2015). *The hidden costs of reward: New perspectives on the psychology of human motivation*. Psychology Press.

Lewis, A., & Smith, D. (1993). Defining higher order thinking. *Theory Into Practice*, *32*(3), 131–137. https://doi.org/10.1080/00405849309543588

Lipman, M. (1988). *Critical thinking: What can it be? Resource Publication, Series 1 No. 1.* 12.

Lipman, M. (2003). *Thinking in education* (Second Edi). Retrieved from http://www.cambridge.org

Lombard, B. J. J. (2008). Modelling critical thinking through learning-oriented assessment. *South African Journal of Higher Education*, *22*(5), 1029–1043. Retrieved from http://sfx-39bic.hosted.exlibrisgroup.com/sfxbic3?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:journal&genre=article&sid=ProQ:ProQ%3Aeric&atitle=Modelling+Critical+Thinking+through+Learn

Lombard, B. J. J., & Grosser, M. M. (2004). Critical thinking abilities among prospective educators: ideals versus realities. *South African Journal of Education*, *24*(3), 212–216.

Lombard, K., & Grosser, M. M. (2008). Critical thinking: Are the ideals of OBE failing us or are we failing the ideals of OBE? *South African Journal of Education*, *28*(4), 561–579. https://doi.org/10.15700/saje.v28n4a207

Lorencová, H., Jarošová, E., Avgitidou, S., & Dimitriadou, C. (2019). Critical thinking practices in teacher education programmes: a systematic review. *Studies in Higher Education*, *44*(5), 844–859.

Luka, E. P., & Dukku, M. G. (2017). The use of critical thinking and creativity in teacher education in Nigeria. *Journal of Educational Foundations*, *7*(1), 115–122. https://doi.org/10.1177/0309133309346882

Lun, V. M.-C., Fischer, R., & Ward, C. (2010). Exploring cultural differences in critical thinking: Is it about my thinking style or the language I speak? *Learning and Individual Differences*, *20*(6), 604–616.

MacKnight, C. B. (2000). Teaching critical thinking through online discussions. *Educause Quarterly*, *23*(4), 38–41.

Madondo, M. M. (2018). A requiem too soon or a landing strand too far? Teacher-centred pedagogy versus teaching for critical thinking in the Zimbabwe curriculum framework 2015-2022. *Zimbabwe Journal of Educational Research*, *30*(1), 1–14.

Mahyuddin, R., Pihie, Z. A. L., Elias, H., & Konting, M. M. (2004). The incorporation of thinking skills in the school curriculum. *Kajian Malaysia*, *22*(2), 23–33.

Makina, A. (2010). The role of visualisation in developing critical thinking in mathematics. *Perspectives in Education*, *28*(1), 24–33.

Mangena, A., & Chabeli, M. M. (2005). Strategies to overcome obstacles in the facilitation of critical thinking in nursing education. *Nurse Education Today*, *25*(4), 291–298. https://doi.org/10.1016/j.nedt.2005.01.012

Marin, L. M., & Halpern, D. F. (2011). Pedagogy for developing critical thinking in adolescents: Explicit instruction produces greatest gains. *Thinking Skills and Creativity*, *6*, 1–13. https://doi.org/10.1016/j.tsc.2010.08.002

Marzano, R. J., Brandt, R. S., Hughes, C. S., Jones, B. F., Presseisen, B. Z., Rankin, S. C., & Suhor, C. (1988). *Others dimensions of thinking: A framework for curriculum and instruction* (Association for Supervision and Curriculum Development, Ed.). Retrieved from https://files.eric.ed.gov/fulltext/ED294222.pdf

Marzano, R. J., Pickering, D., & McTighe, J. (1993). *Assessing student outcomes: performance assessment using the dimensions of learning model*. Retrieved from https://files.eric.ed.gov/fulltext/ED461665.pdf

Matthee, M., & Turpin, M. (2019). Teaching critical thinking, problem solving, and design thinking: Preparing IS students for the future. *Journal of Information Systems Education*, *30*(4), 242–252. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1237430&site=eds-live

McGuire, J. M. (2007). Why has the Critical Thinking Movement not come to Korea? *Asia Pacific Education Review*, *8*(2), 224–232.

McPeck, J. E. (1981). *Critical thinking and education* (1st Editio). https://doi.org/10.4324/9781315463698

McPeck, J. E. (1990). Critical thinking and subject specificity: A reply to Ennis. *Educational Researcher*, *19*(4), 10–12.

Mgomezulu, V., Shawa, L., & Wamba, N. (2014). Blending critical thinking skills with the teaching of subject matter: Case of a geography lesson in a Malawi School. *AFRREV STECH: An International Journal of Science and Technology*, *3*(2), 66. https://doi.org/10.4314/stech.v3i2.5

Milanzi, M. C. (1995). The development of critical systems thinking in Tanzania. *Systems Research*, *12*(4), 313–317. https://doi.org/10.1002/sres.3850120412

Miller, D. I., & Halpern, D. F. (2014). The new science of cognitive sex differences. *Trends in Cognitive Sciences*, Vol. 18, pp. 37–45. https://doi.org/10.1016/j.tics.2013.10.011

Ministry of Education and Sports. (2004). *Education sector strategic plan 2004-2015*. Kampala.

Mitana, J. M. V., Muwagga, A. M., & Ssempala, C. (2018). Assessment of higher order thinking skills: A case of Uganda Primary Leaving Examinations. *African Educational Research Journal*, *6*(October), 240–249. https://doi.org/10.30918/AERJ.64.18.083

Mogale, N. M., Botes, A. C., Cur, M., & Botes, A. C. (2001). Problem-based case study to enhance critical thinking in student nurses. *Curationis*, *24*(3), 27–35.

Mortimer, E., & Scott, P. (2003). *Meaning Making In Secondary Science Classroomsaa*. McGraw-Hill Education (UK).

Moseley, D., Baumfield, V., Elliott, J., Higgins, S., Newton, D. P., Miller, J., & Gregson, M. (2005). *Frameworks for thinking: A Handbook for teaching and learning* (First). Retrieved from https://books.google.co.ug/books?hl=en&lr=&id=s1D2IXoNZjwC&oi=fnd&pg=PP1&dq=critical+thinking+AND+handbook&ots=9q4Z3zbZFW&sig=z7qrnDrTarB7vW5R162wcI9EE30&redir_esc=y#v=onepage&q=critical thinking AND handbook&f=false

Mosston, M., & Ashworth, S. (1990). *The Spectrum of Teaching Styles. From Command to Discovery.* ERIC.

Murphy, P. K., & Alexander, P. A. (2000). A motivated exploration of motivation terminology. *Contemporary Educational Psychology*, *25*, 3–53. https://doi.org/10.1006/ceps.1999.1019

Nardi, A. H., & Wales, C. E. (1985). Teaching decision making with guided design. *Developing Minds: A Resource Book for Teaching Thinking*, 220–223.

Neisser, U., Boodoo, G., Bouchard Jr, T. J., Boykin, A. W., Brody, N., Ceci, S. J., … Sternberg, R. J. (1996). Intelligence: knowns and unknowns. *American Psychologist*, *51*(2), 77.

Newman, J. H. (1996). *The idea of a university*. Retrieved from https://login.proxy.unimib.it/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=53105&lang=it&site=eds-live&scope=site

Ng'ambi, D., & Johnston, K. (2006). An ICT-mediated constructivist approach for increasing academic support and teaching critical thinking skills. *Educational Technology & Society*, *9*(3), 244–253. Retrieved from http://sfx-39bic.hosted.exlibrisgroup.com/sfxbic3?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:journal&genre=article&sid=ProQ:ProQ%3Aeric&atitle=An+ICT-Mediated+Constructivist+Approach+f

Ngudgratoke, S. (2018). A meta-analysis of relationships between teaching methods and critical thinking. *Yearbook of Teacher Education*, 258.

Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: holistic versus analytic cognition. *Psychological Review*, *108*(2), 291.

Niu, L., Behar-Horenstein, L. S., & Garvan, C. W. (2013). Do instructional interventions influence college students' critical thinking skills? A meta-analysis. *Educational Research Review*, *9*, 114–128. https://doi.org/10.1016/j.edurev.2012.12.002

Norenzayan, A., Smith, E. E., Kim, B. J., & Nisbett, R. E. (2002). Cultural preferences for formal versus intuitive reasoning. In *Cognitive Science* (Vol. 26). https://doi.org/10.1016/S0364-0213(02)00082-4

Norris, S. P. (1985). *Studies of thinking processes and the construct validation of critical thinking tests*. Retrieved from https://files.eric.ed.gov/fulltext/ED264259.pdf

Norris, S. P. (1988). *Controlling for Background Beliefs When Developing Multiple-Choice Critical Thinking Tests. Technical Report No. 429.* Retrieved from https://files.eric.ed.gov/fulltext/ED297280.pdf

Norris, S. P. (1989). *Verbal reports of thinking as data for validating multiple-choice tests. Technical report no. 445*. Retrieved from https://files.eric.ed.gov/fulltext/ED302825.pdf

Okagaki, L., & Sternberg, R. J. (1990). Teaching thinking skills: We're getting the context wrong. In D. Kuhn (Ed.), *Developmental Perspectives on Teaching and Learning Thinking Skills* (Contributi). Basel: Karger.

Olatunji, M. O. (2017). Critical thinking in Nigeria's pre-service teachers education: A philosophical investigation. *Journal of Teacher Education and Educators*, *6*(2), 205–221. Retrieved from https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=EJ1215028

Olson, D. R., & Astington, J. W. (1993). Thinking about thinking: Learning how to take statements and hold beliefs. *Educational Psychologist*, *28*(1), 7–23.

Omala, S. K., Mitana, J. M. V., Giacomazzi, M., & Ariapa, M. (2016). *Preliminary Survey of Soft Skills demanded by Employers and other Stakeholders in Uganda*.

Omokhodion, J. O. (1989). Classroom observed: The hidden curriculum in Lagos, Nigeria. International. *Journal of Educational Development*, *9*(2), 99–110.

Ong, W. J. (1967). *The presence of the word: Some prolegomena for cultural and religious history*. Yale: Yale University Press.

Ong, W. J. (1982). *Orality and literacy. The technologizing of the word*. Methuen & Co. Ltd.

Owu-Ewie, C. (2010). Developing critical thinking skills of pre-service teachers in Ghana: Teaching methods and classroom ecology. *Academic Leadership*, *8*(4), 8–17. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=62969853&site=eds-live

Padmanabha, C. H. (2018). Critical thinking: Conceptual framework. *Journal on Educational Psychology*, *11*(4), 45–54.

Patton, M. Q. (1990). *Qualitative evaluation and research methods*. SAGE Publications, inc.

Paul, R., & Elder, L. (2003). Ethical reasoning. *Dillon Beach, CA: The Foundation for Critical Thinking*.

Paul, R. W. (1985). Bloom's taxonomy and critical thinking instruction. *Educational Leadership*, *42*(8), 36–39.

Paul, R. W. (1992). Critical thinking: What, why and how. *New Directions for Community Colleges*, 3–24.

Paul, R. W., & Binker, A. J. A. (1990). *Critical thinking: What every person needs to survive in a rapidly changing world.* ERIC.

Paul, R. W., Binker, A. J. A., Vetrano, C., & Kreklau, H. (1989). *Critical thinking handbook: 6th-9th Grades. A guide for remodelling lesson plans in language arts, social studies, & science*. Rohnert Park, CA 94928: Center for Critical Thinking and Moral Critique Sonoma State University.

Paul, R. W., & Elder, L. (2002). *Critical thinking: Tools for taking charge of your professional and personal life* (2002nd ed.). Retrieved from http://www.bisenter.com

Paul, R. W., & Elder, L. (2005). *A guide for educators to critical thinking competency standards, principles, performance indicators, and outcomes with a critical thinking master rubric* (p. 66). p. 66. Retrieved from www.criticalthinking.org

Paul, R. W., & Elder, L. (2008). *The nature and functions of critical & creative thinking*. Retrieved from www.criticalthinking.org

Paul, R. W., Elder, L., & Bartell, T. (1997). *California teacher preparation for instruction in critical thinking: Research findings and policy recommendations.* ERIC.

Pellegrino, A. M. (2007). *Manifestation of Critical Thinking and Metacognition in Secondary American History Students Through the Implementation of Lesson Plans and Activities Consistent with Historical Thinking Skills*.

Perkins, C., & Murphy, E. (2006). Identifying and measuring individual engagement in critical thinking in online discussions: An exploratory case study. *Journal of Educational Technology & Society*, *9*(1), 298–307. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=eh-h&AN=85920326&site=eds-live

Perkins, D., Jay, E., & Tishman, S. (1993). New conceptions of thinking: From ontology to education. *Educational Psychologist*, *28*(1), 67–85.

Philips, S. U. (1992). Colonial and postcolonial circumstances in the education of Pacific peoples. *Anthropology & Education Quarterly*, *23*(1), 73–78.

Pieterse, T., Lawrence, H., & Friedrich-Nel, H. (2016). Critical thinking ability of 3rd year radiography students. *Health SA Gesondheid*, *21*(1), 381–390. https://doi.org/10.1016/j.hsag.2016.07.002

Pithers, R. T., & Soden, R. (2000). Critical thinking in education: A review. *Educational Research*, Vol. 42, pp. 237–249. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ614224&site=eds-live

Ramsden, P. (2003). *Learning to teach in higher education*. Routledge.

Rankin, S. C., & Hughes, C. S. (1987). Framework highlights thinking skills. *Oklahoma Educator*, *16*, 1–2.

Resnick, L. B. (1987). *Education and learning to think* (Eighth). Retrieved from https://books.google.co.ug/books?hl=en&lr=&id=_zYrAAAAYAAJ&oi=fnd&pg=PA2&dq=resnick+l+b&ots=XYnCPlJT8e&sig=tO1uHrlYmYC9azfZB_E19MFemJg&redir_esc=y#v=onepage&q=resnick l b&f=false

Rogoff, B. (1990). *Apprenticeship in thinking: Cognitive development in social context* (First). New York: Oxford University Press.

Rogoff, B. (2003). *The cultural nature of human development*. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=nlebk&AN=129710&site=eds-live

Russell, C. L. (2005). An overview of the integrative research review. *Progress in Transplantation*, *15*(1), 8–13. https://doi.org/10.7182/prtr.15.1.0n13660r26g725kj

Ryan, J., & Louie, K. (2007). False dichotomy? 'Western' and 'Confucian' concepts of scholarship and learning. *Educational Philosophy and Theory*, *39*(4), 404–417. https://doi.org/10.1111/j.1469-5812.2007.00347.x

Schendel, R. (2015). Critical thinking at Rwanda's public universities: Emerging evidence of a crucial development priority. *International Journal of Educational Development*, *42*, 96–105. https://doi.org/10.1016/j.ijedudev.2015.04.003

Schendel, R., & Tolmie, A. (2017). Beyond translation: Adapting a performance-task-based assessment of critical thinking ability for use in Rwanda. *Assessment & Evaluation in Higher Education*, *42*(5), 673–689. https://doi.org/10.1080/02602938.2016.1177484

Schmidt, H. G. (1983). Problem-based learning: Rationale and description. *Medical Education*, *17*(1), 11–16.

Schonert-Reichl, K. A., Kitil, M. J., & Hanson-Peterson, J. (2017). To Reach the Students, Teach the Teachers: A National Scan of Teacher Preparation and Social & Emotional Learning. A Report Prepared for CASEL. *Collaborative for Academic, Social, and Emotional Learning*.

Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational Psychologist*, *40*, 85–94. Retrieved from http://www.tandf.co.uk/journals/

Schunk, D. H., & Zimmerman, B. J. (1996). *Modeling and self-efficacy influences on children's development of self-regulation.*

Scott, P. H., Mortimer, E. F., & Aguiar, O. G. (2006). The tension between authoritative and dialogic discourse: A fundamental characteristic of meaning making interactions in high school science lessons. *Science Education*, *90*(4), 605–631.

Scriven, M., & Blair, J. A. (2019). Teaching Critical Thinking. *Windsor Studies in Argumentation*.

Scriven, M., & Paul, R. W. (1987). Critical thinking. *The 8th Annual International Conference on Critical Thinking and Education Reform, CA*.

Shim, W., & Walczak, K. (2012). The Impact of Faculty Teaching Practices on the Development of Students' Critical Thinking Skills. *International Journal of Teaching and Learning in Higher Education*, *24*(1), 16–30.

Siegel, H. (1989). The rationality of science, critical thinking, and science education. *Synthese*, *80*(1), 9–41.

Simpson, E., & Courtney, M. (2002). Critical thinking in nursing education: Literature review. *International Journal of Nursing Practice*, *8*, 89–98.

Smith, B. O. (1953). The improvement of critical thinking. *Progressive Education*, *39*(5), 129.

Staib, S. (2018). Teaching and measuring critical thinking. *Journal of Nursing Education*, *42*(11), 498–508. https://doi.org/10.3928/0148-4834-20031101-08

Stapleton, P. (2001). Assessing critical thinking in the writing of Japanese university students: Insights about assumptions and

content familiarity. *Written Communication*, *18*(4), 506–548.

Stein, B. S., & Haynes, A. (2011). Engaging Faculty in the Assessment and Improvement of Students' Critical Thinking Using the Critical Thinking Assessment Test, Change: The Magazine of Higher Learning. *Change: The Magazine of Higher Learning*, *43*(2), 44–49. https://doi.org/10.1080/00091383.2011.550254

Sternberg, R. J. (1986). Critical thinking: Its nature, measurement and improvement. *National Institute of Education, Washington, DC.*, 37.

Stobaugh, R. (2013). *Assessing critical thinking in middle and high schools: Meeting the Common Core*. Routledge.

Super, C. M., & Harkness, S. (1986). The developmental niche: A conceptualization at the interface of child and culture. *International Journal of Behavioral Development*, *9*(4), 545–569. https://doi.org/10.1177/016502548600900409

Swartz, R. J. (1986). Restructuring curriculum for critical thinking. *Educational Leadership*, *43*(8), 43–44.

Takano, Y., & Noda, A. (1993). A temporary decline of thinking ability during foreign language processing. *Journal of Cross-Cultural Psychology*, *24*(4), 445–462.

Tama, C. M. (1989). Critical thinking has a place in every classroom. *Journal of Reading*, *33*(1), 64–65.

Temel, S. (2014). The effects of problem-based learning on pre-service teachers' critical thinking dispositions and perceptions of problem-solving ability. *South African Journal of Education*, *34*(1), 1–20. Retrieved from https://search.proquest.com/docview/1913352170?accountid=16562

ten Dam, G. T. M., & Volman, M. L. L. (2004). Critical thinking as a citizenship competence: teaching strategies. *Learning and Instruction*, *14*(4), 359–379. https://doi.org/10.1016/j.learninstruc.2004.01.005

Thies-Sprinthall, L., & Sprinthall, N. A. (1987). Experienced teachers: Agents for revitalization and renewal as mentors and teacher educators. *Journal of Education*, *169*(1), 65–79.

Thomas, J. W. (1980). Agency and achievement: Self-management and self-regard. *Review of Educational Research*, *50*(2), 213–240.

Thomas, K., & Lok, B. (2015). Teaching Critical Thinking: An Operational Framework. In M. Davies & R. Barnett (Eds.), *The Palgrave Handbook of Critical Thinking in Higher Education* (First, pp. 93–105). New York: Palgrave Macmillan.

Tsui, L. (1999). Courses and instruction affecting critical thinking. *Research in Higer Education*, *40*(2), 185–199.

Uesaka, Y., & Manalo, E. (2014). How communicative learning situations influence students' use of diagrams: focusing on spontaneous diagram construction and protocols during explanation. *International Conference on Theory and Application of Diagrams*, 93–107. Springer.

van Gelder, T. (2001). How to improve critical thinking using educational technology. *Meeting at the Crossroads: Proceedings of the 18th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education*, 539–548. Citeseer.

van Gelder, T. (2015). Using argument mapping to improve critical thinking skills. In M. Davies & R. Barnett (Eds.), *The Palgrave Handbook of Critical Thinking in Higher Education* (First, pp. 183–192). New York: Palgrave Macmillan.

VanderStoep, S. W., & Seifert, C. M. (1994). Learning'how'versus learning'when': Improving transfer of problem-solving principles. *The Journal of the Learning Sciences*, *3*(1), 93–111.

Walsh, D., & Paul, R. W. (1986). *The goal of critical thinking: From educational ideal to educational reality*. Retrieved from https://files.eric.ed.gov/fulltext/ED295916.pdf

Wechsler, S. M., Saiz, C., Rivas, S. F., Vendramini, C. M. M., Almeida, L. S., Mundim, M. C., & Franco, A. (2018). Creative and critical thinking: Independent or overlapping components? *Thinking Skills and Creativity*, *27*(November 2017), 114–122. https://doi.org/10.1016/j.tsc.2017.12.003

Willingham, D. T. (2008). Critical thinking: Why it is so hard to teach? *Arts Education Policy Review*, *109*(4), 21–32.

Wober, M. (1972). Culture and the concept of intelligence: A case in Uganda. *Journal of Cross-Cultural Psychology*.

Woolfolk, A. E. (1998). *Educational psychology*. Boston, MA: Allyn & Bacon.

Woolfolk Hoy, A., Davis, H. A., & Anderman, E. M. (2013). Theories of learning and teaching in TIP. *Theory into Practice*, *52*(sup1), 9–21.

Yang, Y.-T. C., Newby, T., & Bill, R. (2008). Facilitating interactions through structured web-based bulletin boards: A quasi-experimental study on promoting learners' critical thinking skills. *Computers & Education*, *50*(4), 1572–1585.

Yue, M., Zhang, M., Zhang, C., & Jin, C. (2017). The effectiveness of concept mapping on development of critical thinking in nursing education: A systematic review and meta-analysis. *Nurse Education Today*, *52*, 87–94. https://doi.org/10.1016/j.nedt.2017.02.018

Zhang, H., & Lambert, V. (2008). Critical thinking dispositions and learning styles of baccalaureate nursing students from China. *Nursing & Health Sciences*, *10*(3), 175–181.

Zins, J. E., Bloodworth, M. R., Weissberg, R. P., & Walberg, H. J. (2007). The scientific base linking social and emotional learning to school success. *Journal of Educational and Psychological Consultation*, *17*(2–3), 191–210.


LUIGI GIUSSANI
INSTITUTE OF
HIGHER EDUCATION